United Nations
Educational, Scientific and
Cultural Organization

Intergovernmental
Oceanographic
Commission

Technical Series 119

# Transboundary Waters Assessment Programme (TWAP)

## Assessment of Governance Arrangements for the Ocean

## Volume 1 • Large Marine Ecosystems

CERMES UWI
DALHOUSIE UNIVERSITY Inspiring Minds
UNEP
gef
TWAP TRANSBOUNDARY WATERS ASSESSMENT PROGRAMME

**Intergovernmental Oceanographic Commission**

**Technical Series 119**

# Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean

## Volume 1
## Transboundary Large Marine Ecosystems

Lucia Fanning

Robin Mahon

Kimberly Baldwin

Selicia Douglas


**UNESCO 2015**

**Disclaimer**
The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariats of UNESCO and IOC concerning the legal status of any country or territory, or its authorities, or concerning the delimitation of the frontiers of any country or territory.
The authors are responsible for the choice and the presentation of the facts contained in this publication and for the opinions expressed therein, which are not necessarily those of UNESCO and do not commit the Organization.

**For bibliographic purposes, this document should be cited as:** Lucia Fanning[1], Robin Mahon[2], Kimberly Baldwin[2] and Selicia Douglas[1]. 2015. *Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean, Volume 1: Transboundary Large Marine Ecosystems*. IOC-UNESCO, Paris. IOC Technical Series, 119: 80 pp.

[1] Marine Affairs Program, Dalhousie University, Halifax, Nova Scotia, Canada B3H 4JR2

[2] Centre for Resource Management and Environmental Studies (CERMES), University of the West Indies, Cave Hill Campus, St. Michael, Barbados

**Additional information:**

This report is one of three supplementary reports produced by the IOC/UNESCO through the Transboundary Waters Assessment Programme (TWAP), which was supported by the Global Environment Facility. The other reports in this series are: Assessment of Governance Arrangements for the Ocean, Areas Beyond National Jurisdiction (IOC Technical Series 119 Vol 2); and Status and Trends in Primary Productivity and Chlorophyll from 1996 to 2014 in Large Marine Ecosystems and the Western Pacific Warm Pool, Based on Data from Satellite Ocean Colour Sensors (IOC Technical Series 120).

Full results of the LMEs assessment are available at: www.OneSharedOcean.org

Publication Coordinator: Sherry Heileman

Layout: Robin Mahon
Cover: UNESCO

Published in 2015
by United Nations Educational, Scientific
and Cultural Organization
7, Place de Fontenoy, 75352 Paris 07 SP


(IOC/2015/TS/119 Vol.1)

## Preface

This report is an output of the Large Marine Ecosystems component of the Global Environment Facility (GEF) Transboundary Waters Assessment Programme (TWAP)(2013-2015). TWAP conducted indicator-based assessments for transboundary water systems in five categories: aquifers, rivers, lakes, Large Marine Ecosystems (LMEs) and Open Oceans. These included assessment of governance arrangements and overall architecture for transboundary systems. This report covers the arrangements for LMEs, while its companion (Volume 2) covers arrangement for Open Ocean with a focus on Areas Beyond National Jurisdiction (ABNJ). Each report is summarised as a chapter in the overall assessment report for the respective water category (Open Ocean and LME).

The database of agreements that formed the basis of this report is available online as part of the GEOWOW One Shared Ocean initiative. One Shared Ocean, hosted by the IOC-UNESCO International Oceanographic Data and Information Exchange (IODE), will provide a focal access point for ocean scientists and policy makers to retrieve and share data. In the course of preparing this work, a separate assessment was carried out for each transboundary LME. These are compiled into an Annex, which is available as a separate document entitled 'Individual governance architecture assessment for fifty transboundary Large Marine Ecosystems'.

The authors would like to express their thanks and to acknowledge the contributions of those who provided technical assistance and expert judgement in the development of this report. Special thanks to Ms. Katherine Blackman for her assistance with data collection. Thanks also to Stephen Olson and Jakob Granit for their valuable comments of this report. Additional thanks to all of the individual LME experts who were generous with their time and provided feed-back on drafts of the individual LME assessment reports. We are grateful to UNESCO-IOC for the opportunity to carry out this work.

We take this opportunity to let readers know that this report covers primarily the extent to which arrangements are in place and appear to conform to widely accepted governance norms. It does not assess the performance or effectiveness of these arrangements. Assessment of the performance or effectiveness of these arrangements and how these relate to the presence of 'good governance' characteristics should be the next stage of this work.

**Contents** page

## Summary

This report evaluates the structure or architecture of formally-established transboundary governance arrangements that address issues affecting water quality, fisheries, biodiversity and habitat destruction in Large Marine Ecosystems (LMEs). While there are currently 66 LMEs that have been identified globally based on criteria of productivity, trophic relationships, bathymetry and hydrography (Sherman 1994), priority is given in this report to the 50 LMEs shared by more than one coastal country.

Using the TWAP Level 1 Governance Assessment Methodology (Jeftic et al. 2011) , the assessment is conducted by: (1) identifying the list of transboundary issues identified in documents and websites for each LME; (2) exploring the entire set of arrangements present within an LME to determine those addressing the identified issues, their geographic area of competence and the interrelations among them;[1] (3) assessing the level of completeness of each arrangement in each LME; and (4) assessing the degree of integration among them. In addition, analyses were conducted to: (5) assess the level of engagement of each country in each binding and non-binding agreement present in each LME to address the identified transboundary issues; and (6) assess the 'fit' or appropriateness of the arrangements in terms of area of competence to address the identified transboundary issues.

In order to classify transboundary issues identified within the LMEs, a total of 10 different subcategories relating to fisheries, pollution and biodiversity were identified. Of these, 5 subcategories were related to fisheries (highly migratory, within the EEZ, in areas beyond national jurisdiction (ABNJ), in both EEZ and ABNJ and specific species), two to pollution (land-based sources and marine based sources) and three were related to biodiversity (general, specific and habitat). Using these 10 subcategories, a total of 359 transboundary issues were identified in the 50 LMES with some 347 arrangements in place for addressing them. These arrangements comprised a total of 86 binding agreements that required ratification, accession, approval or acceptance by countries eligible to participate in them and 17 non-binding, collaborative agreements. The apparent discrepancy in the number of arrangements and agreements is explained by recognizing that there are cases where the area of competence of a given agreement covers more than one LME.

Three key indicators are used to provide a preliminary assessment of the status of each LME in terms of the ability of the current governance arrangement to address its key transboundary issues:

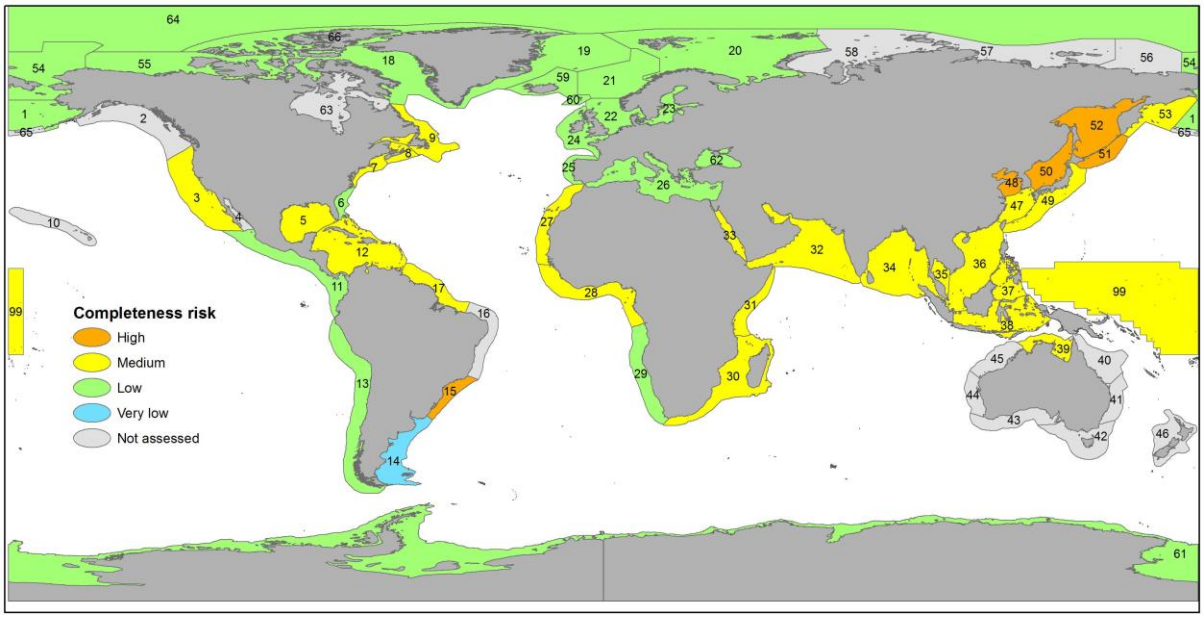
- Level of completeness of the policy cycles for all arrangements addressing identified transboundary issues in an LME;
- Level of integration of organizations involved in arrangements for all transboundary issues in an LME; and,
- Level of engagement of each country in an agreement addressing a given transboundary issue in an LME.

In order to link assessed scores for the three indicators to a perceived level of risk, a five-point score was developed by the LME component of the TWAP-FSP (2013-2015) as provided below:

| Risk level | Completeness Range | Integration Range | Engagement Range |
|---|---|---|---|
| 1 –Very low | 80-100% | 0.80-1.0 | 80-100% |
| 2 - Low | 60-80% | 0.6 -0.8 | 60-80% |
| 3 - Medium | 40-60% | 0.4-0.6 | 40-60% |
| 4 - High | 20-40% | 0.2-0.4 | 20-40% |
| 5 – Very High | 0-20% | 0.0-0.2 | 0-20% |

[1] Data collection covered all available documentation up to March 31, 2014.

**Level of completeness -** The overall comparison of level of completeness with assessed scores and corresponding level of perceived risk for the 50 LMEs is illustrated in the figure below (Figure 6 in the report). The figure illustrates the global distribution with one LME being assessed as having a very low level of risk for completeness, 22 LMEs scoring low level of risk, 22 LMEs scoring medium and five LMEs assessed as having a high level of risk. None of the LMEs were found to have a very high level of risk. The numbers on the map refer to the identification of LMEs by numbers, as provided at http://lme.edc.uri.edu/LMEWeb/downloads/LME66.pdf.




Global distribution of levels of completeness and perceived risk for 50 multi-country LMEs.

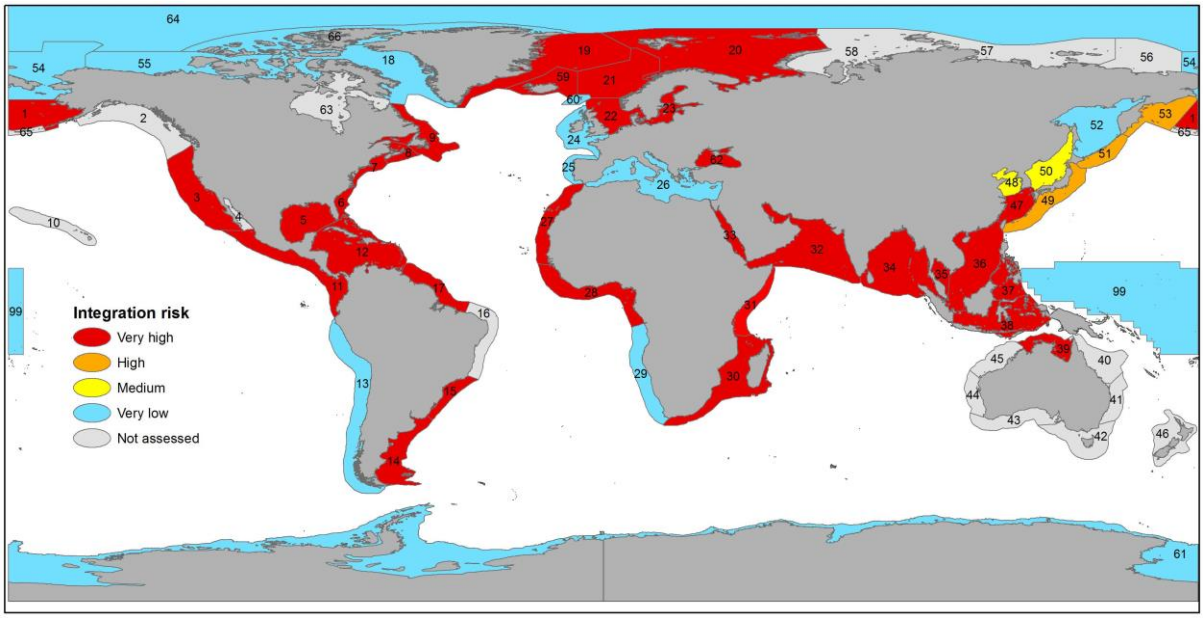
Probing the data further, the analysis revealed the absence of agreements addressing key transboundary issues in 5 of the 13 geographic regions (South-East Atlantic, South-West Atlantic, North Atlantic, North-East Pacific and South-East Asia), pointing to potential areas that may have an even greater priority for intervention in LME-level governance. Furthermore, at the issues level, fisheries arrangements accounted for 38% of the 359 issues and showed the highest level of completeness. Pollution arrangements accounted for 37% of the transboundary issues and had the second highest level of completeness while biodiversity arrangements accounted for 29% and showed the lowest level of completeness.

The analysis of completeness score and risk ranking provides a tool by which LMEs can be monitored over time and as agreements and their arrangements are added or strengthened. The current literature on governance architecture suggests that effort should be made to increase the level of completeness of the policy cycle for any agreement. This is seen as critical as it strengthens and facilitates the flow of valuable data and information into the analysis and advice stage of the cycle which in turn provides the structures that contributes to informed decision-making, implementation and review.

**Level of integration –** An index for the overall level of integration across all of the arrangements within an LME that address the identified transboundary issues was calculated as part of the TWAP Level 1 Governance Assessment Methodology (Jeftic et al. 2011). The integration score for any LME was calculated based on averaging the integration scores for all arrangements in the LME and ranged between 0 and 1. Whenever an overarching arrangement was in place in the LME, the LME received a score of 1. The figure below (Figure 13 taken from the body of the report) shows the assessed integration scores and perceived level of risk for each of the 50 LMEs, based on collaboration across organizations involved in arrangements addressing transboundary issues in each LME. The numbers on the map refer

to the identification of LMEs by numbers, as provided at http://lme.edc.uri.edu/LMEWeb/downloads/LME66.pdf.

The global distribution of LMEs based on integration showed 14 LMEs as having the highest level of integration thereby corresponding to being assessed as having a very low level of risk, two with a medium level, 3 with a high risk ranking and the remaining 31 as having the highest level of risk based on extremely low integration across the organizations in place to address fisheries, biodiversity and pollution issues at the transboundary level.



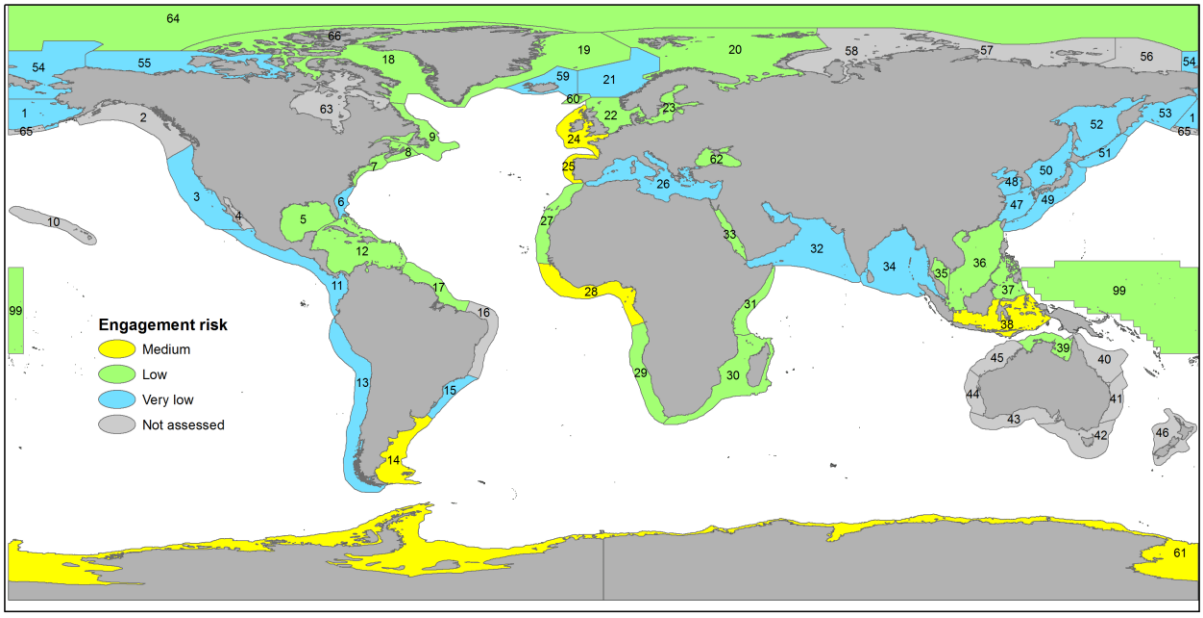

Global distribution of levels of integration and perceived risk for 50 multi-country LMEs

There is no *a priori* criterion for the extent of clustering that would be considered optimal. Nonetheless, the assumption underpinning the scoring was based on an expectation that without considerable attention to linkages and interaction among arrangements, it would be difficult to have the integrated approach within a system that would be needed to achieve EBM. At the other end of the scale, in a system with highly diverse issues, one would not normally expect to find them all covered by the same responsible bodies. In fact, depending on complexity and capability, it may be more effective and flexible for arrangements to have common responsible organizations at policy setting stages, but different responsible organizations at technical and operational policy cycle stages. The results for integration across the LMEs provide some evidence that both scenarios are in play.

**Level of engagement –** The number of eligible countries engaging in relevant agreements addressing identified transboundary issues in a given LME was calculated as a percentage to determine an engagement level across all eligible countries in the LME. Furthermore, the analysis examined whether the nature of the agreement, i.e. binding or non-binding, had any effect on engagement levels by countries. The analysis revealed that fewer LMEs were committing to higher levels of engagement for binding agreements than for non-binding agreements. This may be explained by the higher level of accountability expected for binding agreements as compared to a non-binding agreement.

The figure below (Figure 15 taken from the body of the report) shows both the assessed engagement scores and perceived level of risk. It illustrates that none of the LMEs were assessed to have engagement scores resulting in very high or high risk levels. The numbers on the map refer to the identification of LMEs by numbers, as provided at http://lme.edc.uri.edu/LMEWeb/downloads/LME66.pdf.

Twenty-one LMEs were characterised as having a very high level of engagement corresponding to an assessment of potential risk as being very low. Five LMEs were found to have engagement levels resulting in a potential risk ranking of medium and 24 LMEs were found to have engagement levels resulting in a low ranking of risk.




Global distribution of levels of engagement and perceived risk for 50 multi-country LMEs

Probing the data further, all binding agreements had examples in which none of the countries in a particular LME were engaged, highlighting the need to further assess the reason for the lack of engagement. Furthermore, binding agreements for fisheries, pollution and those that were more of a generic type of agreement (such as the Regional Seas Conventions) had the greatest diversity in levels of engagement, ranging from no engagement by countries in a given agreement for the LME to 100% engagement. Overall, non-binding biodiversity agreements had the highest level of engagement among countries in the relevant LMEs.

The results obtained from the assessment of engagement speaks to the need to understand why there is the sense amongst the drafters of policy instruments that binding agreements are preferred over non-binding ones even in the face of a lower level of engagement by countries. The literature on governance complexity would suggest that rather than generalising that one form of agreement is better over another, a far more effective, albeit demanding, approach is to examine the context specificity of each LME or groupings of LMEs, prior to establishing the nature of agreements set up to address transboundary issues. Such an approach should also be informed by current thinking on governance which highlights the fact that 'governance is more than just government'. It should also include an examination of the cultural, geopolitical and socio-economic factors, among others, that may influence the architecture of governance responses in some LMEs, (e.g. those in South-East Asia and the Caribbean) where the preferred choice seems to follow a more collaborative, networked approach.

The analysis of engagement identified some instances in which countries within an LME were ineligible to participate in an agreement addressing an issue in the LME. This ranged from just a single country in a given LME to as much as 20 countries, depending on the specific agreement. In many of these instances, the explanation was evident, in part due to the sub-LME nature of the agreement. However, it would seem appropriate for efforts to be made to examine the consequences of all such omissions identified in this analysis and if deemed negative, to avoid such situations from occurring by rectifying existing agreements and ensuring new agreements prevent such situations from arising. Where relevant, input from LME-level experts should be sought on this issue.

**Appropriateness or 'fit' of arrangement -** The analysis of 'fit' of areal extent of governance arrangements addressing transboundary issues in the LMEs assessed the degree to which these instruments, and the mechanisms developed to implement them, take LMEs as management units into account. The majority of the arrangements (90%) were deemed to be supra-LME in scope, either inclusive of but extending beyond the boundaries of the LME or covering only a part of the LME while extending to other areas outside of the LME. Furthermore, there were examples at the other end of the spectrum in which agreements were restricted to subregions within LMEs.

In the case of supra-LME agreements, the potential exists for countries outside of a given LME to be able to exercise influence, either directly or indirectly, at a level that is contrary to the needs of those within the LME. This appears to be the case in the Caribbean LME where the needs of the countries in terms of management of 'regional' pelagic species by ICCAT are superseded, if not undermined, by those outside of the region who see little value in addressing these species. This suggests the need for potentially allowing lower level, nested governance mechanisms within these supraregional agreements that would serve the needs of those parties to the agreement at the LME level. Again, this provides a cautionary reminder of the limitations of the 'one size fits all' approach when it comes to dealing with the level of complexity inherent in ocean systems. The challenge associated with 'fit' is also demonstrated at the sub-LME level where only some countries within the LME may be entitled to participating in particular subregional agreements.

Probing the data further, the analysis revealed that pollution agreements were most likely to have areas of competence that exactly matched the areal extent of the LME. The majority of fisheries agreements had areas of competence that were either larger than the LME or offset to include areas outside of the LME. While this can be explained as reflecting the biology and migratory range of the species being addressed in arrangements for highly migratory species, it does not appear to reflect transboundary fisheries issues for species found within a single LME. For the 6% of fisheries arrangements that had areas of competence focusing only on part of the relevant LME, a feasible explanation may be due to the target species being distributed subregionally. No fisheries arrangement was an exact match with an LME.

The observation that the majority of arrangements assessed are larger than and/or offset from LMEs calls for reflection on the role of LMEs in the overall arrangements for governance of the oceans. LMEs appear as a level between national and the large-scale regional clusters described by Mahon et al. (in press). It appears that there may often be a sub-LME level as well, when issues requiring governance involve only a subarea of the LME or a subset of the countries within an LME. Thus for oceans, the scale gradation would be: global>regional cluster> LME>sub-LME> national> local. The relative emphasis on these will vary among regions and will also lead to an emphasis on rationalizing roles and responsibilities as well as linkages within the nested system.

The analysis of the three indicators of completeness, integration and engagement to assess the structure of governance arrangements addressing transboundary issues in LMEs, along with the preliminary assessment of 'fit', is a preliminary step towards understanding:

- the extent to which governance issues are covered (thereby allowing identification of gaps);
- the match between governance arrangements and issues;
- the extent to which arrangements extend outside the LME;
- the extent to which issues are covered by multiple arrangements that could result in conflict; and,
- the extent to which there is integration among arrangements either through existing institutions and organizations or through specific integrating mechanisms.

The analysis is considered preliminary for three main reasons: 1) the number of issues identified are based on available published literature, possibly resulting in some newly emerging issues and even existing issues not being captured in the analysis; 2) it focuses exclusively on formal agreements (binding and non-binding) that are currently in place for addressing these identified transboundary issues in the LMEs; and 3) the data collection process is entirely secondary in nature, based on desk-top research, although efforts are made for expert judgment to inform the findings and conclusions reached.

Nonetheless, this analysis has identified the potential for assessing governance arrangements in LMEs in a number of ways. From a substantive perspective, this assessment appears to be supportive of the conclusion of heterogeneity among LMEs. At the same time, it is suggestive of some aspects of commonality across LMEs, particularly those relating to the level of completeness of policy cycles to facilitate 'good' governance. The level of engagement by countries which affect or are affected by transboundary issues within the LME also appears to be a cross-cutting factor for 'good' governance. However, this indicator may be driven by the binding or non-binding nature of an agreement, the type of issue that the agreement is established to address and the area of competence or 'fit' of the agreement for 'good' governance to be realised.

In addition to its substantive contribution in preliminarily identifying the status of baseline governance indicators across LMEs, the potential of this LME level governance arrangements assessment to inform process may prove to be equally valuable. First, it would be of benefit to determine whether actors involved in addressing these issues at the transboundary level see the potential of the TWAP Level 1 Methodology as providing the context or framework within which a structured discussion about governance arrangements within their LME can take place. Second, by using a common framework and methodology, key actors within each LME can have a more informed perspective of their LME's position relative to other LMEs and to the broader suite of both regional and global governance mechanisms in place for addressing similar issues. This could potentially serve to facilitate learning across relevant LMEs from exposure to both failure and successes in governance processes being used.

In summary, while assessing indicators of governance arrangements are possible and progress can be made towards enhancing these by direct intervention by GEF and other donor agencies, it is essential to reiterate that governance success requires a detailed understanding of the complexity of the system to be governed. Any preliminary conclusion of ranking of any indicator that assigns a potential level of risk for any LME must be seen as simply a flag to determine whether the assessment points to the need for intervention or whether the identified ranking is in fact appropriate for the system. Overall, what we learned is that it is really complex to assess the governance systems of LMEs which are based on an ecosystem management approach rather than being drawn "according to legal, political, or economic facts" (Rothwell and Stephens 2010).

> *The LME approach is the pathway towards sustainable use of marine ecosystems provided the interaction between the various players becomes much stronger amongst the various science sectors and between scientists and stakeholders, the general public and the national and international administration. Partnership and communication are required on all levels and on all geographical scales. What is lacking is not so much the money but rather the political will and the vision of enthusiastic and competent experts on the way to apply the LME concept for the sustainable development of the use and conservation of the marine environment in many parts of the World Ocean.*
>
> *Sherman and Hempel, 2009, p.13*

## 1. Introduction

Large marine ecosystems (LMEs) have been defined as relatively large regions of coastal oceans on the order of 200,000 $km^2$ or greater, characterized by distinct bathymetry, hydrography, productivity and trophically-dependent populations (Sherman 1994). Given the generally higher primary productivity of these marine areas as compared with the open ocean and their close proximity to continental and island land masses, LMEs have been found to account for some 80% of the world's annual fish catch, estimated at some 70 billion dollars (Sherman and Hempel 2009). However, it is also as a result of their proximity to human habitation and associated terrestrial and marine-related economic activity that these large areas of coastal ocean space are being negatively affected by increasing land and marine-based sources of pollution, habitat modification and over-fishing.

Over the past 30 years, the LME concept has been used to investigate the problems affecting the world's coastal marine ecosystems and has had a global impact on how initiatives to address these problems are defined, developed and funded. The concept has focused attention on the world-wide need to address marine ecosystem issues at a geographical scale that is appropriate to major marine biophysical processes (Hennessey and Sutinen 2005, Sherman and Hempel 2009). As such, the LME concept has provided a rallying point for countries to cooperate in dealing with problems relating to the utilization of transboundary resources. It has been supported financially by a number of international and multilateral funding mechanisms such as the Global Environment Fund (GEF).

As of August 2013, sixty-six LMEs have been proposed as ecologically rational units of ocean space in which ecosystem-based management (EBM) can be applied (Figure 1). This attention to LMEs has been underlain by the LME approach which is based on five modules: productivity, fish and fisheries, pollution and ecosystem health, socioeconomics and governance (Sherman 1999, Duda and Sherman 2002). As usually presented, these modules provide a framework for an indicator-based approach to assessing and monitoring LMEs. Some modules have received more attention both in their conceptualization and practical implementation than others, with the socioeconomics and governance module being the least well-developed (Sherman et al. 2005). To address this deficiency, greater focus has been placed in developing mechanisms to assess both socio-economic and governance characteristics of LMEs (Olsen et al. 2006, Fanning et al. 2007, Hoagland and Jin 2008, Mahon et al. 2010, Jeftic et al. 2011).

### 1.1 The GEF IW TWAP and the Large Marine Ecosystem Assessment

The GEF International Waters Programme (GEF-IW) supports projects and other activities aimed at improving the capacity of transboundary water systems to deliver ecosystem goods and services. This programme has been active for over 20 years with considerable investments in these water systems (Duda and Hume 2013). The aim of the GEF-IW Transboundary Waters Assessment Programme Full-size Project (TWAP FSP) (2013-2015) is to produce the first truly global assessment of all five categories of transboundary water systems: (1) aquifers, (2) lake/reservoir basins, (3) river basins, (4) large marine ecosystems, and (5) open ocean. This will be accomplished by applying the methodologies developed during the TWAP Medium-sized Project (2009-2010) (Jeftic et al. 2011). At the same time, TWAP will formalize the network of partners involved in the full-sized project to establish a basis for the conduct of future periodic assessments. A primary purpose of the TWAP FSP (2013-2015) is to assist the Global Environment Facility (GEF) and other international organizations in priority-setting by providing a baseline and priorities for intervention. The main assessment report will provide a baseline for future periodic assessments.

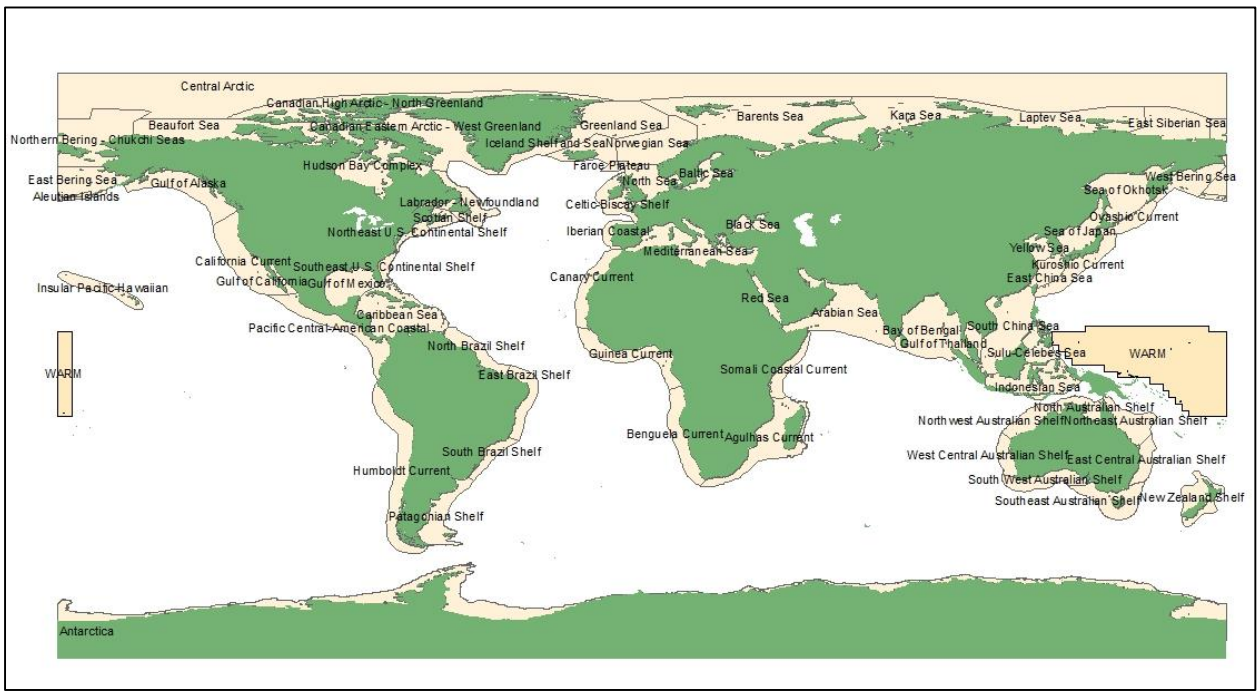



**Figure 1.** Large marine ecosystems of the world

As noted in the introduction, overfishing, habitat destruction and pollution have been identified as among the priority environmental issues in LMEs generally and by GEF LME projects specifically. The overall large marine ecosystems assessment focuses on these themes as well as on socioeconomics and governance. For each theme, a number of indicators and metrics are being used in the global baseline comparative assessment of LME status, future trends and associated drivers, and the consequences for humans.

This component of the TWAP FSP (2013-2015) looks at the assessment of governance at the level of the LME. It recognizes that effective governance is fundamental to achieving healthy ecosystems (inclusive of people), and in this context, has a direct effect on the sustainability of ecosystem goods and services, in addition to other politically negotiated goals. Governance affects what activities people pursue and with what intensity, and if or how value derived from natural systems reaches human communities. As a first step in understanding governance at the LME level, this component of the LME assessment evaluates the formally-established transboundary governance arrangements that are relevant to these key issues: water quality, fisheries, biodiversity and habitat destruction. These transboundary arrangements may occur at a level within the LME, at the level of the entire LME or include all or a part of the LME while extending beyond the boundary of the LME. Arrangements that are unique to a particular country within an LME are not considered in this assessment.

It is important to note that the assessment is intended to look only at transboundary governance arrangements and their associated structure or architecture, defined by Biermann and Pattberg (2012) as the set of commonly-shared principles, institutions and practices that affect decision-making. Due to resources constraints, it does **not** examine the outcome or impacts of decision-making, i.e. the effectiveness of the governance process, important as the assessment of these may be. Further. The study acknowledges that several LMEs have used the GEF International Waters (GEF-IW) transboundary diagnostic analysis (TDA) and strategic action programme (SAP) processes, identified as an innovative approach introduced by the GEF as a global scale framework for prioritizing and implementing ecosystem based governance. While this study recognizes this approach by the GEF in a subset of the LMEs examined, the focus in the TWAP Level 1 governance assessment is on assessing the LMEs

at the level of formally-established transboundary governance arrangements. As such, the analysis does not include SAPs as formal international agreements because they are project outputs with a determinate time-frame. However, it does include assessing any permanent formal outputs of the SAP, such as a transboundary agreement establishing a Commission.

## 1.2 Assessing governance arrangements and effectiveness - where governance structure fits in

The assessment of governance arrangements and their effectiveness is a complex and multifaceted task (Young 2013). One perspective is that it can be broken into three components (Young 1999). The first of these is 'outputs', which are the agreements that are put in place to achieve governance. The second is 'outcomes' which represents changes in the behaviour of people that are the target of the agreement. The third is 'impact' which represents changes in the state of the system that is the target of the agreement. These can be assessed separately, and in sequence, as it is likely that there will be time lags in changes in these components. This perspective is consistent with the formulation of the GEF IW programme approach to evaluation of its projects and intervention, which has been based on three categories of indicators: (1) process indicators, (2) stress reduction indicators and (3) environmental status indicators (Duda 2002).

Mahon and colleagues (2011a) expressed concern that the GEF IW approach is missing four categories of indicators that are critical for the assessment of effective governance for sustainable development. They argued that for the indicator scheme to be in accord with current thinking regarding the objectives for sustainable development, there is the need to include new categories of indicators for participation, social justice and human well-being that are in tandem with those for the environment (Mahon et al. 2011a)(Figure 2). They also argue that there is the need for a category of governance structure or architecture, the assessment of which should precede the assessment of the governance process. This is considered to be particularly important in the case of multilevel, nested systems such as those that are the focus of international environmental governance (Fanning et al. 2007, Biermann 2007). Consistent with this perceived need, this report is primarily concerned with assessing the structural arrangements for governance at the LME level.

## 1.3 Scope of the LME governance assessment

Current research suggests that an understanding of the suite of transboundary arrangements relating to a given LME may provide considerable insight into understanding how best to approach LME-level governance in an integrated and coordinated fashion. To that end, the Terms of Reference (TOR) for the LME governance assessment focused on conducting a governance architecture or structure assessment for each transboundary LME (two or more coastal countries) with an emphasis on those LMEs in which at least one of the coastal countries are GEF-eligible. The TOR indicated that the assessment of the targeted LMEs is to be conducted using the TWAP Level 1 Governance Assessment Methodology (Jeftic et al. 2011, Mahon et al. 2011b). In addition to assessing the 36 multi-country, GEF-eligible LMEs, this analysis also includes the additional 14 multi-country LMEs whose coastal countries are not GEF-eligible.[2] By assessing the current suite of arrangements addressing the key issue areas for each LME included, an assessment of gaps and weaknesses relating to the governance structure for the LME can be obtained.

[2] Given the focus of the governance arrangements assessment for key transboundary issues within a given LME, the analysis does not include the remaining 16 of the world's LMEs that are bordered by a single-country, regardless of their GEF eligibility

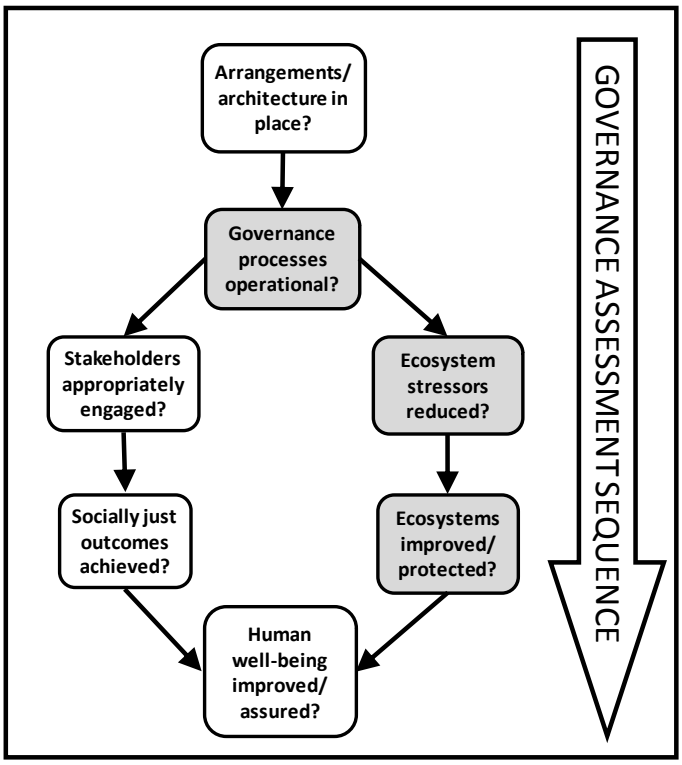



**Figure 2.** The expanded GEF IW indicator framework. The original GEF IW indicator categories (Duda, 2002) are shaded in gray. The additional indicator categories are unshaded. (Source: Mahon et al. 2011a)

This aim is approached by first exploring the entire set of arrangements present within an LME to determine the issues they cover, their geographic area of competence and the interrelations among them.[3] Fanning and colleagues (2007) developed a conceptual model or Large Marine Ecosystem Governance Framework based on nested policy cycles at multiple levels (local to global) with vertical and horizontal linkages providing the basis for interplay. The policy cycles comprised five stages considered to be important for adaptive governance (development and provision of advice, decision-making, implementation, review and generation and management of data and information). For two stages, advice and decision-making, it is considered important that there be the requisite level of capacity at both the policy level and the management/planning or operational level. While for conceptual simplicity the model depicts complete policy processes within levels, the reality is that policy, management planning, and implementation decisions for a particular issue may take place at different levels within the governance system as illustrated by Fanning et al. (2013).

This assessment of governance arrangements for LMEs includes an evaluation of the extent to which the stages of the policy process are in place for each arrangement, i.e. the level of completeness of the policy cycle. This evaluation is based on criteria which are considered to reflect 'good governance'. It must be emphasised that while the presence of policy processes that meet good governance criteria might be expected to result in better outcomes and impacts (the ultimate tests of effective governance), a causal link between good governance processes and effective governance has not been conclusively demonstrated in the literature. The criteria for good governance that are used to evaluate the policy processes for the arrangements are largely based on operational principles, such as transparency, accountability, participation, and efficiency that are considered desirable and appear in the preambles to many multilateral environmental agreements.

[3] Data collection covered the period up to March 31, 2014.

## 2 Methodology

The Transboundary Waters Assessment Programme methodology for governance is part of an overall methodology that is being developed by the TWAP (Jeftic et al. 2011). The objective of TWAP is to develop scientifically credible methodologies for conducting a global assessment of water systems for the five transboundary water categories and to catalyse a partnership and arrangements for conducting such a global assessment. As such, a key outcome of the TWAP Level 1 Governance Assessment methodology is to develop the approach in a way that it can be applied by key stakeholders within the water system as a form of self-assessment.

The Level 1 Governance Assessment evaluates: (1) whether the critical transboundary issues are covered by governance arrangements that have full policy cycles, and (2) the level of integration across the different arrangements in place to address these concerns (Mahon et al. 2011b). It is expected to reveal the extent to which the issues are covered, whether there are gaps or overlaps in coverage and the nature of the arrangements that are in place.

In addition to analyzing LMEs using the TWAP Level 1 governance assessment methodology, two additional analyses relevant to governance architecture were conducted. These were (1) the level of country commitment and buy-in, that is, their level of engagement in agreements pertaining to issues within the LME and (2) the assessment of the 'fit' of each arrangement affecting the LME to the areal extent of the LME. A separate volume is provided containing individual chapters of the desk-top research documentation on the assessment for the four types of analyses for each of the 50 LMEs analysed for this report.[4] All four types of analysis contribute to an increased understanding of how the structure of governance arrangements can contribute to enhancing the goal of improving overall human well-being (Figure 2).

### 2.1 Terminology

For the purposes of this LME governance arrangements assessment, the following key terms deserve explanation:

- **Agreement** refers to the actual multilateral documentation pertaining to any of the key focus areas of the assessment, namely pollution, fisheries, biodiversity and habitat modification, that has direct relevance to the LME. The term 'agreement' is limited to the content of the actual document outlining the goals, objectives and clauses detailing the terms and conditions of the agreement.

While all agreements used in this analysis are formal documents, some are binding (e.g. International Convention for the Conservation of Atlantic Tunas (ICCAT) while others are non-binding (e.g. the agreement establishing the Caribbean Regional Fisheries Mechanism). Non-binding agreements are indicative of a commitment to collaborate on the part of those signing the agreement.

- **Arrangement** refers to both the formal documentation and the institutional structures that have been put in place to implement an agreement.

On the basis of the above two definitions, all regional agreements such as regional fisheries conventions and Regional Seas Programme conventions are included, as are commissions, secretariats and coordinating bodies established to implement binding and non-binding multilateral agreements. Additionally, all other multilateral agreements that include all or a portion of an LME addressing specific fisheries (such as a particular species), marine-sources of pollution (such as oil spills) and biodiversity arrangements that

[4] Input from knowledgeable experts on as many of the LMEs assessed as is possible within the project timeframe was solicited on the accuracy of the information and to identify any gaps in data collection.

are either general in nature or target the conservation and protection of specific species and their habitat, are included. Global arrangements that cover all LMEs are not included but provide a common context for regional arrangements.

- **'Good' versus 'effective' governance**

This assessment of governance arrangements for LMEs includes an evaluation of the extent to which the stages of the policy process are in place for each arrangement (level of completeness), whether opportunities exist to facilitate ecosystem-based management (level of integration) and whether or not countries are engaging in existing agreements that are put in place to address transboundary issues (level of engagement). This evaluation is based on criteria that are considered to reflect 'good governance'. The criteria for good governance that are used to evaluate the policy processes for the arrangements are largely based on operational principles, such as transparency, accountability, participation, and efficiency that are considered desirable and that appear in the preambles to many multilateral environmental agreements. For example, having clearly specified processes and mechanisms across the different policy cycle stages (e.g. from data and information to analysis and advice to decision making to implementation, to monitoring and evaluation) is seen as likely to improve transparency, accountability, and ease with which stakeholders can engage with the process. Ultimately, these characteristics can be expected to produce better governance results, and are often cited as being desirable characteristics of governance processes, of value in their own right (Lemos and Agrawal, 2006; Lockwood et al. 2010). However, the state of governance research is such that it is not possible to conclude clearly that these characteristics are necessary for governance to be effective. As such, it must be emphasized that while the presence of policy processes that meet good governance criteria might be expected to result in better outcomes and impacts, the ultimate test of effective governance, a causal link between good governance processes and effective governance has not been demonstrated in the literature.

- **Policy Cycle** refers to the iterative process by which decision making is undertaken (Fanning et al. 2007). A generalized cycle includes the provision of relevant data and information that is then analyzed and allows advice to be fed to those making decisions. These decisions are then implemented, monitored and then evaluated to determine the level of success in addressing the problem for which the cycle was initiated.

Typically, the decision making process has a policy level stage where policy level advice and decisions are distinct from the operational or management level advice and decisions. As such, the assessment of the completeness of the policy cycle involves assessing seven stages of the policy cycle, two each for policy and operational level analysis and advice, two each for policy and operational level decision making, and a single stage for implementation, monitoring and evaluation and data and information

- **Risk** refers to the perceived level of the LME governance indicator to negatively affect processes leading to 'good' governance.

For this assessment, the three indicators of governance arrangements were assessed based on a percentage score (completeness and engagement indicators) or a decimal score ranging from 0 to 1 (integration). For comparison purposes, these scores were converted to correspond to five categories of risk ranging from very low, low, medium, high to very high. Given the generalized assumptions that the more complete governance processes are, the more countries are actively engaged in participating in agreements to address transboundary issues within the LME and the more integrated organizations involved in implementing these agreements are, the more likely processes that meet good governance criteria will be in place, the risk categories were inversely related to the scores attained. However, while the five risk categories from very high to very low risk were

assigned to assessed scores for each indicator ranging from very low (0-20%) to very high (80-100%), it is important to stress that the assigned risk category does not necessarily correspond to information on the level of degradation of the LME based on the governance arrangements in place. This is because the level of degradation and impact on the state of the LME reflect the performance of governance arrangements and, as has been clearly identified previously in this report, this study does not focus on assessing governance effectiveness but rather the structure or architecture of the governance arrangements to facilitate good governance. As such, caution must be exercised by the reader in ensuring any conclusions reached as a result of the assigned risk category is limited to those regarding good governance criteria and a recognition that governance assessment is necessarily context-driven.

- **Transboundary Issue** refers to an area of concern (e.g. over-exploitation of fish stocks, marine-based pollution or loss of biodiversity) that has been identified and documented as affecting more than one country within a given LME and which should be addressed by a clear and distinct policy process.

## 2.2 Assessment of system governance arrangements

Several steps are required to determine the governance arrangements in place for a particular water system (Table 1). The whole architecture is considered to be greater than the sum of its parts, especially for integration of governance at the transboundary level. This process, as summarized in Table 1, provides a picture of:

- The extent to which transboundary governance issues are covered, thereby allowing for gaps to be identified;
- the match between governance arrangements and issues;
- the extent to which arrangements extend outside the system;
- the extent to which issues are covered by multiple arrangements that could result in conflict; and,
- how well arrangements are clustered or integrated to make the best use of existing institutions and organizations.

The process is used to reduce the governance architecture for each system to a set of scores for completeness of arrangements for transboundary issues (see Table 2). The final outputs of the methodology are two indices (System architecture completeness index and System priority for intervention index). These will be derived from separate assessments of the issue specific arrangements as shown in Table 3. The assessment of completeness of an arrangement for an issue (Table 3) is based upon whether there are organizations with responsibility for the various stages of the policy cycle for that issue.

**Table 1.** Steps required to assess governance architecture in a system to be governed

| Step | Key points |
|---|---|
| Identify system to be governed | Begin with a clear definition of the system to be governed. Geographical boundaries of the system and the countries involved in the transboundary system must be clearly identified. In the case of this assessment for the TWAP, the system to be governed is considered to be the entire LME. |
| Identify issues to be governed | In some IW systems such as LMEs, the issues will already have been identified through a TDA and may have been further explored through Causal Chain Analysis (CCA). Issues may have both a topical and a geographical component. |

| | |
|---|---|
| Identify arrangements for each issue | Determine the extent to which each issue is covered by an identifiable arrangement that is specific to the issue, whether formal or informal. The aim will be to evaluate the extent to which the arrangement comprises a complete policy cycle with the potential to function in three modes (Kooiman 2003): (1) The meta-mode (articulation of principles, visions and goals); (2) the institutional mode (agreed ways of doing things reflected in plans and organizations; and, (3) the operational mode. It also examines the extent to which these modes may operate at different scale levels within the same arrangement, hence the need for linkages within arrangements. |
| Identify clustering of arrangements within institutions | Examine the way that arrangements are clustered for operational purposes and/or share common institutions/organisations at different levels. Similar issues may be covered by similar arrangements. There may be efficiency in clustering these arrangements. Alternatively, clustering may occur at higher levels for policy setting or institutional efficiency, but be separated at lower levels. |
| Identify linkages | Identify actual and desirable linkages within and among arrangements and clusters. |

**Table 2.** LME governance architecture – System summary

| IW category: | | Total number of countries: | System name: | | Region: |
|---|---|---|---|---|---|
| Complete these columns then assess issues using the arrangements tables (Table 4) | | | After completing the arrangements tables, complete these columns | | |
| **Trans-boundary issue[1]** | **Number of countries involved[2]** | **Collective importance for countries involved[3]** | **Completeness of governance arrangement[4]** | **Priority for intervention to improve governance[5]** | **Observations[6]** |
| 1 | | | | | |
| 2 | | | | | |
| …n | | | | | |
| | System architecture completeness index[7] >> | | | | << System priority for intervention index[8] |

**Notes for Table 2**

[1]**Issues:** For the assessment, the following categories of issues have been identified: Fisheries – HMS (highly migratory species), Fisheries – EEZ (within the exclusive economic zone), Fisheries – Specific (addressing specific species other than tunas), Fisheries – ABNJ (areas beyond national jurisdiction other than highly migratory species);Fisheries – EEZ/ABNJ (both within the EEZ and ABNJ); Pollution – MBS (marine-based sources); Pollution – LBS (land-based sources); Biodiversity – Specific (particular species), Biodiversity – General, Biodiversity – Habitat. Ideally, these issues should be identified and quantified in a TDA. If not, other documented sources and experts knowledgeable about the system may have to identify them.

[2]**Number of countries involved:** Indicates how many of the total number of countries are involved in the particular issue.

[3]**Collective importance for countries involved:** This should be based on the TDA but may have to be based on expert judgement, or other sources of regional information. It is to be scored from 0-3.

[4]**Completeness of governance arrangement % (category):** The percentage given in this column is derived from the completeness scores allocated in the arrangement specific Table (see Table 3). This score will then be reallocated into a category where none = 3, low = 2, medium = 1 and high = 0) for input into the Priority for intervention column. The reason for reversing the score is that the higher the completeness, the less the need for intervention.

[5]**Priority for intervention to improve governance**: This priority is calculated as the product of the 'collective priority for countries involved for the issue' and completeness category. It can range from 0-9.

[6]**Observations:** This provides the opportunity for brief comments that may help the user interpret the information provided on the summary page, but is not intended to be a substitute for annotation.

[7]**System architecture completeness:** Average for issues.

[8]**System priority for intervention:** Average for issues.

The approaches to evaluating the arrangements may vary among systems and arrangements, ranging from highly expert judgment-based to being based on extensive desk-top analysis of multilateral agreements, protocols, institutional constitutions and other instruments, supported by sound science and knowledge of stakeholder opinion. This allows for considerable flexibility in approach within each system, but will also mean that the final summaries for the systems will be based on widely ranging degrees of analysis. For this reason, it is important that there be provision in the system for extensive annotation in foot or endnotes, so that the user can understand what went into each analysis.

**Table 3.** LME governance architecture – Summary for individual issue-specific arrangements

| Arrangement: | | Issue: | | | |
|---|---|---|---|---|---|
| **Policy cycle stage (governance function)[1]** | **Responsible organisation or body[2]** | **Scale level or levels[3]** | **Completeness score[4]** | **Other key organisations[5]** | **Observations[6]** |
| Policy analysis and advice | | | | | |
| Policy decision-making | | | | | |
| Planning analysis and advice | | | | | |
| Planning decision-making | | | | | |
| Implementation | | | | | |
| Review and evaluation | | | | | |
| Data and information | | | | | |
| Overall total and % completeness[7] >> | | | | | |

**Notes for Table 3**
[1] **Policy cycle stage**: This column lists the governance functions that are considered to be necessary at two levels (a) the policy setting level and (2) the planning/management level.
[2]**Responsible organisation or body**: Organisation or organisations responsible for the function should be listed here
[3]**Scale level or levels**: These are the institutional scale level or levels at which the function is performed (national, subregional, regional or LME wide level, supra-regional or larger than but inclusive of the LME)
[4]**Completeness:** Rate on a scale of 0 – 3 based on the policy cycle stages scoring criteria (see Table 5)
[5]**Other key organisations:** Identification of other organisations with a shared interest in the issue
[6]**Observations:** This provides the opportunity for brief comments that may help the user interpret the information provided, but is not intended to be a substitute for annotation.
[7]**Overall total and % completeness:** Assume each step is equally important and receives equal weighting. Total possible score is 21.

### 2.2.1 Systems to be assessed

As management units, LMEs cover all of the world's coastal oceans and are designated based on the criteria of bathymetry, hydrography, productivity and trophically-dependent populations. Currently, 66 LMEs have been identified as illustrated in Figure 1. For the purposes of this assessment, the LMEs are categorised according to whether or not they have two or more coastal countries bordering the LME and whether or not at least one of the coastal countries is GEF-eligible[5]. LMEs in which one country had a marine domain of over 99% of the LME were treated as single country LMEs. As shown in Table 4, these four categories comprise: (a) 36 multi-country, GEF-eligible LMEs; (b) 14 multi-country, non-GEF-eligible LMEs; (c) 5 single country GEF-eligible LMEs; and (d) 11 single country non-GEF-eligible LMEs. Based

[5]The identification of GEF Eligible countries was derived from the drop down list of countries on the GEF website (see http://www.thegef.org/gef/gef_projects_funding ). It includes Russia, China and Brazil which both contribute to and receive GEF funds.

on the TOR, the focus of this assessment is on those multi-country LMEs that are in category (a) and category (b).

**Table 4.** Breakdown of LMEs by GEF eligibility and number of countries

| | Include GEF-eligible countries | No GEF-eligible countries |
|---|---|---|
| Multi-country LMEs | 36<br>Agulhas -Somali Current, Arabian Sea, ATSEA-North Australian Shelf, Baltic Sea, Barents Sea, Bay of Bengal, Benguela Current, Black Sea, California Current, Canary Current, Caribbean Sea, Central Arctic Ocean , East Bering Sea, East China Sea, Guinea Current, Gulf of Mexico, Gulf of Thailand, Humboldt Current, Indonesian Sea, Mediterranean, Kuroshio Current, North Bering - Chukchi Sea, North Brazil Shelf, Oyashio Current, Pacific Central American Coastal, Pacific Warm Pool, Patagonian Shelf, Red Sea, Sea of Japan, Sea of Okhotsk, South Brazil Shelf, South China Sea, Southeast U.S. Continental Shelf, Sulu-Celebes Sea, West Bering Sea, Yellow Sea | 14<br>Antarctica, Beaufort Sea, Canadian Eastern Arctic - West Greenland, Canadian High Arctic North Greenland Shelf, Celtic-Biscay Shelf, Faroe Plateau, Greenland Sea, Iberian Coastal, Iceland Shelf, Newfoundland-Labrador Shelf, North Sea, Northeast U.S. Continental Shelf, Norwegian Sea, Scotian Shelf |
| Single Country LMEs | 5<br>East Brazil Shelf, East Siberian Shelf, Gulf of California, Laptev Sea, Kara Sea | 11<br>Aleutian Islands, East Central Australian Shelf, Gulf of Alaska, Hudson Bay Complex, Insular Pacific Islands, New Zealand Shelf, Northeast Australian Shelf, Northwest Australian Shelf, Southeast Australian Shelf, Southwest Australian Shelf, West Central Australian Shelf |

For all LMEs, data on the spatial extent of the area was collected in square kilometres as well as the breakdown of the LME in terms of the percent area covered by High Seas and each coastal country's maritime domain, based on the equidistant EEZ boundaries from marineregions.org . This division of the LME was important to identify not only the extent of the maritime domain of those coastal countries bordering the LME but also to capture those countries with a maritime domain that may not have a coast within the LME area. From a governance structure perspective, this information was considered potentially important as those countries lacking a shoreline within the LME could be potentially marginalized during the development and subsequent implementation of governance arrangements or alternatively, may choose to limit their level of commitment to arrangements affecting all or some of the transboundary issues affecting the well-being of the LME.

### 2.2.2 Identification and categorisation of issues

For each of the 50 multi-country LMEs, a number of sources were reviewed to identify key transboundary issues. Key among these were the relevant individual chapters from the UNEP Regional Seas Report and Studies No. 182, edited by Sherman and Hempel (2009) entitled "The UNEP Large Marine Ecosystem Report: A perspective on changing conditions in LMEs of the world's Regional Seas", GEF documents such as any Project Documents (PRODOCs),

Transboundary Diagnostic Analayses (TDAs), Strategic Action Programmes (SAPs) and project terminal evaluations for those LMEs that have received GEF funding, Global International Waters Assessment (GIWA) regional reports, and LME specific reports. In addition, an array of primary and grey literature, websites and consultation with experts for individual LMEs were used to identify key transboundary issues. References used are provided in the individual reports for the 50 LMEs provided in a separate volume to this report.

In terms of the suite of transboundary issues identified as key areas of concern for LMEs, the following categories and associated subcategories were used to identify issues having direct relevance to pollution, fisheries, biodiversity and habitat modification in a given LME. These included five distinct subcategories for fisheries issues, two distinct subcategories for pollution issues and three distinct subcategories for biodiversity issues.

- Fisheries – HMS (highly migratory species)
- Fisheries – EEZ (within the exclusive economic zone)
- Fisheries –ABNJ – (in areas beyond national jurisdiction)
- Fisheries – EEZ-ABNJ (include both the EEZ and the area beyond national jurisdiction)
- Fisheries – Specific (specifically identified species)
- Pollution – MBS (marine-based sources)
- Pollution – LBS (land-based sources)
- Biodiversity – General
- Biodiversity – Habitat
- Biodiversity – Specific (particular species)

### 2.2.3 Identification of relevant LME arrangements

The approach taken to the assessment was to compile a database of all the transboundary arrangements relating to fisheries, pollution and biodiversity that could be found for the LMEs and to categorise them using the same categories discussed in section 2.1.2 to identify issues of concern. Given the encompassing nature of global arrangements, these were not duplicated for the LME Governance Arrangements Assessment since they were already captured in the similar governance assessment for ocean areas beyond national jurisdiction (ABNJ) and were not specific to any particular LME. Furthermore, any transboundary arrangement whose area of competence covered less than one percent of the LME was not included in the analysis.

Relevant agreements were sought in the literature and on the internet where several databases of international agreements can be found[6]. The process of identifying agreements was similar to that described in the Methodology section for the TWAP report entitled "Assessment of Governance Arrangements for Ocean Areas Beyond National Jurisdiction" (Mahon et al. in press). In fact, the agreements researched for the LME assessment and those for the ocean areas beyond national jurisdiction assessment form a common database. For each of the agreements included in the database, a variety of information was sought and compiled. The first part of each database record includes basic background information on the

[6] e.g., ECOLEX http://www.ecolex.org/start.php , National University of Singapore http://cil.nus.edu.sg/2009/cil-documents-database/ , University of Oslo, Faculty of Law, treaty database http://www.jus.uio.no/english/services/library/treaties/

agreement. The second part of the database record includes information aimed at evaluating the policy process that is intended to give effect to the agreement.

The primary sources for this information were the actual conventions and agreements, rules of procedure for the organizations and secretariats for the agreements, and organizational websites. Other documentation and websites were explored when all the desired information could not be found in these sources. The arrangements database includes those arrangements that were in effect as of March 31, 2014 for the identified transboundary issues. The database is in the form of an Excel spreadsheet with the key information in the cells. Comment boxes are used to record details, such as excerpts from agreements that are considered necessary context for what was included in the table cells.

### 2.2.4 Completeness scoring criteria for policy cycle stages

Scoring criteria were used to assign each identified arrangement relevant to an LME with a score for each of seven policy cycle stages for that agreement: (1) Provision of policy advice, (2), Policy decision-making, (3) Provision of management advice, (4) Management decision-making, (5) Management implementation, (6) Management review, and (7) Data and information management (Table 5).

In this assessment the advisory and decision-making stages of the policy cycle are each considered in two modes -- policy mode and management mode -- making a total of seven stages to be assessed. The provision of each of these policy cycle stages is considered to be an important component of the institutional arrangements needed for good governance (Fanning et al. 2007, Mahon et al. 2013). The scores in each case ranged from 0 to 3 and are intended to reflect the institutional strength of the arrangement for transboundary governance at that particular policy cycle stage. An overall policy cycle completeness score is derived from the sum of scores of the individual stages and expressed as a percentage.

**Table 5.** Scoring Criteria for Policy Cycle Stages for Each Arrangement

| Policy Cycle Stage | Scoring Criteria |
|---|---|
| Advisory mechanism (policy and planning/management) | 0 = No transboundary science policy mechanism, e.g. COP self advises[1]<br>1 = Science-policy interface mechanism unclear - irregular, unsupported by formal documentation<br>2 = Science-policy interface not specified in the agreement, but identifiable as a regular process<br>3 = Science-policy interface clearly specified in the agreement |
| Decision-making (policy and planning/management) | 0 = No decision-making mechanism[2]<br>1 = Decisions are recommendations to countries<br>2 = Decisions are binding with the possibility for countries to opt out of complying<br>3 = Decisions are binding |
| Implementation | 0 = Countries alone<br>1 = Countries supported by secretariat<br>2 = Countries and regional/global level support[3]<br>3 = Implemented through a coordinated regional/global mechanism[4] |
| Review | 0 = No review mechanism<br>1 = Countries review and self-report<br>2 = Agreed review of implementation at regime level<br>3 = Agreed compliance mechanism with repercussions |
| Data and information: | 0 = No DI mechanism<br>1 = Countries provide DI which is used as is<br>2 = DI centrally coordinated, reviewed and shared[5]<br>3 = DI centrally managed and shared |
| **Notes for Table 5**<br>[1]Nothing in documentation indicates a mechanism by which scientific or policy advice is formulated at the transboundary level prior to consideration by decision-making body. | |

[2] This refers to decisions on matters that will have a direct impact on ecosystem pressures or state. It does not refer to mechanisms for making decisions on the organization itself, such as process or organizational structure.
[3] This means support from regional programmes or partner organizations arranged via secretariat
[4] For example a coordinated enforcement system with vessels following a common protocol and flying a common flag identifying them as part of the mechanism, for example the FFA surveillance flag
[5] For both 2 and 3 scores, data are checked for quality and consistency. The difference is that for a score of 3, there is a centralised place where all the data can be found, whether as actual data or metadata.

### 2.2.5 Integration versus an integrating mechanism

The assessment of integration among the arrangement is based on the extent to which issue specific arrangements in a system share a responsible body at various policy cycle levels. This can be determined directly by comparing the arrangements summaries (Table 3). The integration score can thus range from zero where each arrangement has a totally separate set of responsible bodies, to one, where all arrangements share the same responsible bodies at every level. While the methodology provides for an overall level of integration among arrangements in the LME, there is no *a priori* criterion for the extent of clustering that would be considered optimal. However, one would expect that without considerable attention to linkages and interaction among arrangements, a score of zero would make it difficult to have an integrated approach within a system. At the other end of the scale, in a system with highly diverse issues, one would not normally expect to find them all covered by the same responsible bodies. One could posit that it would be desirable to have arrangements share common responsible organizations at policy setting levels, but that having different responsible organizations at technical and operational policy cycle stages could be more effective and even more flexible.

In addition to evaluating the level of clustering or integration among the stages of the policy cycle for the different issue specific arrangements, an assessment was made as to whether there was a demonstrated attempt by the countries in the region to develop and support an overarching integrating mechanism for the issues associated with fisheries, pollution and biodiversity in the LME. If such an integrating mechanism was present, this was noted and an integration score of one was assigned to the LME, regardless of the calculated score across all of the arrangements as it could be argued that the presence of such a mechanism would facilitate an integrated approach within the LME.

## 2.3 Country-level engagement in transboundary agreements

Two variables, the nature of the agreement (in terms of whether it is a non-binding agreement facilitating collaboration or one of a binding nature requiring formal approval by the country) and the level of engagement of member countries in these agreements were considered important aspects of LME governance. The nature of each agreement was obtained by reviewing the text of the agreement. To provide a measure of the actual level of country engagement in each transboundary agreement relevant to a given LME, the status of each country for each agreement was researched and the highest level of engagement possible for each agreement was assessed. For binding agreements, countries that have demonstrated the highest level of engagement possible through ratification, accession, approval or acceptance, were considered to be ‘bound’ by the agreement. For non-binding agreements, countries providing evidence of their intent to fully participate in such agreements were considered ‘committed’ to the agreement.

In some cases, the identification of the engagement status of a country in a particular agreement may reveal a situation in which the country’s lack of involvement was not as a result of a lack of interest but rather a condition arising from the articles of the agreement that prevented it from becoming a member. While this is not expected to be a frequent occurrence,

it was deemed important to distinguish this situation from one in which the country was eligible to be engaged but chose not to do so.

### 2.4 'Fit' of agreements and geographical extent of issues

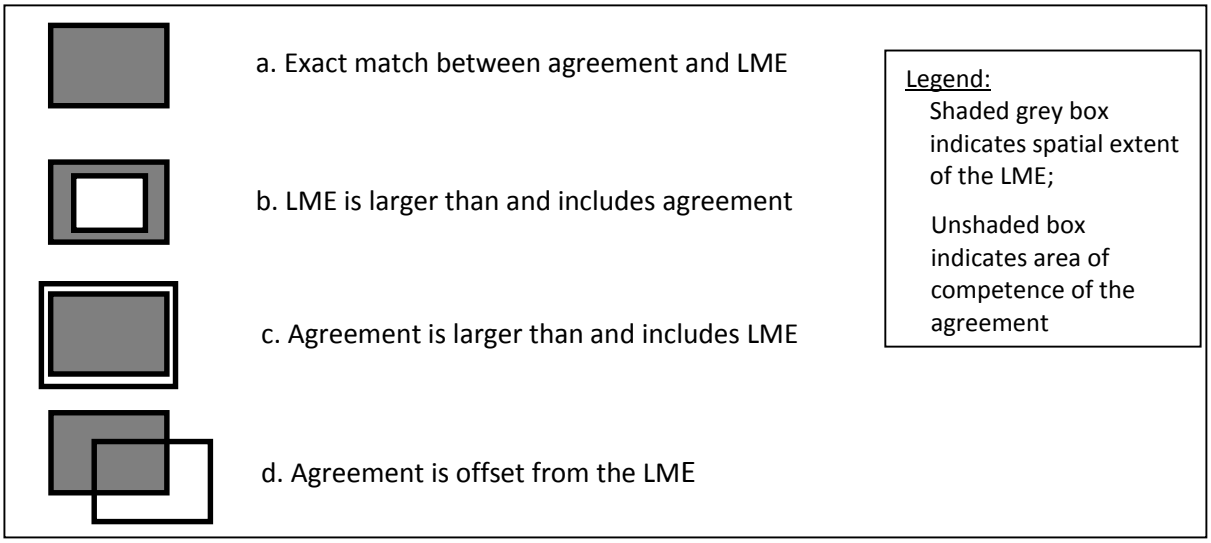
For large scale systems-to-be-governed such as LMEs, the 'fit' of area of competence of the transboundary agreement to the area of the issue is a primary governance architecture concern (Young 2002, Young et al. 2007). This is analysed for the LME governance assessment based on the response to the following question: Given the current assumption that the LME is an appropriate ecological entity for ocean management, how well do the agreements match the LME spatially? In the case of LMEs, this will depend largely on the areas of competence for the agreements.

For each of the agreements identified as relevant to a given issue in a particular LME, shape files are used to calculate the area of overlap between the LME and the agreement. In situations where the area of competence of the agreement covers less than one percent of the LME a decision was made to not include that agreement in the analysis for that LME.

For agreements whose area of competence include more than one percent of the LME, Figure 3 provides a simple summary of the four categories of 'fit' that can be encountered.

In the case of an exact match occurring, the agreement is referred to as 'LME' in scope . When the LME is larger than the agreement, the agreement is referred to as 'sub-LME' in scope. Agreements that extend beyond the geographic area of the LME, to cover similar issues in adjacent areas, as may be the case with some UNEP Regional Seas arrangements or some of the highly migratory fisheries arrangements are referred to as supra-LME. In such situations, there is the need to consider whether the larger agreement has a mechanism to deal with the governance issues at the appropriate lower geographic scale. Finally, an agreement that is offset from the LME, meaning that it cannot fully address it, is a special case of a supra-LME agreement since it extends beyond the boundaries of the LME but does not include the entire LME. The degree of offset can be a significant factor affecting governance. If it results in a missing country that is only a small part of the issue relative to the others, the issue may be well governed without its involvement, but the principle of inclusivity would be compromised. If, on the other hand, it results in one or a number of key countries in the LME being unable to fully participate in an agreement for a key transboundary issue in the LME, the architecture of the agreement may severely compromise governance effectiveness.

**Figure 3.** Range of possible 'fit' between the spatial boundary of the LME and any given agreement



The categories of 'fit' described above are simple governance structure indicators. They can be refined to reflect actual areas involved. This lack of 'fit' has been identified as a frequently occurring problem leading to dysfunctional governance (Young 2002, Young et al. 2007). Identification of a lack of appropriate 'fit' can lead to recommendations on how to remedy the situation if deemed necessary and provide a basis for a discussion of the problem.

### 2.5 Database analysis

The variables that were identified for data collection for this assessment of LME governance architecture that were either numeric or could be categorised were converted into an SPSS database for analysis. This facilitated the preparation of tabular and graphical summaries.

### 2.6 Spatial analyses

GIS shape files representing the area covered by each LME and the majority of identified transboundary agreements were acquired. These shape files were used to estimate the extent of spatial overlap for the regional arrangements. They were also used to develop a web-based interface where users can visually explore the spatial interrelationships among the arrangements, and see the extent of coverage of each LME by the agreements. Three additional areas that are not included in the GIS shape files of LMEs available from NOAA were used in the analysis. For the purposes of TWAP, the WPWP is defined as the WARM ocean province of Longhurst (1998) (Honey and Sherman 2013). Whereas Honey and Sherman (2013) argue that the WPWP is not an LME, GEF documents refer to it as one. For the Agulhas Somali Currents LME (ASCLME), two areas were included in the analysis. The first is the combined areas of these two LMEs, and the second is the more extensive Agulhas Somali Currents management area being used by the project. For the North Australian Shelf LME (NASLME), two areas were also considered, the area of the original LME, and the more extensive area of the Arafura Timor Seas (ATSEA) project.

## 3 Results

As noted above, the analysis for this report on LME Governance Arrangements focused on the 50 multi-country LMEs, their transboundary issues as relating to fisheries, pollution and biodiversity and the suite of governance arrangements currently in place to address these issues. The details of the analysis for each of the 50 LMEs are provided in a separate volume.

### 3.1 System identification and country membership

The identified 50 LMEs are located in 13 georgraphic regions of the globe, comprising some 152 distinct countries and range in membership from 2 to 26 countries (Table 6). In terms of the same country being a member in multiple LMEs, the United States, Denmark and Russia lead by each being members of some 10 different LMEs. The number of LMEs in each region ranged from one, primarily those regions in the Pacific, to 11 in the North Atlantic (East and West).

Although characterised as areas of coastal oceans, all but three of the 50 LMEs analysed include areas of High Seas[7], with the exception of the Gulf of Thailand, Norwegian Sea and the Faroe Plateau. This is potentially significant from a governance arrangements perspective as the high seas are generally governed by a different set of rules from those governing the EEZs of coastal states. Table 6 also indicates the amount of High Seas area for each LME. While more than half of the LMEs have less than 2% of the area as High Seas, 13 of the LMEs

[7] High Seas is the legal term for waters beyond the zones of national jurisdiction: parts of the sea that are not included in the EEZ, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State (UNEP, 2010).

have High Seas covering more than 10% with one, the Central Arctic LME, having 66% of its area as High Seas. In terms of actual area covered, the Pacific Warm Pool has the largest area under high seas with some 2.4 million km$^2$, amounting to approximately 19% of the LME. The potential to develop and support governance mechanisms for pollution, biodiversity and fisheries that consider both high seas and EEZ areas is a topic that warrants further investigation and is identified in the report on governance arrangements in areas beyond national jurisdiction (Mahon et al. in press).

**Table 6.** Breakdown of multi-country LMEs by countries and region

| LME # | LME Name | Region (# of LMEs) | Countries comprising the LME | # of countries | Area of High Seas (km$^2$) (% of LME) |
|---|---|---|---|---|---|
| 1 | East Bering Sea | North Polar Region (10) | Russia, United States | 2 | 171,317 (13.4%) |
| 18 | Canadian Eastern Arctic - West Greenland | | Canada, Denmark | 2 | 27,702 (2%) |
| 19 | Greenland Shelf | | Denmark, Iceland, Norway | 3 | none |
| 20 | Barents Sea | | Denmark, Norway, Russia | 3 | 53,237 (2.9%) |
| 53 | West Bering Sea | | Russia, United States | 2 | 13,314 (1.8%) |
| 54 | Northern Bering – Chukchi Seas | | Russia, United States | 2 | 292,169 (21.9%) |
| 55 | Beaufort Sea | | Canada, United States | 2 | 144,613 (13.4%) |
| 59 | Iceland Shelf | | Denmark, Iceland, Norway | 3 | 1,467 (0.3%) |
| 64 | Central Arctic Ocean | | Canada, Denmark (Greenland), Norway, Russia | 4 | 2,285,594 (66%) |
| 66 | Canadian High Arctic North | | Canada, Denmark | 2 | 20,167 (3.5%) |
| 61 | Antarctica | Antarctic Region (1) | Not applicable | | 12,000 (0.4%) |
| 7 | Northeast U.S. Continental Shelf | North Atlantic (11) | Canada, United States | 2 | 3,410 (1.1%) |
| 8 | Scotian Shelf | | Canada, France | 2 | 2,547 (0.9%) |
| 9 | Newfoundland-Labrador Shelf | | Canada, France | 2 | 113,274 (12.6%) |
| 21 | Norwegian Sea, | | Denmark, Norway, Iceland, United Kingdom | 4 | 230,720 (20.6%) |
| 22 | North Sea | | Belgium, Denmark, France, Germany, Netherlands, Norway, Sweden, United Kingdom | 8 | 1,378 (0.2%) |
| 23 | Baltic Sea | | Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, Sweden | 9 | 2,683 (0.7%) |
| 24 | Celtic-Biscay Shelf | | France, Ireland, United Kingdom | 3 | 26,460 (3.5%) |
| 25 | Iberian Coastal | | France, Portugal, Spain | 3 | 604 (0.2%) |
| 26 | Mediterranean Sea | | Albania, Algeria, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Morocco, Serbia-Montenegro, Slovenia, | 21 | 6,227 (0.2%) |

| LME # | LME Name | Region (# of LMEs) | Countries comprising the LME | # of countries | Area of High Seas ($km^2$) (% of LME) |
|---|---|---|---|---|---|
| | | | Spain, Syria, Tunisia, Turkey, United Kingdom | | |
| 60 | Faroe Plateau | | Denmark, United Kingdom | 2 | none |
| 62 | Black Sea | | Bulgaria, Georgia, Romania, Russia, Turkey, Ukraine | 6 | 575 (0.1%) |
| 5 | Gulf of Mexico | West Central Atlantic (4) | Cuba, Mexico, United States | 3 | 41,639 (2.7%) |
| 6 | South-East US Continental | | Bahamas, United States | 2 | 1,334 (0.5%) |
| 12 | Caribbean Sea | | Antigua and Barbuda, Bahamas, Barbados, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, France, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, Netherlands, Nicaragua, Panama, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, United Kingdom, United States, Venezuela | 26 | 18,249 (0.6%) |
| 17 | North Brazil Shelf | | Barbados, Brazil, France, Guyana, Suriname, Trinidad and Tobago, Venezuela | 7 | 51,724 (4.9%) |
| 27 | Canary Current | South-East Atlantic (3) | Cape Verde, Gambia, Guinea-Bissau, Morocco, Mauritania, Portugal, Senegal, Spain, | 8 | 6,084 (0.5%) |
| 28 | Guinea Current | | Angola, Benin, Cameroon, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Nigeria, Republique du Congo, Sao Tome and Principe, Senegal, Sierra Leone, Togo | 17 | 213,888 (11.1%) |
| 29 | Benguela Current | | Angola, Democratic Republic of the Congo, Namibia, South Africa | 4 | 149,024 (10.2%) |
| 14 | Patagonian Shelf | South-West Atlantic (2) | Argentina, Uruguay, United Kingdom | 3 | 21,126 (1.8%) |
| 15 | South Brazil Shelf | | Brazil, Uruguay | 2 | 2,732 (0.5%) |
| 3 | Californian Current | North-East Pacific (1) | Mexico, United States | 2 | 671,711 (30.3%) |
| 11 | Pacific Central American Coast | East Central Pacific (1) | Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, México, Nicaragua, Panamá, Perú | 10 | 22,888 (1.1%) |
| 13 | Humboldt Current | South-East Pacific (1) | Argentina, Chile, Peru | 3 | 290,359 (11.3%) |
| 48 | Yellow Sea | West Pacific (5) | China, North Korea, South Korea | 3 | 2,827 (06%) |
| 49 | Kuroshio Current | | Japan, Philippines, Taiwan | 3 | 34,000 (2.6%) |
| 50 | Sea of Japan | | Japan, North Korea, Russia, South Korea, | 4 | 378 (<0.1%) |

| LME # | LME Name | Region (# of LMEs) | Countries comprising the LME | # of countries | Area of High Seas ($km^2$) (% of LME) |
|---|---|---|---|---|---|
| 51 | Oyashio Current | | Japan, Russia | 2 | 10,557 (2%) |
| 52 | Sea of Okhotsk | | Japan, Russia | 2 | 38,618 (2.5%) |
| 99 | Pacific Warm Pool | Pacific Islands (1) | Fiji, France, Indonesia, Kiribati, Marshall Islands, Micronesia, Nauru, Tokelau, Palau, Papua-New Guinea, Philippines, Solomon Islands, Tonga, Tuvalu, United States, Vanuatu | 16 | 2,406,982 (18.8%) |
| 35 | Gulf of Thailand | South-East Asia (6) | Cambodia, Malaysia, Thailand, Vietnam | 4 | none |
| 36 | South China Sea | | Brunei-Darussalam, China, Indonesia, Malaysia, Philippines, Singapore, Taiwan, Vietnam | 8 | 40,573 (1.3%) |
| 37 | Sulu-Celebes Sea | | Indonesia, Malaysia, Philippines | 3 | 10,679 (1%) |
| 38 | Indonesian Sea | | Timor-Leste, Indonesia | 2 | 20,705 (0.9%) |
| 39 | North Australian Shelf/Arafura-Timor Seas | | Australia, Indonesia, Papua-New Guinea, Timor-Leste | 4 | 6,444 (0.8%) |
| 47 | East China Sea | | China, Japan, South Korea, Taiwan | 4 | 4,074 (0.5%) |
| 30 | Agulhas-Somali Current | Indian Ocean (4) | Comoro Islands, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, South Africa, Tanzania | 10 | 142,274 (4.1%) |
| 32 | Arabian Sea | | Bahrain, Djibouti, India, Iran, Iraq, Kuwait, Maldives, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, United Arab Emirates, Yemen | 14 | 1,245,574 (31.6%) |
| 33 | Red Sea | | Djibouti, Egypt, Eritrea, Israel, Jordan, Saudi Arabia, Sudan, Yemen | 8 | 3,549 (0.8%) |
| 34 | Bay of Bengal | | Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka, Thailand | 8 | 954,738 (25.9%) |

## 3.2 Issues and arrangements identification

Using the 10 subcategories identified for the 3 categories of transboundary issues (fisheries, pollution and biodiversity), Table 7 provides a breakdown of the total number of issues for all LMEs.

A total of 359 transboundary issues requiring governance arrangements were identified across the 50 LMEs, covering the three categories of issues and their subcategories. Arrangements were in place for 347 issues. The 12 issues not addressed were related to pollution (both marine and land-based) and biodiversity.

Issues relating to both marine-based and land-based sources of pollution were the most prevalent identified for LMEs, with a total of 71 and 61 respectively and were present in all of the LMEs. The number of arrangements addressing these issues was 66 and 56 respectively,

with no identifiable transboundary arrangement for either land-based sources or marine-based sources of pollution in the California Current, Newfoundland and Labrador Shelf, Northeast United States, Scotian Shelf or South Brazil Shelf LMEs.

Each of the five LMEs lacking pollution arrangements has only two coastal countries. For the South Brazil Shelf LME, the Scotian Shelf LME, The Newfoundland and Labrador Shelf LME and the Northeast United States Continental Shelf LME, the majority of the maritime domain in the LME, sometimes as much as 99%, rests with one of the two countries. As such, it may be interpreted that pollution issues are dealt with by this country. This analysis suggests that while no further action may be necessary, the two countries involved should be made aware of this situation. In contrast, the two countries in the California Current LME have an array of non-governmental and multi-partnered organizations that work on pollution issues. While no identifiable transboundary agreement was found to prevent or address land-based or marine-based sources of pollution, the two countries have a long history of working together and in fact, each has an operational plan for mobilizing action to address marine spills once an incident has occurred in each other's EEZ that could potentially threaten the other's maritime and coastal environment.

In terms of transboundary fisheries issues, a total of 137 Issues were identified among the 50 LMEs, with 43 issues relating to highly migratory species (HMS - tunas and tuna-like species) being most prevalent. In total, these HMS issues were covered by five distinct and ratifiable conventions, namely the Convention on the Conservation of Southern Bluefin Tuna (CCSBT), Inter-American Tropical Tuna Convention (IATTC), International Convention for the Conservation of Atlantic Tuna (ICCAT), Indian Ocean Tuna Convention (IOTC) and the Western Central Pacific Tuna Convention (WCPTC). In terms of other fisheries related issues, 36 arrangements addressed EEZ fisheries, 34 were species-specific, 21 were straddling and 3 were concerned with fisheries in areas beyond national jurisdiction.

Some 88 arrangements governing aspects of biodiversity were identified for a total of 90 transboundary issues across the 50 LMEs. Two LMEs, the Canary Current and the East China Sea LMEs had no identifiable transboundary arrangement for addressing biodiversity concerns although they were identified as a transboundary issue for both LMEs. Among the biodiversity issues, 43 were species-specific concerns, 33 were of a general nature and 14 were habitat-related.

In terms of individual LMEs, the Greenland Sea LME led the way with some 13 transboundary issues identified as areas of concern, followed closely by the Barents Sea, Central Arctic Ocean, North Sea and the Bay of Bengal. The major concerns in the five LMEs focused on all three categories of issues, although the subcategory in the fisheries relating to ABNJ was absent in all of them. As well, habitat-specific concerns as a subcategory of biodiversity were absent in all of these LMEs except for the Bay of Bengal. Given the size of high seas in the Central Arctic, the lack of any arrangement for ABNJ fisheries could create a potential area of concern if fisheries activities increase in this region due to climate change effects. Likewise, given the almost one million $km^2$ of high seas in the Bay of Bengal, the absence of arrangements specifically dealing with fisheries in ABNJ, potentially points to a need by the countries in the LME to address this issue. At the other end of the spectrum, the Sea of Okhotsk LME in the West Pacific had only two transboundary issues identified, one each dealing with land-based and marine-based sources of pollution.

**Table 7.** Breakdown of transboundary issues across all multi-country LMEs

| Region | LME | Issue | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Biodiversity | | | Fisheries | | | | | Pollution | | |
| | | General | Habitat | Specific | ABNJ | EEZ | ABNJ-EEZ | HMS | Specific | LBS | MBS | |
| North Polar Region (10 LMEs) | East Bering Sea | 1 | | | | | | 1 | 3 | 1 | 1 | 7 |
| | Canadian Eastern Arctic - West Greenland | 1 | | | | 1 | | 1 | 2 | 1 | 1 | 7 |
| | Greenland Shelf | 2 | | 1 | | 1 | 1 | 1 | 2 | 2 | 3 | 13 |
| | Barents Sea | 2 | | 2 | | | 1 | 1 | 1 | 2 | 2 | 11 |
| | West Bering Sea | 1 | | 1 | | | | | | 1 | 1 | 4 |
| | Northern Bering – Chukchi Seas | 1 | | 1 | | | | | 1 | 1 | 1 | 5 |
| | Beaufort Sea | 1 | | | | | | | | 1 | 1 | 3 |
| | Iceland Shelf | 2 | | | | | 1 | 1 | 2 | 2 | 2 | 10 |
| | Central Arctic Ocean | 2 | | 2 | | | 1 | 1 | 1 | 2 | 2 | 11 |
| | Canadian High Arctic North | 2 | | | | | 1 | 1 | 2 | 2 | 2 | 10 |
| Antarctic | Antarctica | 1 | | 1 | | | 1 | 1 | | 2 | 2 | 8 |
| North Atlantic (11 LMEs) | Northeast U.S. Continental Shelf | | | | | | 1 | 1 | 2 | 1 | 1 | 6 |
| | Scotian Shelf | | | | | 1 | | 1 | 2 | 1 | 1 | 6 |
| | Newfoundland-Labrador Shelf | | | | | | 1 | 1 | 2 | 1 | 1 | 6 |
| | Nowegian Sea | | | | | | 1 | 1 | 2 | 2 | 2 | 8 |
| | North Sea | | | 1 | | 1 | 1 | 1 | 2 | 2 | 3 | 11 |
| | Baltic Sea | 1 | | 1 | | | | | 1 | 1 | 1 | 5 |
| | Celtic-Biscay Shelf | | | 1 | | 1 | 1 | 1 | 2 | 1 | 2 | 9 |
| | Iberian Coastal | | | 1 | | 1 | 1 | 1 | 2 | 1 | 2 | 9 |
| | Mediterranean Sea | 1 | 1 | | | | 1 | 1 | | 1 | 4 | 9 |
| | Faroe Plateau | | | | | | 1 | 1 | 2 | 2 | 2 | 8 |
| | Black Sea | | 1 | 1 | | 1 | | 1 | | 1 | 1 | 6 |
| West Central Atlantic (4 LMEs) | Gulf of Mexico | | 1 | 1 | | 1 | 1 | 1 | | 1 | 1 | 7 |
| | South-East US Continental | | | 1 | | | | 1 | | 1 | 1 | 4 |
| | Caribbean Sea | 1 | | 1 | | 3 | 1 | 1 | | 1 | 1 | 9 |
| | North Brazil Shelf | 1 | | 1 | | 2 | 1 | 1 | | 1 | 1 | 8 |
| South-East Atlantic (3 LMEs) | Canary Current | 2 | | | | 2 | | 1 | | 1 | 1 | 7 |
| | Guinea Current | 1 | | | | 2 | | 1 | | 1 | 1 | 6 |
| | Benguela Current | | 1 | | 1 | 1 | | 1 | | 1 | 1 | 6 |
| South-West Atlantic (2 LMEs) | Patagonian Shelf | | 1 | 1 | | 1 | | 1 | 1 | 1 | 1 | 7 |
| | South Brazil Shelf | | | 1 | | | | 1 | | 1 | 1 | 4 |
| North-East Pacific (1 LME) | Californian Current | | | 1 | | | | 1 | 2 | 1 | 1 | 6 |
| East Central Pacific | Pacific Central American Coast | | 1 | 1 | | 3 | | 1 | | 1 | 2 | 9 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1 LME) | | | | | | | | | | | | |
| South-East Pacific (1 LME) | Humboldt Current | 1 | | 1 | 1 | 1 | | 1 | | 1 | 2 | 8 |
| West Pacific (5 LMEs) | Yellow Sea | 1 | 1 | | | 1 | | | | 1 | 1 | 5 |
| | Kuroshio Current | | | | | | | 1 | | 1 | 1 | 3 |
| | Sea of Japan | 1 | 1 | | | 1 | | | | 1 | 1 | 5 |
| | Oyashio Current | | | | | 1 | | | | 1 | 1 | 3 |
| | Sea of Okhotsk | | | | | | | | | 1 | 1 | 2 |
| Pacific Islands (1 LME) | Pacific Warm Pool | 1 | | | | 1 | | 1 | | 1 | 1 | 5 |
| South-East Asia (6 LMEs) | Gulf of Thailand | | 1 | 1 | | 1 | | 1 | | 1 | 1 | 6 |
| | South China Sea | | 1 | 1 | | | 1 | 1 | | 1 | 1 | 6 |
| | Sulu-Celebes Sea | | 1 | 1 | | 1 | | 1 | | 1 | 1 | 6 |
| | Indonesian Sea | | 1 | 1 | | 1 | | 2 | | 1 | 1 | 7 |
| | North Australian Shelf/Arafura-Timor Seas | 1 | | 1 | | 1 | | 1 | | 1 | 1 | 6 |
| | East China Sea | 1 | | | | 1 | | 1 | | 1 | 1 | 5 |
| Indian Ocean (4 LMEs) | Agulhas-Somali Current | 1 | | 1 | 1 | 1 | | 1 | | 1 | 1 | 7 |
| | Arabian Sea | 2 | | 1 | | 1 | | 1 | | 2 | 2 | 9 |
| | Red Sea | 1 | | 1 | | | | 1 | | 1 | 1 | 5 |
| | Bay of Bengal | | 2 | 1 | | | 2 | 1 | | 2 | 2 | 10 |
| Total # of issues | | 33 | 14 | 43 | 3 | 36 | 21 | 43 | 34 | 61 | 71 | 359 |
| Total # of arrangements in place | | 31 | 14 | 43 | 3 | 36 | 21 | 43 | 34 | 56 | 66 | 347 |

A summary figure showing the frequency distribution of the LMEs by number of issues is provided in Figure 4. This figure illustrates a typical normal distribution with the majority of the LMEs having six, seven or eight transboundary issues relating to fisheries, pollution and biodiversity and their subcategories. It also shows that every LME had at least two identified transboundary areas of concern and one with as many as thirteen.

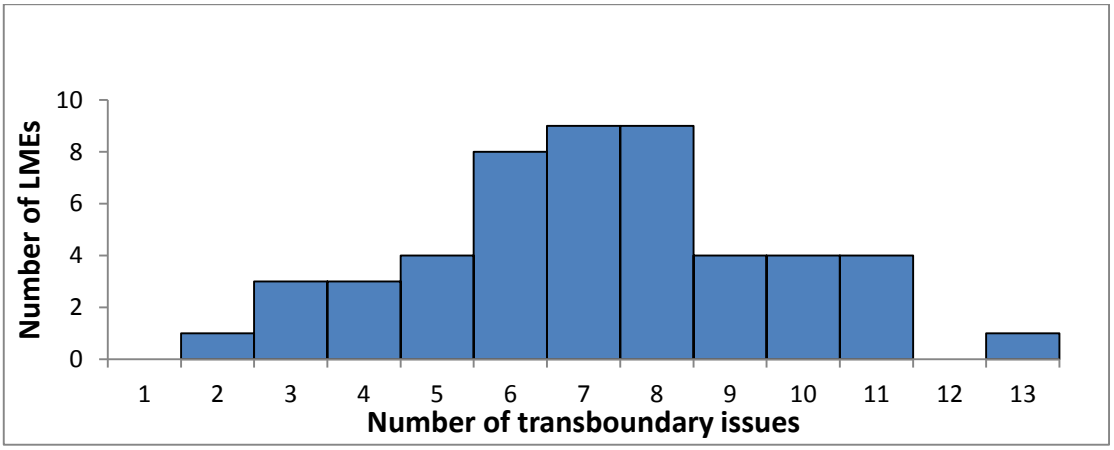



**Figure 4.** Frequency distribution of LMEs by number of transboundary issues

## 3.3 Assessment of arrangements

The assessment of the completeness level of the 347 arrangements in place for governing the 359 transboundary issues across all LMEs was analysed as follows:

- by individual LME

- by issues
- by regions
- by policy cycle stage scores
- by policy cycle stage levels

### 3.3.1 Assessment of completeness at LME level

The governance assessment conducted for each of the 50 LMEs provided an average of the overall level of completeness for all arrangements relevant to the three categories of transboundary issues and their subcategories that were in each LME. The frequency distribution of percent completeness by LMEs is depicted in Figure 5 and ranged from 20% to 90%.

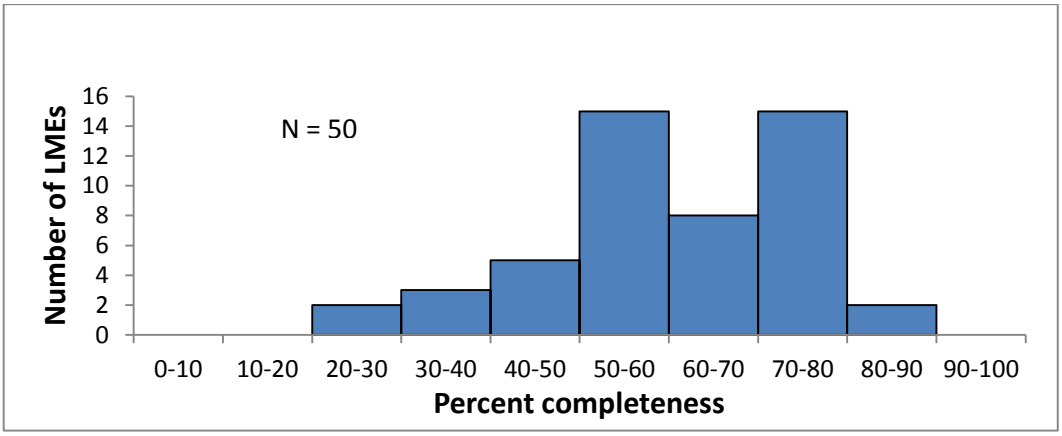



**Figure 5.** Frequency distribution of LMEs by average percent completeness of all arrangements in each LME

Table 8 provides the detailed list of each LME's overall completeness score based on averaging the completeness scores for all arrangements relevant to the transboundary issues for that LME and the perceived risk level associated with the assessed score.

The completeness indicator ranged from 0-100% (lowest level of completeness to highest completeness). The ranking of risk of the LMEs as illustrated in column 5 of Table 8 was based on a five level scale to indicate the potential need for intervention, based on the TWAP Level 1 Governance Assessment methodology and highlights a perceived level of risk:

| Risk level and Ranking | Completeness Indicator Range |
|---|---|
| 1 –Very low (VL) | 80-100% |
| 2 – Low (L) | 60-80% |
| 3 – Medium (M) | 40-60% |
| 4 – High (H) | 20-40% |
| 5 – Very High (VH) | 0-20% |

**Table 8.** Average completeness score and potential risk level for transboundary arrangements in LMEs

| LME # | LME Name | # of Arrangements | Engagement (%) | Ranking of Risk | Level of Risk |
|---|---|---|---|---|---|
| 50 | Sea of Japan | 5 | 30 | H | 4 |
| 51 | Oyashio Current | 3 | 30 | H | 4 |
| 48 | Yellow Sea | 5 | 33 | H | 4 |
| 15 | South Brazil Shelf | 4 | 36 | H | 4 |
| 52 | Sea of Okhotsk | 2 | 38 | H | 4 |
| 47 | East China Sea | 5 | 43 | M | 3 |
| 32 | Arabian Sea | 9 | 45 | M | 3 |
| 27 | Canary Current | 7 | 46 | M | 3 |
| 30 | Agulhas -Somali Current | 7 | 47 | M | 3 |
| 7 | Northeast US Continental Shelf | 6 | 49 | M | 3 |
| 3 | California Current | 6 | 50 | M | 3 |
| 9 | Newfoundland-Labrador Shelf | 6 | 50 | M | 3 |
| 8 | Scotian Shelf | 6 | 50 | M | 3 |
| 36 | South China Sea | 6 | 50 | M | 3 |
| 37 | Sulu-Celebes Sea | 6 | 50 | M | 3 |
| 35 | Gulf of Thailand | 6 | 50 | M | 3 |
| 34 | Bay of Bengal | 10 | 50 | M | 3 |
| 99 | Pacific Warm Pool | 5 | 51 | M | 3 |
| 39 | North Australian Shelf | 6 | 51 | M | 3 |
| 38 | Indonesian Sea | 7 | 52 | M | 3 |
| 33 | Red Sea | 5 | 52 | M | 3 |
| 28 | Guinea Current | 6 | 54 | M | 3 |
| 49 | Kuroshio Current | 3 | 56 | M | 3 |
| 17 | North Brazil Shelf | 8 | 58 | M | 3 |
| 5 | Gulf of Mexico | 7 | 58 | M | 3 |
| 12 | Caribbean Sea | 9 | 60 | M | 3 |
| 53 | West Bering Sea | 4 | 60 | M | 3 |
| 23 | Baltic Sea | 5 | 61 | L | 2 |
| 11 | Pacific Central American Coastal | 9 | 65 | L | 2 |
| 6 | Southeast U.S. Continental Shelf | 4 | 65 | L | 2 |
| 55 | Beaufort Sea | 3 | 67 | L | 2 |
| 13 | Humboldt Current | 8 | 68 | L | 2 |
| 54 | North Bering - Chukchi Sea | 5 | 69 | L | 2 |
| 61 | Antarctica | 8 | 70 | L | 2 |
| 1 | East Bering Sea | 7 | 70 | L | 2 |
| 18 | Canadian Eastern Arctic - West Greenland | 7 | 72 | L | 2 |
| 22 | North Sea | 11 | 73 | L | 2 |
| 64 | Central Arctic Ocean | 11 | 73 | L | 2 |
| 25 | Iberian Coastal | 9 | 74 | L | 2 |
| 24 | Celtic-Biscay Shelf | 9 | 74 | L | 2 |
| 20 | Barents Sea | 11 | 74 | L | 2 |
| 19 | Greenland Sea | 13 | 74 | L | 2 |
| 21 | Norwegian Sea | 8 | 76 | L | 2 |
| 60 | Faroe Plateau | 8 | 77 | L | 2 |
| 62 | Black Sea | 6 | 77 | L | 2 |
| 66 | Canadian High Arctic North Greenland Shelf | 10 | 77 | L | 2 |
| 26 | Mediterranean | 9 | 78 | L | 2 |
| 59 | Iceland Shelf | 10 | 78 | L | 2 |
| 29 | Benguela Current | 6 | 80 | L | 2 |
| 14 | Patagonian Shelf | 7 | 82 | VL | 1 |

As noted earlier in the explanation of terminology, risk, as used in this assessment of completeness, refers to the perceived level of the indicator to negatively affect the practice of good governance, characterised by processes that support such principles as inclusivity, transparency, efficiency, adaptive management, accountability, etc. The interpretation of the assessed level of completeness of the seven stages of the policy cycle for each arrangement in the LME into a perceived level of risk to governance must be limited to one addressing the presence of these characteristics of good governance. The completeness scores and the corresponding inverse risk level cannot be used to inform whether or not the governance arrangements within a given LME are having a direct effect on the achievement of stated outcomes for governance (such as changing behaviour that alters the state of degradation of the LME). This requires the assessment of governance effectiveness which has not been undertaken in this assessment.

An immediate observation from the table is that all of the LMEs in the two polar regions score a low ranking of perceived risk for completeness for all of the arrangements in place in the region to address transboundary areas of concern relating to fisheries, pollution and biodiversity, followed closely by the LMEs in the North Atlantic. Similarly, the table highlights that all of the LMEs in Southeast Asia and the Indian Ocean received a medium ranking. The LMEs with the lowest estimated level of risk due to the completeness assessment was found in the Southwest Atlantic (Patagonian Shelf LME). In contrast, four of five LMEs in the Western Pacific received a low completeness score and hence were assessed as having a high level of risk associated with this indicator.

The overall comparison of level of completeness with assessed scores and corresponding level of perceived risk for the 50 LMEs, identified by LME number, is illustrated in Figure 6. The figure shows the global distribution across the assessed LMEs with one LME being assessed as having a very low level of risk for completeness, 22 LMEs scoring low level of risk, 22 LMEs scoring medium and five LMEs assessed as having a high level of risk. None of the LMEs were found to have a very high level of risk. The overall global average for the completeness score for the 50 LMEs that were assessed was 59%, corresponding to a ranking of Medium, suggesting considerable room for improvement in the design of arrangements in terms of the completeness of the stages of the policy cycle to address key transboundary areas of concern.

### 3.3.2 Assessment of completeness by issues

The level of completeness for the arrangements addressing each of the 359 issues was further analysed based on their ability to address the specific suite of transboundary issues that were identified for the LMEs.

#### *3.3.2.1 The issue category level*

Figure 7 illustrates the range in completeness by number of arrangements at the level of each of three categories of transboundary issues, namely fisheries, pollution and biodiversity. Fisheries arrangements accounted for 137 of the 359 issues and showed the highest level of completeness.

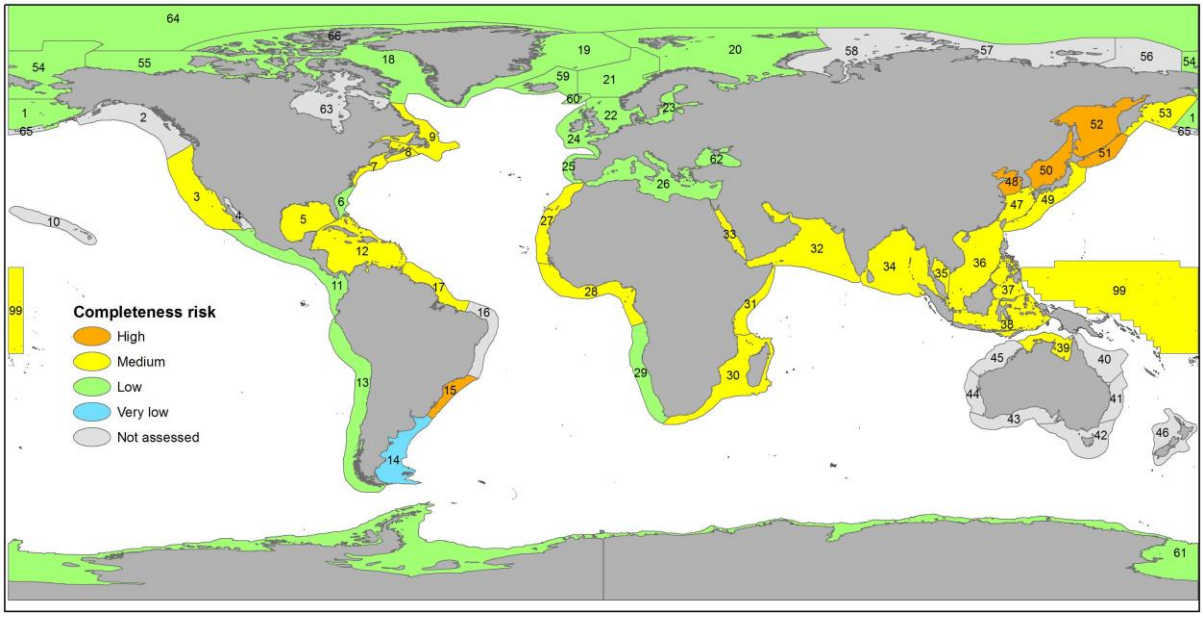



**Figure 6.** Global distribution of levels of completeness and perceived risk for 50 multi-country LMEs.

Arrangements aimed at addressing pollution issues at the transboundary level, regardless of which of the two subcategories they applied to, showed the second highest level of completeness. As mentioned earlier, 5 LMEs accounted for 10 of the 132 pollution issues but had no formal transboundary arrangements in place for addressing them.

As a general observation, the biodiversity related arrangements showed the lowest level of completeness. As was the case for pollution, there were also LMEs with no formal transboundary arrangements in place for addressing general biodiversity concerns. As such, only 88 arrangements were identified for addressing the 90 issues relating to biodiversity in the 50 LMEs.

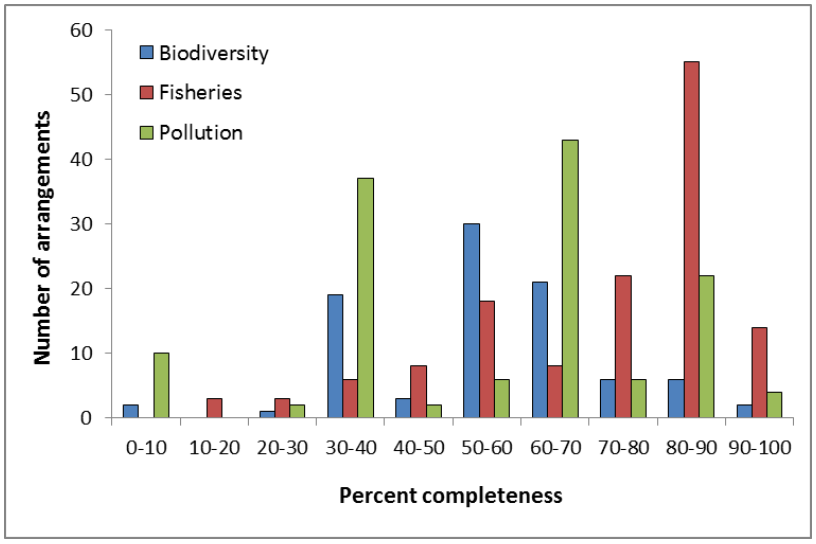



**Figure 7.** Completeness distribution of fisheries, pollution and biodiversity arrangements across all LMEs

### *3.3.2.2 The subcategory level*

The data were further probed to assess whether particular subcategories of the three categories of issues shown in Figure 7 had any influence on the level of completeness found for the arrangement. The results of this analysis are represented by the 'Box and Whiskers' plot in Figure 8. As illustrated by Figure 8, the 43 arrangements relating to the highly migratory species (HMS) subcategory showed the highest level of overall completeness with a range of 67% to 90% and a median of 86%, indicating more than half of the arrangements had a completeness score between 86% and 90%. While the 34 arrangements for the fisheries specific subcategory showed a wider range from 57% to 95%, the median was much lower than for highly migratory species at 66%, indicating a greater range in level of completeness for the agreements in the upper two quartiles. The 36 arrangements relating to transboundary fisheries within the EEZs of countries showed the greatest diversity among all of the fisheries issue subcategories in terms of level of completeness, ranging from 14% to 95%, with a median of 71%.

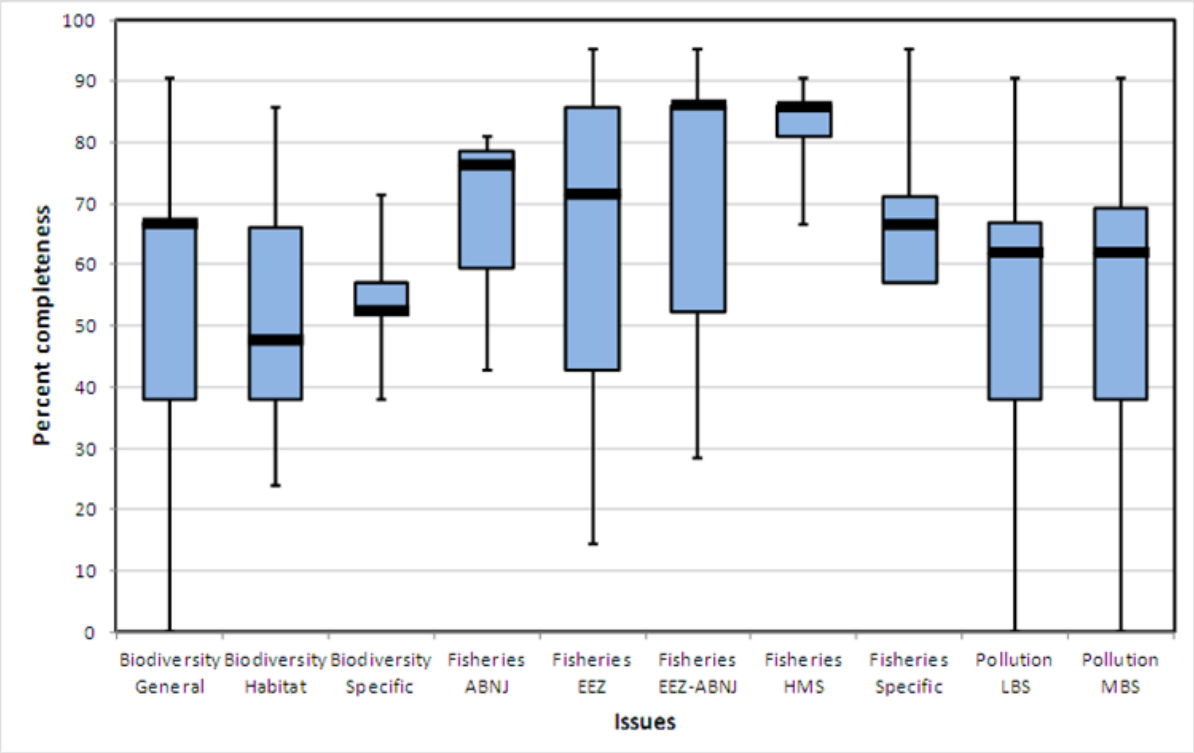



**Figure 8.** 'Box and Whiskers' plot showing range and median of percent completeness of arrangements for each of the 10 subcategories of issues. (The 'whiskers' define the range of completeness level for arrangements in each subcategory while the blue highlighted 'box' shows the median as represented by the black line, separating the second and third quartiles.)

In terms of the arrangements in place for addressing the 71 LBS and 61 MBS pollution agreements, the plot shows a similar spread in overall level of completeness from 0% to 90% as well as between the 2nd and 3rd quartiles for these arrangements. With similar medians as well at 62%, there was essentially no difference in terms of level of completeness of policy cycles for arrangements in place to address land-based sources of pollution as compared to marine-based pollution. The plot also highlights the already mentioned point that there were situations in which no arrangements were present in LMEs to address land-based sources of pollution and marine-based sources of pollution.

In contrast to the pollution arrangements, there are considerable differences among the three biodiversity subcategories (general, habitat and specific). For the 33 general issues,

completeness ranged from 0%-90% with a median of 67%, indicating half of the arrangements had completeness levels between 68% and 90%. For both the habitat and the specific arrangements, the medians were approximately the same at 48% and 52% respectively. However, the range for the 14 habitat arrangements was considerably wider at 24% to 86%, as compared to the range for the 43 specific arrangements between 38% and 71% completeness. A distinctive feature of the specific subcategory was the aggregation of the level of completeness for arrangements in the 2nd and 3rd quartiles around the median. As for pollution, it is also worth noting that the plot highlights situations in which no arrangements were present in LMEs to address biodiversity (general).

### 3.3.3 Assessment of completeness by regions

As with the assessment of completeness by subcategories of issues discussed in section 3.3.2.2, a 'Box and Whiskers' plot was used to assess the level of completeness of arrangements for LMEs within 13 geographic regions (Figure 9). Table 7 in section 3.2 of this report provides the identification of the LMEs in each region as well as the types of issues present in each LME in each region.

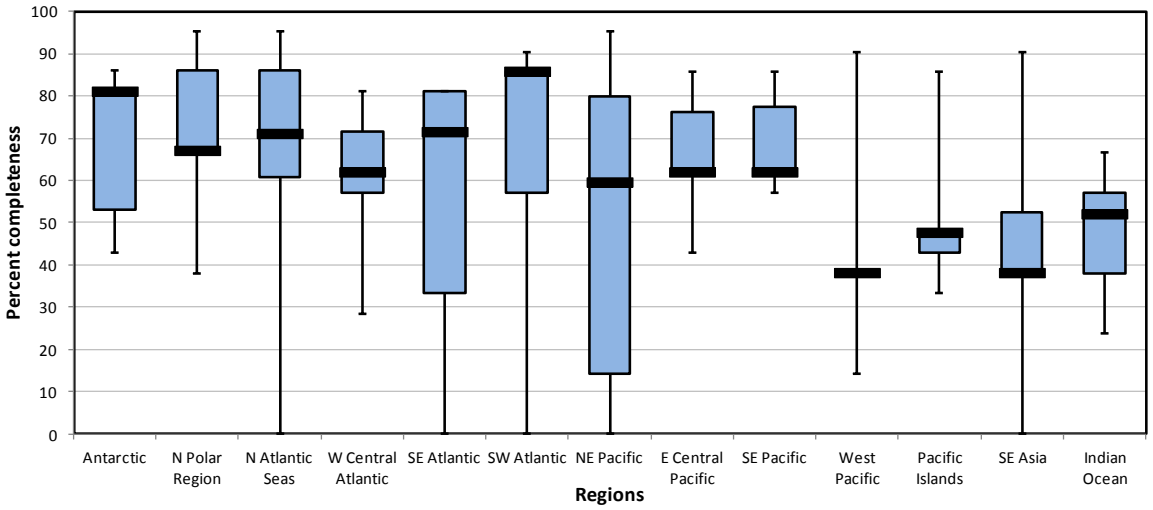



**Figure 9.** 'Box and Whiskers' plot showing range and median of completeness of arrangements in percent for each of the 10 subcategories of issues for LMEs grouped into geographic regions. (The 'whiskers' define the range of completeness level for arrangements in each subcategory while the blue highlighted 'box' shows the median as represented by the black line, separating the second and third quartiles.

A scan of the plot suggests that for arrangements relevant to transboundary issues within the West Pacific and Pacific Islands regions, the level of completeness tends to be similar, with arrangement scores in the 2nd and 3rd quartiles clustering around the median. In contrast, the arrangements relevant to the North-East Pacific and the North Atlantic show the greatest diversity as well as not having arrangements in place to address at least one category of transboundary issues since the completeness range extends 0% to 95%. A similar situation arises for the set of arrangements in the South-East Atlantic with the exception that the highest level of completeness only reaches 81% with limited diversity in the agreement scores in the 3rd and 4th quartile.

Arrangements relevant to the North Polar, East Central Pacific, South-East Pacific and South-East Asia Regions all have scores in the 2nd quartile clustering close to the median with a diversity of scores comprising the 3rd quartile. In contrast, the arrangements in the Antarctic and South-West Atlantic show the reverse with 3rd quartile scores clustering around the median, with a diversity of scores for arrangements in the 2nd quartile.

From a governance assessment perspective, the 'Box and Whiskers' plot highlights the potential priority areas for intervention based on both existing arrangements whose completeness scores indicate a possible need for attention as well as those issue areas that lack arrangements. The absence of arrangements addressing key transboundary issues that were identified in the documentation analyzed were noted in 5 of the 13 geographic regions (South-East Atlantic, South-West Atlantic, North Atlantic, North-East Pacific and South-East Asia), pointing to potential areas that may have an even greater priority for intervention in LME-level governance. It is also important to recognize that there may also be situations where transboundary issues exist but are not documented and as such, the gaps in governance arrangements may be even larger.

### 3.3.4 Assessment of completeness of policy cycle stage scores

The analysis of policy cycle scores by issue shows some differences in strength among the issues (Figures 10a - g). For both the policy and management advice stages (Figures 10a and 10c), the distribution of scores appears similar among issues, although these stages of the policy cycles score a bit higher for fisheries and pollution than for biodiversity. This may be due to the number of regionally-enforced agreements for fisheries and pollution that have a clearly defined science-policy mechanism as compared to biodiversity mechanisms in which the science-policy interface is identifiable but generally not specified in the agreement.

For decision-making (Figures 10b and 10d), fisheries arrangements clearly scored highest, whereas decisions made for pollution are primarily recommendations for contracting parties and biodiversity mechanisms were mostly either recommendations or decisions that contracting parties could choose to opt out of. In contrast, 56% of the fisheries arrangements had no involvement in implementation which is predominantly at the level of contracting parties, scoring the lowest among the three categories of issues for this stage (Figure 10e). However, while biodiversity and pollution arrangements were considerably more likely to have secretariat support (score of 1), in terms of regional level assistance for implementation, fisheries arrangements did score a full 10% more than biodiversity arrangements and 5% more than pollution arrangements, even with the latter's expected assistance from Regional Seas Programmes. The high number of fisheries arrangements with a score of two is attributed to the regional-level support in place for highly migratory and ABNJ species.

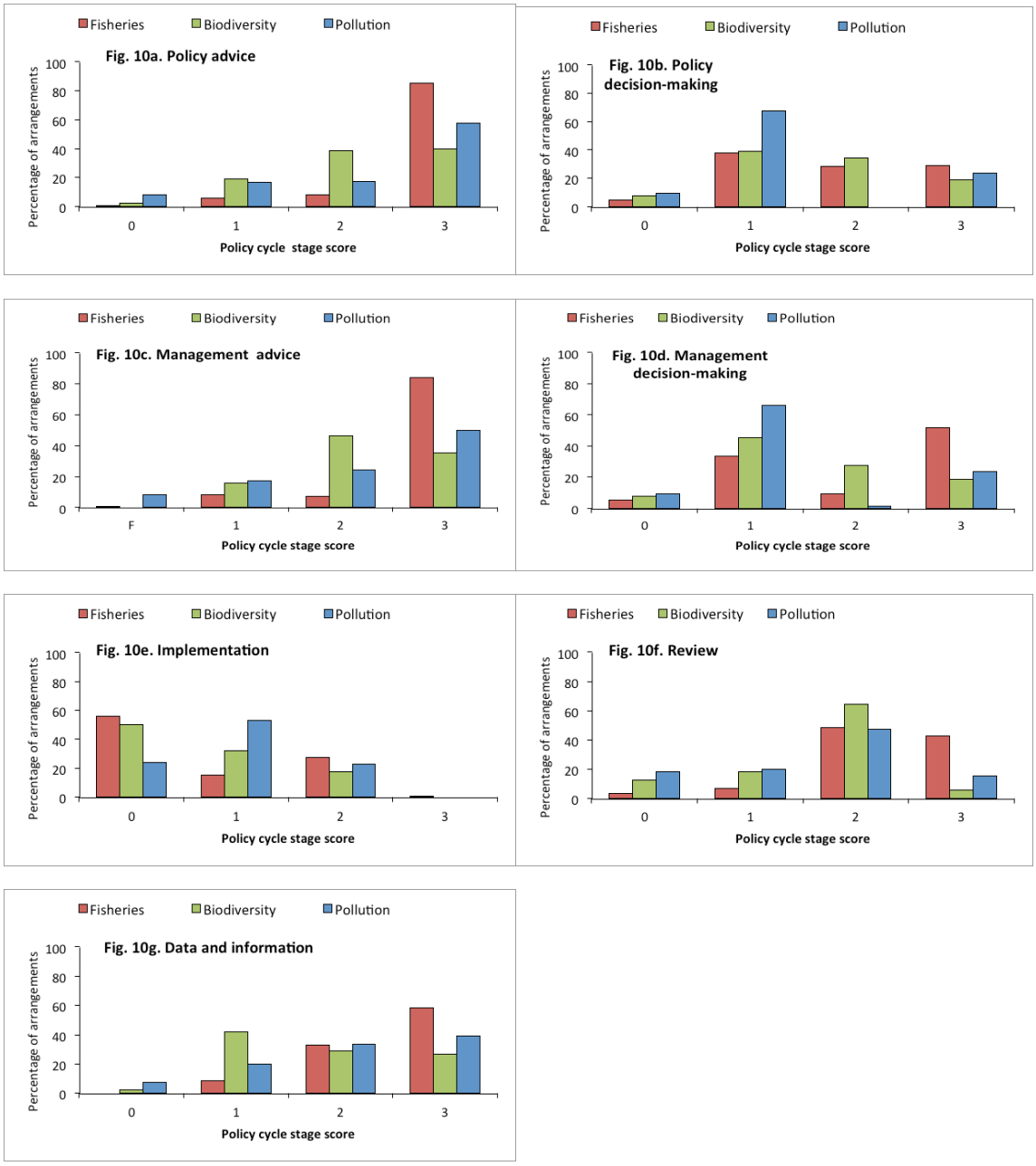



**Figure 10.** The distribution of scores for each of the seven policy cycle stages for arrangements addressing fisheries, pollution, and biodiversity across all LMEs. (See Table5 for the scoring criteria).

The distribution of scores for review mechanisms at the regional level shows that the majority of the arrangements, regardless of issues, have regional review (score of 2) included in the agreements, but few pollution and biodiversity arrangements have review mechanisms with built-in repercussions for non-compliance (score of 3) (Figure 10f). In contrast, almost half of the fisheries agreements specified fisheries data and information mechanisms that included centralised review and checking of the data prior to distribution for use by contracting parties. This allowed for the highest scores to be obtained for these arrangements, probably because for transboundary stocks, there is the need to bring data together into a single dataset if meaningful analysis is to be carried out.

Biodiversity and pollution arrangements displayed the full array of mechanisms from no data and information requirements all the way through to a small fraction of the arrangements

requiring data and information to be centrally collected and managed (Figure 10g). However, national reporting and compilation of national reports to be used without additional quality control at the regional level appeared to predominate among the arrangements for biodiversity issues while the majority of fisheries and pollution agreements focus on regional level review. This is likely due to the accepted inherent transboundary nature of the pollution and fisheries whereas data and information for biodiversity issues, particularly habitat-related, may be perceived as more likely to be dealt with at a national level.

The differences among policy cycle stages and issues shown in Figure 10 are thought to provide insight into where attention should be focussed in order to promote good governance. For fisheries, attention to collaboration in implementation of measures is clearly needed. For pollution the analysis points to the need for strengthening agreement in the area of accountability since few of these arrangements have any repercussions associated with lack of compliance. For biodiversity, the high proportions of agreements show both limited accountability requirements and the lack of regional data and information, posing a serious shortcoming to addressing this issue at the LME level.

### 3.3.5 Assessment of policy cycle stage levels

The analysis conducted to identify the jurisdictional level(s) at which different stages of the policy cycle occur was based on the concept that nesting and interplay are often closely connected with particular stages of the policy cycles. As discussed by Fanning et al. (2013) for the Caribbean LME, linkages within and between different stages of the policy cycle are critical components of an effective marine resource governance system.

This analysis focuses on the seven stages of the policy cycle in which policy level advice and decision-making stages are distinguished from the planning or management level stages of advice and decision-making. It illustrates the current diversity and jurisdictional levels of involvement by organisations at the national, sub-LME (comprising only a portion of the LME), LME-wide and supra-LME (larger than but inclusive of the LME) levels, or any combination thereof[8], at each stage of the policy cycle for all arrangements relevant to the fisheries, biodiversity and pollution transboundary issues in the LMEs (Figures 11a-g).[9]

For both the policy advice stage (Figure 11a) and the planning advice stage (Figure 11c), the levels of institutional involvement of the organizations were very similar. Overwhelmingly, supra-LME and LME level organisations accounted for policy advice and planning advice in almost 90% of all arrangements. However, a noticeable increase from two percent to six percent in the joint participation of national and supra-LME level organizations in providing advice at the planning level was observed. This suggests a possible growing interest in national players to interact with supra-LME organizations at the operational advice stage of the policy cycle for some of the arrangements.

[8] A total of nine combinations were identified by reviewing the arrangements. These were as follows: (i) national; (ii) national and sub-LME levels; (iii) sub-LME level; (iv) national and LME levels; (v) LME level; (vi) national and supra-LME levels; (vii) national, sub-LME and supra-LME levels; (viii) LME and supra-LME levels; (ix) supra-LME level.

[9] While each pie chart in the figure includes all nine combinations of jurisdictional levels in the legend, those with a 0% score were not included.

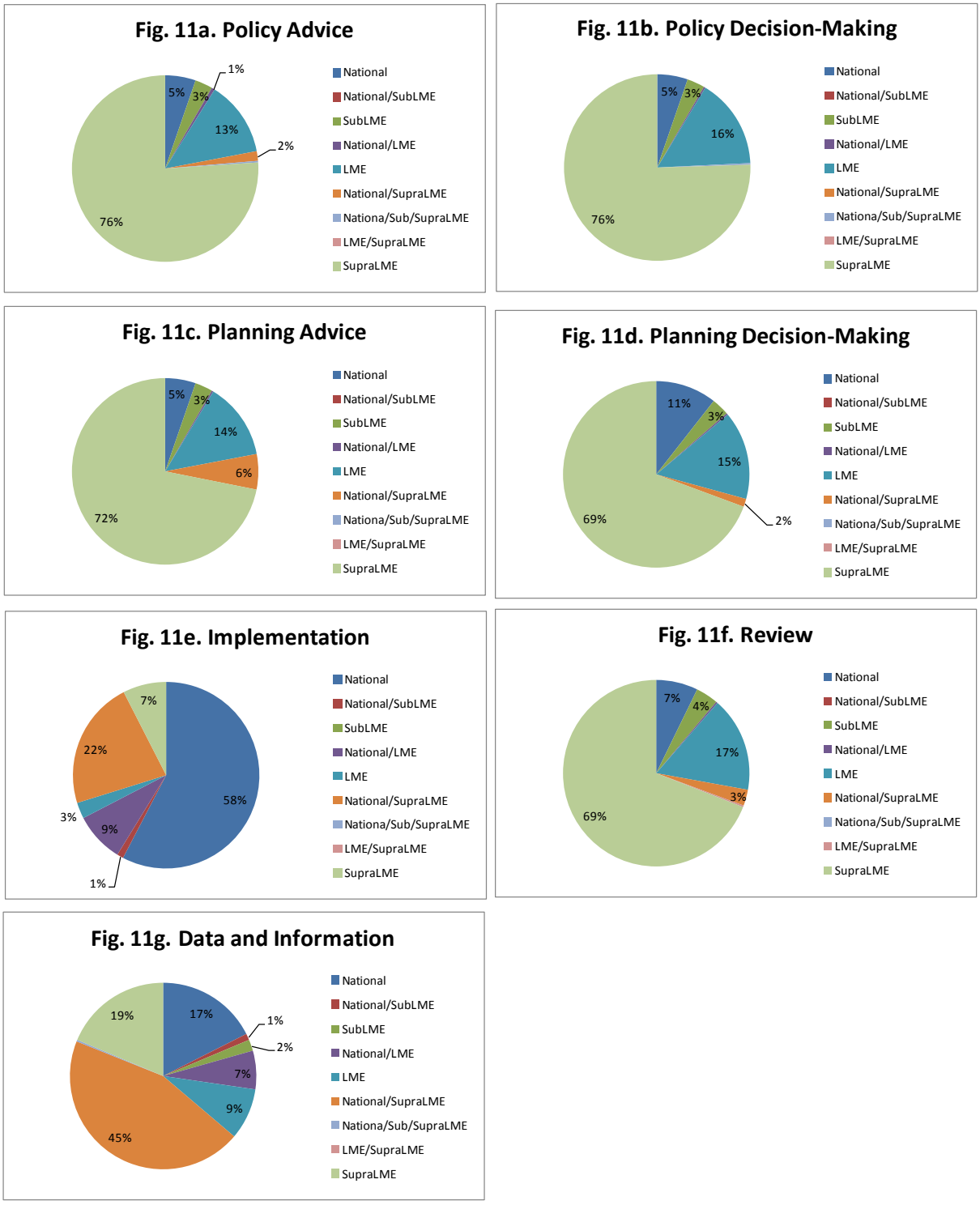



**Figure 11.** Jurisdictional level of organizations involved in the seven stages of the policy cycle for arrangements addressing fisheries, biodiversity and pollution transboundary issues in multi-country LMEs.

In terms of decision-making, a similar pattern of involvement is seen across the institutional levels for both policy level and planning level decisions, with the supra-LME and LME-level organizations taking the lead (Figures 11b and 11d). However, not surprisingly, the percent of involvement of national level institutions in planning type decisions increased to 11% as compared to the 5% involvement at the policy level decision-making stage. This increase is

consistent with the increased level of involvement observed by national players in analysis and advice for planning.

Figure 11e shows the dominance at the national level for organizations involved in implementation across all arrangements identified to address transboundary areas of concern. This is expected but is in stark contrast to the results obtained for the review stage of the policy cycle where the level of involvement drops off to a mere seven percent and organizations at institutional levels above the national level account for 89% of the involvement in the review stage (Figure 11f). This is an interesting finding from a governance perspective as it highlights the importance of a bi-directional, nestedness approach that connects institutions for implementation with those involved in review. In its absence, countries that assume the responsibility for implementation may not be seeing themselves accountable for reviewing how well they are doing in terms of implementation.

For the data and information stage of the policy cycle, all possible combinations of institutional levels are present with the national, LME and supra-LME levels playing the most significant roles (Figure 11g). This is very promising from a governance perspective as it suggests that almost all holders of data and information, irrespective of their institutional level, are contributing to this stage of the policy cycle. It also speaks to the level of integration across institutional levels that have been observed empirically at this stage of the policy cycle. The challenge remains to determine if such cooperation and collaboration across institutional levels are necessary at each stage of the policy cycle and if so, how it can be achieved.

### 3.4 Integration of Governance Arrangements across LMEs

A score for the level of integration across all of the arrangements within an LME that address the identified transboundary issues was arrived at by a two-step process. The integration score for any LME ranged between 0 and 1.0 (Figure 12). The first step was to determine whether there was a demonstrated attempt by the countries in the region to develop and support an overarching integrating mechanism for the issues associated with fisheries, pollution and biodiversity in the LME. If so, the LME was given a score of 1 for integration. If not, the second step was to assess the degree of integration across all of the arrangements within the LME based on the extent to which the arrangements had common responsible organizations.

At the first step, an integration score of 1.0 was given to 14 LMEs in which an integration mechanism could be identified. This was most noticeable for the six LMEs located primarily beyond the Arctic Circle in the North Polar Region where the Arctic Council was assessed as serving the role of an overarching integrated mechanism. It was also noticed in Antarctica, with the Antarctic Treaty System, in the Benguela Current LME with its Commission and the Humboldt Current LMNE in which the Permanent Commission for the South Pacific connects the work of the Lima Convention with that of the living marine resources Convention and its action plan. Integrating mechanisms were also found in the Mediterranean Sea LME with its Mediterranean Commission for Sustainable Development, in the LMEs whose countries are in the European Union and the Pacific Warm Pool with its Pacific Islands Forum and Council of Regional Organisations of the Pacific.

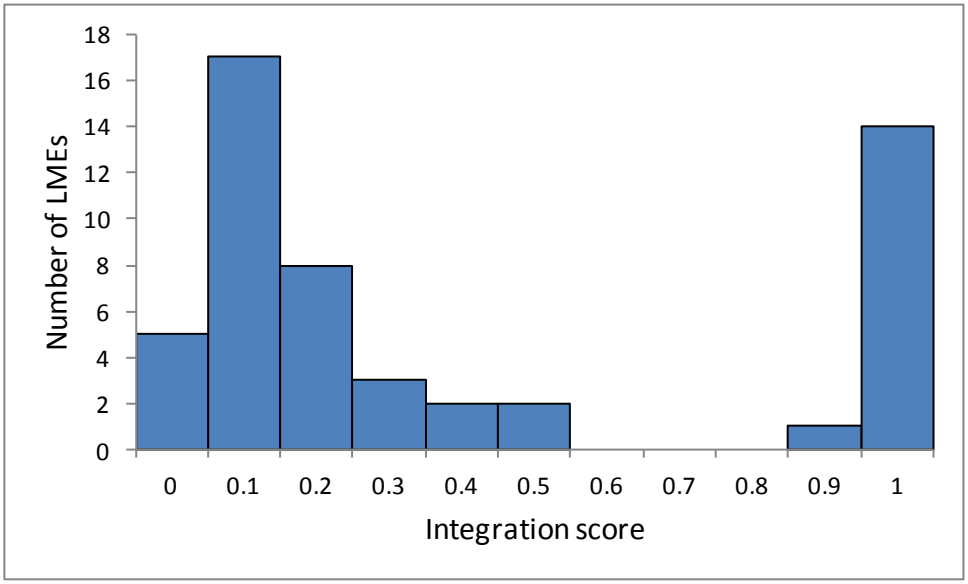



**Figure 12.** Distribution of integration scores across LMEs based on scoring of individual arrangements

Table 9 provides a list of each LME's overall final integration score based on an overarching integrating mechanism being present. The converting of integration scores into a five-category ranking of risk from very low to very high was based on the same assumptions as that made earlier for the completeness indicator. As such, the scores and the corresponding inverse risk level cannot be used to inform on the effectiveness of governance but only whether or not characteristics of good governance, specifically the principles of integration, collaboration and efficiency, were present among the arrangements. The global distribution of LMEs based on integration showed 14 LMEs as being in the highest category of integration, corresponding to being assessed as having a very low level of risk, two with a medium level, three with a high risk ranking and the remaining 31 as having the highest level of risk based on extremely low integration scores across the organizations in place to address fisheries, biodiversity and pollution issues at the transboundary level.

Ranking of the LMEs as illustrated in Table 9 was assessed on a five level scale to indicate the potential need for intervention, based on the TWAP Level 1 Governance Assessment methodology and a perceived level of risk:

| Risk level and Ranking | Integration Indicator Range |
|---|---|
| 1 –Very low (VL) | 0.80-1.0 |
| 2 – Low (L) | 0.6 -0.8 |
| 3 – Medium (M) | 0.4-0.6 |
| 4 – High (H) | 0.2-0.4 |
| 5 – Very High (VH) | 0.0-0.2 |

**Table 9.** Average integration score and potential risk level for transboundary arrangements in LMEs

| LME # | LME Name | # of Arrange-ments | Integration (%) | Ranking of Risk | Level of Risk |
|---|---|---|---|---|---|
| 15 | South Brazil Shelf | 4 | 0 | VH | 5 |
| 7 | Northeast US Continental Shelf | 6 | 0 | VH | 5 |
| 3 | California Current | 6 | 0 | VH | 5 |
| 9 | Newfoundland-Labrador Shelf | 6 | 0 | VH | 5 |
| 8 | Scotian Shelf | 6 | 0 | VH | 5 |
| 47 | East China Sea | 5 | 0.1 | VH | 5 |
| 32 | Arabian Sea | 9 | 0.1 | VH | 5 |
| 30 | Agulhas -Somali Current | 7 | 0.1 | VH | 5 |
| 36 | South China Sea | 6 | 0.1 | VH | 5 |
| 37 | Sulu-Celebes Sea | 6 | 0.1 | VH | 5 |
| 35 | Gulf of Thailand | 6 | 0.1 | VH | 5 |
| 34 | Bay of Bengal | 10 | 0.1 | VH | 5 |
| 39 | North Australian Shelf | 6 | 0.1 | VH | 5 |
| 38 | Indonesian Sea | 7 | 0.1 | VH | 5 |
| 23 | Baltic Sea | 5 | 0.1 | VH | 5 |
| 11 | Pacific Central American Coastal | 9 | 0.1 | VH | 5 |
| 1 | East Bering Sea | 7 | 0.1 | VH | 5 |
| 22 | North Sea | 11 | 0.1 | VH | 5 |
| 20 | Barents Sea | 11 | 0.1 | VH | 5 |
| 19 | Greenland Sea | 13 | 0.1 | VH | 5 |
| 21 | Norwegian Sea | 8 | 0.1 | VH | 5 |
| 62 | Black Sea | 6 | 0.1 | VH | 5 |
| 59 | Iceland Shelf | 10 | 0.1 | VH | 5 |
| 27 | Canary Current | 7 | 0.2 | VH | 5 |
| 33 | Red Sea | 5 | 0.2 | VH | 5 |
| 28 | Guinea Current | 6 | 0.2 | VH | 5 |
| 17 | North Brazil Shelf | 8 | 0.2 | VH | 5 |
| 5 | Gulf of Mexico | 7 | 0.2 | VH | 5 |
| 12 | Caribbean Sea | 9 | 0.2 | VH | 5 |
| 6 | Southeast U.S. Continental Shelf | 4 | 0.2 | VH | 5 |
| 14 | Patagonian Shelf | 7 | 0.2 | VH | 5 |
| 51 | Oyashio Current | 3 | 0.3 | H | 4 |
| 49 | Kuroshio Current | 3 | 0.3 | H | 4 |
| 53 | West Bering Sea | 4 | 0.3 | H | 4 |
| 50 | Sea of Japan | 5 | 0.5 | M | 3 |
| 48 | Yellow Sea | 5 | 0.5 | M | 3 |
| 52 | Sea of Okhotsk | 2 | 0.9 | VL | 1 |
| 99 | Pacific Warm Pool | 5 | 1 | VL | 1 |
| 55 | Beaufort Sea | 3 | 1 | VL | 1 |
| 13 | Humboldt Current | 8 | 1 | VL | 1 |
| 54 | North Bering - Chukchi Sea | 5 | 1 | VL | 1 |
| 61 | Antarctica | 8 | 1 | VL | 1 |
| 18 | Canadian Eastern Arctic - West Greenland | 7 | 1 | VL | 1 |
| 64 | Central Arctic Ocean | 11 | 1 | VL | 1 |
| 25 | Iberian Coastal | 9 | 1 | VL | 1 |
| 24 | Celtic-Biscay Shelf | 9 | 1 | VL | 1 |
| 60 | Faroe Plateau | 8 | 1 | VL | 1 |
| 66 | Canadian High Arctic North Greenland Shelf | 10 | 1 | VL | 1 |
| 26 | Mediterranean | 9 | 1 | VL | 1 |
| 29 | Benguela Current | 6 | 1 | VL | 1 |

Figure 13 shows the global comparison of the assessed integration scores and perceived level of risk for each of the 50 LMEs, based on collaboration across organizations involved in arrangements addressing transboundary issues in each LME.

It is important to stress that the assessment of integration focused on linkages between organizations in place to address agreements relating to transboundary areas of concern. As such, LMEs in which a single country has marine jurisdiction over the majority of the LME and is addressing these concerns at the national level will score low in terms of integration. This suggests that caution must be used in assuming that a very high or high risk ranking necessitates immediate intervention. Rather, its value is in providing a flag to probe the absence of these linkages further so as to understand the context for the assessed integration score.

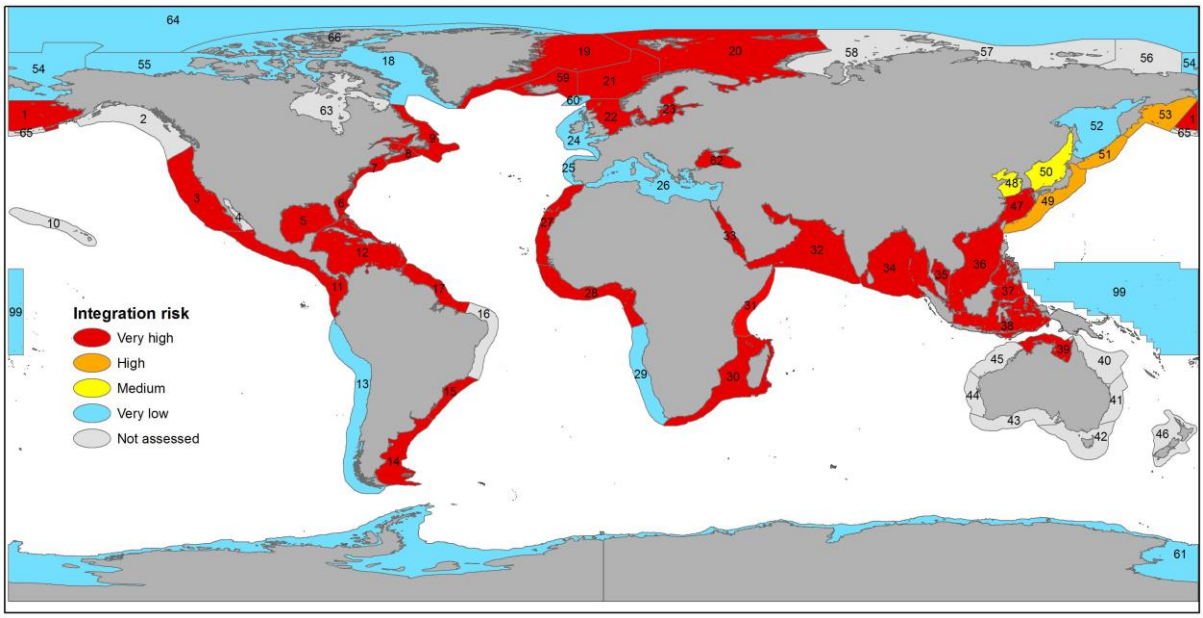



**Figure 13.** Global distribution of levels of integration and perceived risk for 50 multi-country LME

## 3.5 Assessing country engagement in transboundary agreements

The level of country engagement in agreements relevant to transboundary issues in each LME was assessed as an indicator of good governance and specifically addressed principles of inclusivity, participation and accountability. All countries eligible to participate in an agreement were evaluated in terms of whether or not they had committed to the highest level of engagement possible for the agreement. For binding agreements, this included evidence of ratification, accession, acceptance or approval while for non-binding agreements, evidence of a willingness to collaborate and participation in the agreement indicated engagement. Finally, countries in any LME that were not eligible to be part of the agreement were flagged as a possible cause of governance dysfunctionality. Appendix 1 provides a list of all agreements identified as relevant to the transboundary issues identified for each of the 50 LMEs.

### 3.5.1 Overall engagement level in relevant agreements by LMEs

For all 50 LMEs, a total of 103 agreements were identified, comprised of 17 individual non-binding, collaborative agreements and 86 binding agreements (including protocols). The analysis revealed that 32 of the 50 LMEs had both binding and non-binding agreements present, 17 LMEs only had binding agreements in place while one LME only had a non-binding agreement. Recognising that the same agreement may be present in more than one

arrangement, the analysis determined the 17 non-binding agreements to be found in 70 arrangements across 33 LMEs while the 86 binding agreements were identified in 272 arrangements across 49 LMEs.

Figure 14 shows the average percentage engagement by countries in agreements for each of the 50 LMEs, separately for binding and non-binding agreements. The figure illustrates that fewer LMEs are committing to higher levels of engagement for binding agreements than for non-binding agreements. This may be explained by the higher level of accountability expected for binding agreements as compared to a non-binding agreement.

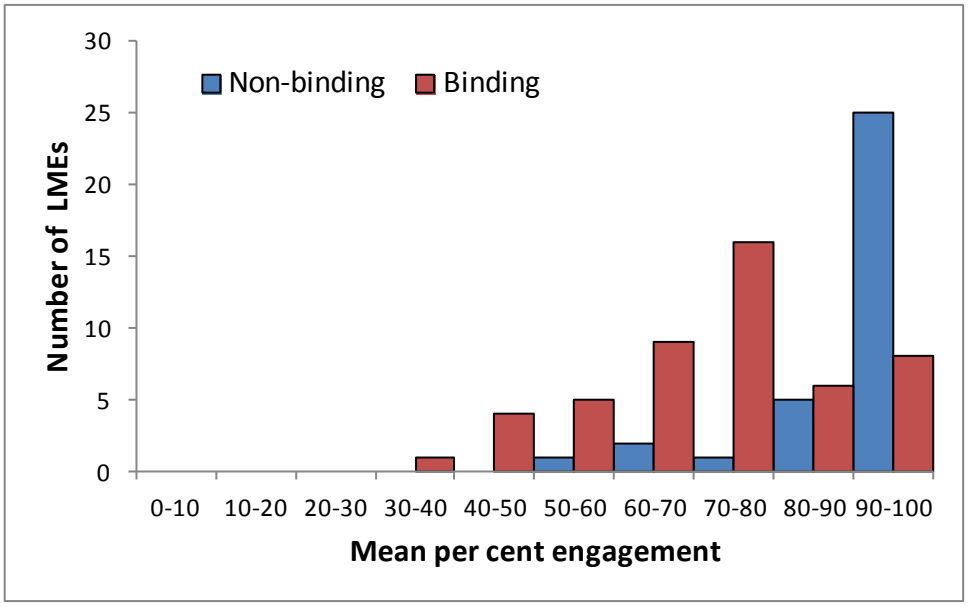



**Figure 14.** Level of overall country engagement in binding and non-binding agreements by number of LMEs.

Table 10 shows the average level of engagement in per cent for each of the 50 LMEs, based on the level of each country's commitment to each relevant agreement in the LME.

The engagement indicator ranged from 0-100% (lowest level of engagement to highest engagement). The converting of integration scores into a five-category ranking of risk from very low to very high was based on the same assumptions as that made earlier for the completeness and integration indicators. As such, the scores and the corresponding inverse risk level cannot be used to inform on the effectiveness of governance but only whether or not characteristics of good governance, specifically the principles of inclusivity, participation and accountability, were present among the arrangements. Ranking of the LMEs as illustrated in column five of Table 10 was based on a five level scale to indicate the potential need for intervention, based on a perceived level of risk:

| Risk Level and Ranking | Engagement Range |
|---|---|
| 1 –Very low | 80-100% |
| 2 – Low | 60-80% |
| 3 - Medium | 40-60% |
| 4 - High | 20-40% |
| 5 – Very High | 0-20% |

**Table 10.** Average engagement score and potential risk level of relevant arrangements for transboundary issues in each LME

| LME # | LME name | Number of arrangements | Engagement score (%) | Risk rank |
|---|---|---|---|---|
| 25 | Iberian Coastal | 9 | 41 | Medium |
| 38 | Indonesian Sea | 7 | 56 | Medium |
| 14 | Patagonian Shelf | 7 | 58 | Medium |
| 61 | Antarctica | 8 | 59 | Medium |
| 24 | Celtic-Biscay Shelf | 9 | 59 | Medium |
| 23 | Baltic Sea | 5 | 61 | Low |
| 22 | North Sea | 11 | 62 | Low |
| 8 | Scotian Shelf | 6 | 63 | Low |
| 9 | Newfoundland-Labrador Shelf | 6 | 63 | Low |
| 99 | Pacific Warm Pool | 5 | 64 | Low |
| 33 | Red Sea | 5 | 65 | Low |
| 36 | South China Sea | 6 | 68 | Low |
| 12 | Caribbean Sea | 9 | 68 | Low |
| 30 | Agulhas-Somali Current | 7 | 69 | Low |
| 37 | Sulu-Celebes Sea | 6 | 71 | Low |
| 29 | Benguela Current | 6 | 71 | Low |
| 60 | Faroe Plateau | 8 | 71 | Low |
| 17 | North Brazil Shelf | 8 | 74 | Low |
| 62 | Black Sea | 6 | 74 | Low |
| 19 | Greenland Shelf | 13 | 75 | Low |
| 20 | Barents Sea | 11 | 75 | Low |
| 66 | Canadian High Arctic North | 10 | 75 | Low |
| 7 | Northeast U.S. Continental Shelf | 6 | 75 | Low |
| 35 | Gulf of Thailand | 6 | 75 | Low |
| 64 | Central Arctic Ocean | 11 | 78 | Low |
| 28 | Guinea Current | 6 | 78 | Low |
| 27 | Canary Current | 7 | 80 | Low |
| 18 | Canadian Eastern Arctic - West Greenland | 7 | 80 | Low |
| 39 | North Australian Shelf/Arafura-Timor Seas | 6 | 80 | Low |
| 6 | South-East US Continental | 4 | 81 | Very low |
| 5 | Gulf of Mexico | 7 | 81 | Very Low |
| 21 | Norwegian Sea, | 8 | 83 | Very Low |
| 47 | East China Sea | 5 | 83 | Very Low |
| 48 | Yellow Sea | 5 | 83 | Very Low |
| 26 | Mediterranean Sea | 9 | 85 | Very Low |
| 11 | Pacific Central American Coast | 9 | 85 | Very Low |
| 32 | Arabian Sea | 9 | 86 | Very Low |
| 34 | Bay of Bengal | 10 | 87 | Very Low |
| 50 | Sea of Japan | 5 | 88 | Very Low |
| 13 | Humboldt Current | 8 | 88 | Very Low |
| 3 | Californian Current | 6 | 89 | Very Low |
| 59 | Iceland Shelf | 10 | 90 | Very Low |
| 1 | East Bering Sea | 7 | 93 | Very Low |
| 54 | Northern Bering – Chukchi Seas | 5 | 100 | Very Low |
| 49 | Kuroshio Current | 3 | 100 | Very Low |
| 53 | West Bering Sea | 4 | 100 | Very Low |
| 55 | Beaufort Sea | 3 | 100 | Very Low |
| 15 | South Brazil Shelf | 4 | 100 | Very Low |
| 51 | Oyashio Current | 3 | 100 | Very Low |
| 52 | Sea of Okhotsk | 2 | 100 | Very Low |

Figure 15 illustrates the global distribution of assessed engagement scores and perceived levels of risk for the 50 LMEs that were evaluated for this report.

Overall, none of the LMEs were assessed to have engagement scored that resulted in an assessment of very high or high risk levels. Twenty-one LMEs were characterised as having a very high level of engagement corresponding to an assessment of potential risk as being

very low. Five LMEs were found to have engagement levels resulting in a potential risk ranking of medium and 24 LMEs were found to have engagement levels resulting in a low ranking of risk.

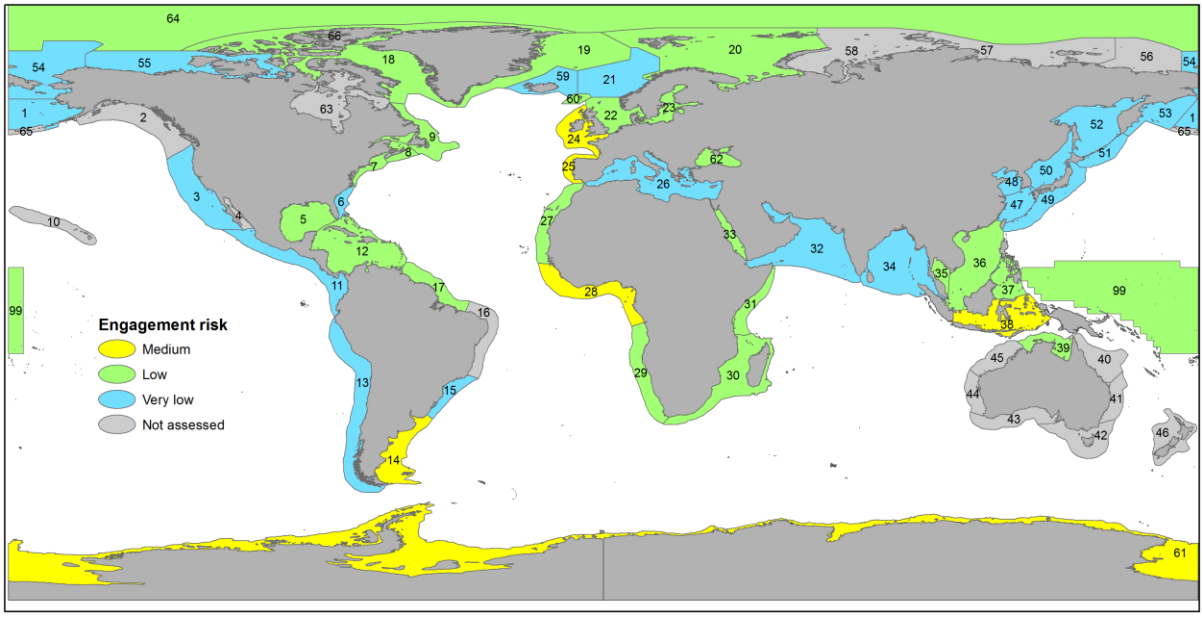



**Figure 15.** Global distribution of levels of engagement and perceived risk for 50 multi-country LMEs

The summary data for engagement by countries in each LME for each of the relevant arrangements, both binding and non-binding, is provided in Appendix 2.

### 3.5.2 Overall engagement level in issue-identified arrangements by LMEs

Figure 16 illustrates the overall level of participation by countries comprising each LME, regardless of type of involvement, for issue-identified and general agreements. of 342[10] arrangements for governance of the three transboundary issues, 144 were related to Fisheries, 44 were related to Pollution and 63 to Biodiversity. In addition, 91, including the Regional Seas Conventions, were designated as 'General' as they covered more than one of the above categories of issues.[11]

As shown in the 'Box and Whiskers' plot for all 50 of the LMEs (Figure 16), all four categories (the three issue categories and the general category) had LMEs in which none of the countries was participating in one or more of the arrangements as well as arrangements in which all of the relevant countries were participating.

[10] Recall that the number of arrangements exceeds the actual number of agreements. This is because agreements whose area of competence span multiple LMEs are therefore present in the arrangements of two or more LMEs. For example, the LBS protocol of the Cartagena Convention is present in arrangements in the Gulf of Mexico, Caribbean, South-East US Continental Shelf, and Northeast Brazil Shelf LMEs, so this single agreement is present in four different LME arrangements. Additionally, some countries (e.g. Indonesia or Colombia) are in several LMEs so their engagement in a given agreement is represented in the arrangements for that agreement in each of those LMEs.
[11] This additional breakdown of the 'general' category was used to distinguish issue-specific agreements from those that were tending towards EBM by including more than one issue. From a governance perspective, obtaining preliminary insight into how countries engaged in these different types of agreements was seen as potentially important.

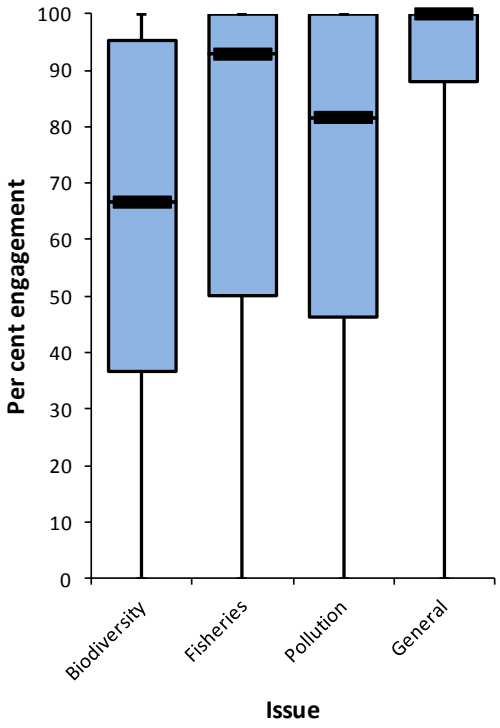



**Figure 16.** Level of overall engagement in agreements in different arrangements by category of issues

Most noticeable from the figure is the difference in median for biodiversity arrangements from those for fisheries, pollution or the general category. In the former case, half of the arrangements had engagement levels above 67% while for the latter three categories, engagement for more than half of the arrangements were at engagement levels above 81% for pollution, 92% for fisheries and an astounding 100% for the general category. This analysis highlights that while the diversity in the level of engagement for these three issues was extremely small for the arrangements scoring above the median, it was significantly larger for those with scores below the median, potentially flagging these arrangements for further attention. In other words, engagement is a skewed distribution with a tail towards lower values.

The data were further examined by the nature of agreement (i.e. binding or non-binding) for each of the four categories of issues illustrated in Figure 16. The results of this analysis are shown in Figure 17 while the breakdown of the number of arrangements containing agreements by categories and nature of the agreement is provided in Table 11. It was noted that all of the agreements addressing pollution were binding. Regardless of the issue, all binding agreements had LME level arrangements examples in which none of the countries were engaged, highlighting the need to further assess the reason for the lack of engagement.

In the case of biodiversity arrangements, there was essentially no difference between the levels of engagement by countries in the 44 binding versus 19 non-binding arrangements. In contrast, fisheries engagement levels by countries differed significantly between binding and non-binding arrangements. Some 127 binding fisheries arrangements had engagement levels ranging from 0% by countries in a given LME to 100%, with over half of these binding arrangements having engagement levels of over 80%. The 17 non-binding fisheries arrangements showed a range in engagement levels from 83% to 100%, with some 14 of the 17 arrangements having 100% engagement levels.

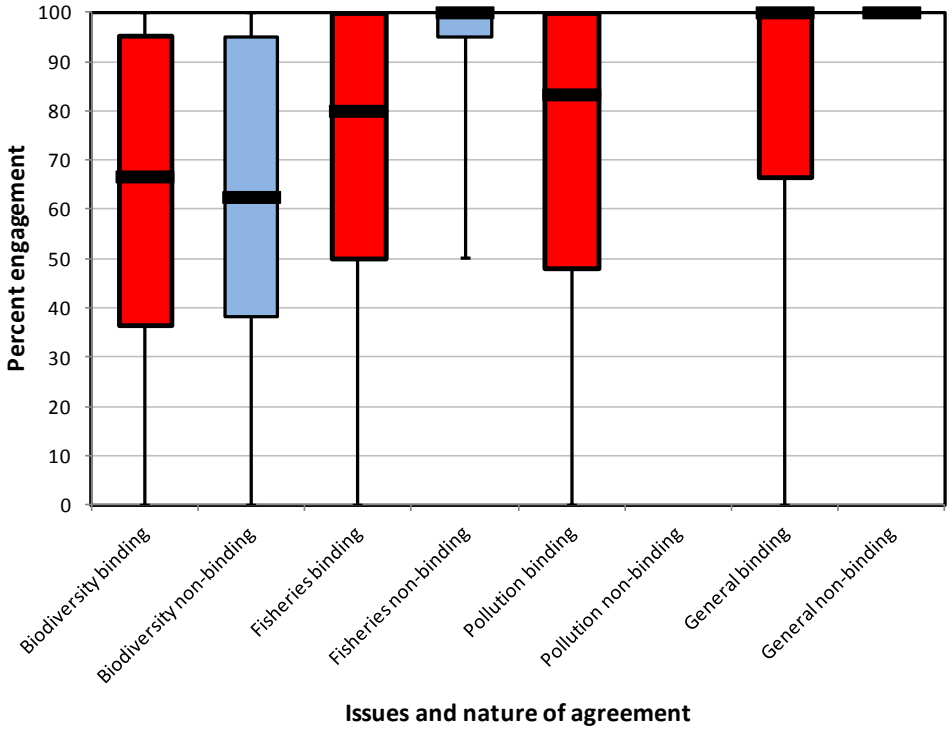



**Figure 17.** Percent engagement by countries in binding and non-binding agreements relevant to categories of transboundary issues in LMEs

For the 44 binding pollution arrangements, the analysis showed a similar result as that obtained for binding fisheries arrangements, with more than half having engagement levels over 81%. As noted, none of the pollution agreements were non-binding which is explained by the fact that the majority of these are protocols under Regional Seas Conventions. This explanation is also applicable for the 57 General binding arrangements where most of the agreements are Regional Seas Conventions. All of the 34 non-binding general arrangements showed 100% engagement levels suggesting the need to thoroughly understand the generic and context-specific factors that may be accounting for this success. When this is coupled with the high level of engagement in non-binding fisheries agreements by countries, it provides empirical support to the notion that "softer" collaborative arrangements may play an important potential role in achieving regional level governance outcomes. However, confirmation will require an assessment of the nature of the performance outcomes arising from these different types of agreements which is not possible to determine at this time.

**Table 11.** Number and nature of agreements in arrangements relevant to transboundary issues in LMEs

| Category | Number of times binding agreements were present | Number of times of non-binding, collaborative agreements were present | Total number of times agreements were present |
|---|---|---|---|
| Biodiversity | 44 | 19 | 63 |
| Fisheries | 127 | 17 | 144 |
| Pollution | 44 | 0 | 44 |
| General (including Regional Seas Conventions) | 57 | 34 | 91 |
| Total | 272 | 70 | 342 |

### 3.5.3 Countries ineligible to participate in agreements

The analysis of countries ineligible to participate in agreements showed this occurring in 25 of the 50 LMEs, ranging from just one country being ineligible to as much as 20 countries, in the case of the Caribbean, not being able to participate in sub-regional Central American fisheries agreement. In many of these instances of ineligibility, the explanation was mainly due to the sub-LME nature of the agreement or the small degree of overlap between two adjacent LMEs that had different arrangements in place for addressing similar transboundary issues. This was generally was not anticipated to lead to significant governance challenges.[12]

While ineligibility of some countries within a given LME to participate in arrangements addressing transboundary areas of concern has the potential to influence governance effectiveness as a result of this structural aspect, care must be taken to understand the underlying reasons for ineligibility.

## 3.6 Assessing 'fit' of arrangements for governance of transboundary issues

The analysis of 'fit' of areal extent of governance agreements addressing transboundary issues in the LMEs, assesses the degree to which these instruments and the arrangements developed to implement them take LMEs as ecosystem management units into account. This is illustrated in Figure 18 which shows the percent of all arrangements which are in each of the four categories of 'fit'. The results indicate that 90% of all arrangements had an area of competence that exceeded the size of the LME or were offset.

To ascertain whether arrangements relating to one particular category of issue (i.e. fisheries, pollution or biodiversity) or a more general type of arrangement that was not specific to any one issue, influenced the 'fit' of the agreement to the LME, the data were further analysed as illustrated in Figure 19. This analysis revealed that pollution arrangements were most likely to have areas of competence that exactly matched the areal extent of the LME but this still only accounted for19% of all the pollution arrangements.

[12] Two LMEs are the Pacific Central American Coast LME which includes a portion of the area of competence of the Lima Regional Seas Convention and the Arabian Sea LME into which a portion of the Jeddah Regional Seas Convention extends. In both instances, it is likely that the ineligibility of the countries did not pose a significant threat to the governance structure due to the small area of overlap. Another example not likely significant due to the small area of interest was the Guinea Current LME in which two countries (Angola and Equatorial Guinea) were ineligible to be a party to Convention Concerning the Regional Development of Fisheries in the Gulf of Guinea and the Regional Fisheries Committee for the Gulf of Guinea (COREP).

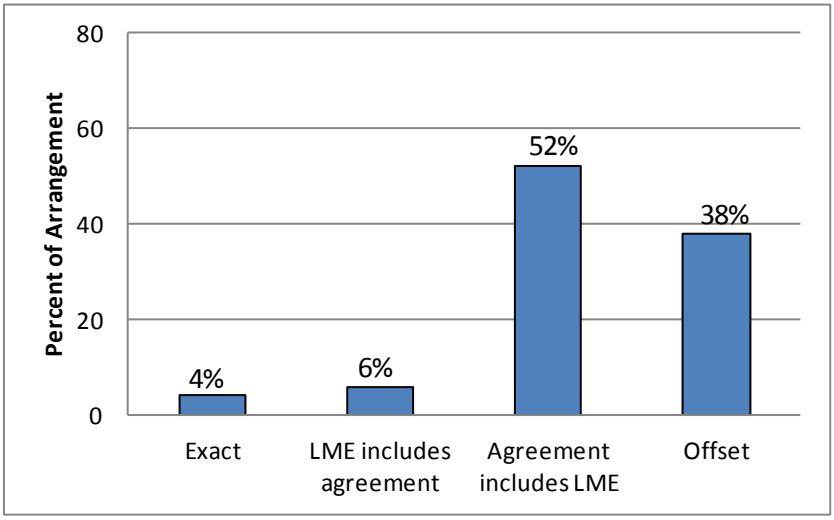



**Figure 18.** Area of competence or 'Fit' of all arrangements to areal extent of LME

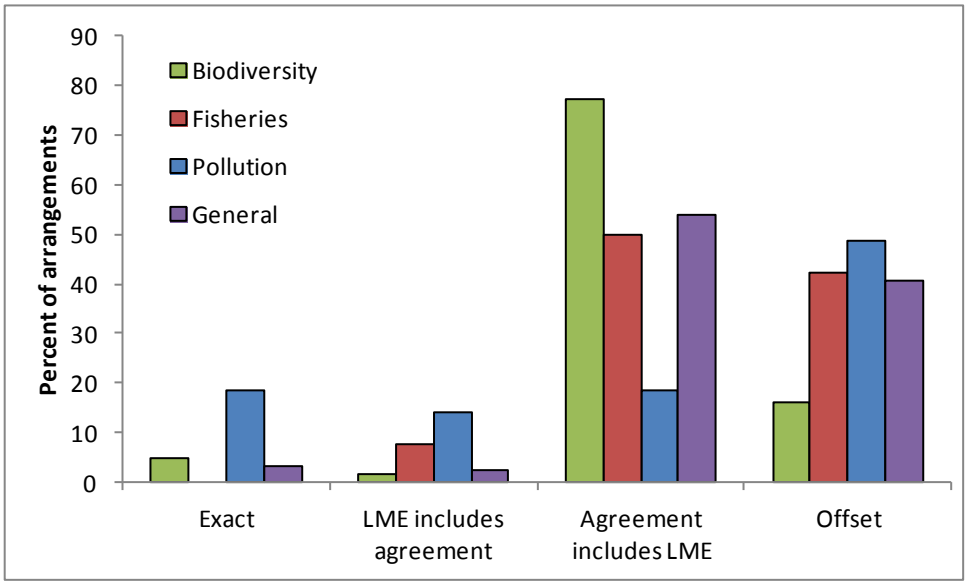



**Figure 19.** Area of Competence or 'Fit' of Arrangements by Issue category to Areal Extent of LME

The majority of fisheries arrangements (92%) had areas of competence that were either larger than the LME, or offset to include areas outside of the LME. While this can be explained as reflecting the biology and migratory range of the species being addressed in arrangements for highly migratory species, it does not appear to reflect transboundary fisheries issues for species found within a single LME. For the 6% of fisheries arrangements that had areas of competence focusing only on part of the relevant LME, a feasible explanation may be due to the target species being distributed subregionally. No fisheries arrangement was an exact match with an LME, which has been noted to cause governance-related problems within the Caribbean LME and the Bay of Bengal LME where regional-specific pelagic species occur. Most biodiversity arrangements (77%) had areas of competence larger than the LME, likely reflecting the highly migratory nature of the species covered under many of the biodiversity agreements such as marine mammals, turtles and dugongs.

Finally, the arrangements that were more general in nature followed a similar trend to the overall finding by having the areas of competence for the majority of these being either larger

than the LME or offset. As previously noted, this category includes Regional Seas conventions, European Union Common Fisheries Policy and several overarching coordination arrangements such as the Arctic Council and PEMSEA.

## 4 Discussion

This assessment of governance arrangements addressing issues of fisheries, pollution and biodiversity in LMEs was undertaken to contribute to the work being done by the TWAP FSP (2013-2015) to assist the Global Environment Facility (GEF) and other international organizations in priority setting by providing a baseline and priorities for intervention.

The analysis conducted is a preliminary step towards understanding:

- The extent to which governance issues are covered (thereby allowing identification of gaps);
- The match between governance arrangements and issues;
- The extent to which arrangements extend outside the lme;
- The extent to which issues are covered by multiple arrangements that could result in conflict; and,
- The extent to which there is integration among arrangements either through existing institutions and organizations or through specific integrating mechanisms.

This analysis must be considered preliminary by TWAP for three main reasons: 1) the number of issues identified are based on available published literature, possibly resulting in some newly emerging issues and even existing issues not being captured in the analysis; 2) it focuses exclusively on formal agreements (binding and non-binding) that are currently in place as of March 31, 2014 for addressing these identified transboundary issues in the LMEs; and 3) the data collection process is entirely secondary in nature, based on desk-top research, although efforts were made for expert judgment to inform the findings and conclusions reached.

### 4.1 Monitoring the extent to which governance issues are addressed

The two main purposes of the TWAP FSP (2013-2015) are: (1) to develop a baseline for assessment of conditions in the five IW water categories, and (2) to put in place a system for monitoring these conditions at regular intervals. The discussion of governance assessment at the time of development of the TWAP FSP recognised, as discussed in Section 1.2 of this report, that governance effectiveness could only be clearly evaluated by assessing the extent to which arrangements have achieved outcomes such as reduced stresses, improved ecosystems, socially just solutions to problems, and improved human well-being (see Figure 2). However, the level of published research currently undertaken to assess governance performance is extremely limited. As such, this analysis focused on contributing to the knowledge base surrounding practices that contribute to ‘good’ governance, (i.e. those that facilitate the implementation of principles such as transparency, accountability, inclusivity, participation, ecosystem-based and adaptive management espoused in most multilateral agreements), using the assumption that good governance may be necessary but insufficient to achieve effective governance.[13] It does this by focusing of indicators of completeness, integration and engagement pertaining to arrangements that address transboundary issues

[13] The current state of knowledge regarding effective governance, mainly due to limited research in this area, is insufficient to conclude a causal link between good governance characteristics and effective governance as measured by performance outcomes

identified within a given LME. As well, the analysis explored the 'fit' of these arrangements to address the transboundary issues from the perspective of areal competence.

Using the TWAP Level 1 Governance Assessment Methodology, it is necessary to reiterate that the policy cycle scoring process mainly assesses whether arrangements in place are structured according to 'good governance'. For example, having clearly specified processes and mechanisms across the seven policy cycle stages could be seen as likely to improve transparency, accountability, and ease with which stakeholders could engage with the process. Ultimately, these characteristics might be expected to produce better governance results, and as noted earlier, are often cited as being desirable characteristics of governance processes (Lemos and Agrawal 2006, Lockwood et al. 2010). However, the state of governance research is such that it is not possible to say definitively that these characteristics are necessary for governance to be effective. The degree to which good governance characteristics are correlated with effective governance remains an emerging area of research in the field of international governance.

This assessment of the 50 multi-country LMEs provides supporting evidence that arrangements for governing transboundary issue relating to fisheries, pollution and biodiversity are sufficiently context specific that it would be unwise to propose a definite link between 'good' governance and effectiveness. Therefore, monitoring the policy cycle stage scores and overall completeness for the arrangements pertaining to LMEs should be perceived only as monitoring the extent to which practices considered to reflect 'good' governance are in place. Over time, as variables relating to outcomes of governance are monitored, the extent to which 'good' governance and effectiveness are related will become better understood.

In addition to monitoring the extent to which 'good' governance practices appear to be reflected in arrangements using the TWAP Level 1 Governance Assessment Methodology, this assessment of LMEs focused on collecting and analysing data for three other potentially valuable indicators of governance architecture/structure that could be monitored:

- The extent to which there is a mechanism specified for integrating policy and management across issues within each LME with linkages extending beyond the regional level to global level arrangements;
- The extent to which there is engagement or "buy in" among the countries taking part in an arrangement in place for addressing an issue(s) of concern, whether binding or non-binding, as indicated by formal commitment at the country-level; and
- The extent to which there is spatial and jurisdictional coherence between the arrangements and the issue to be addressed.

## 4.2 The current status for 'good governance' across GEF-eligible, multi-country LMEs

The results indicate that with few exceptions, the 359 transboundary issues identified as areas of concern for the 50 multi-country LMEs were addressed by some 347 different arrangements[14], comprising 17 non-binding collaborative agreements and 86 binding agreements. While there is no doubt as to the large number of arrangements currently in place, this preliminary analysis suggests that their suitability from a governance architectural perspective focusing on assessing 'good' governance was wanting in many of the LMEs. As such, it has the potential for assisting GEF and other international organizations two ways: (1)

[14] The missing agreements related to pollution issues (both marine-based and land-based) in the California Current, Newfoundland and Labrador Shelf, Northeast United States, Scotian Shelf or South Brazil Shelf LMEs. As well, the Canary Current and the East China Sea LME lacked identifiable transboundary agreements addressing general biodiversity issues.

by identifying priority areas for intervention; and (2) by providing a baseline across all LMEs against which to monitor subsequent changes over time.

Specifically, the Level 1 Governance Assessment Methodology was used to develop a preliminary, baseline assessment of governance architecture for transboundary LMEs by identifying:

- level of completeness of arrangements to address transboundary issues
- level of integration of organizations responsible for addressing transboundary issues
- level of engagement of countries involved in relevant agreements
- assessment of 'fit' of the current agreements and the arrangements in place to address transboundary areas of concern

## 4.3 Level of completeness

Overall, completeness scores relating to the arrangements in place to address the suite of 10 subcategories of issues relating to fisheries, biodiversity and pollution in each of the LMEs allowed for an average score to be determined. This score was converted to a ranking of potential risk, using a 5-point score corresponding to very low, low, medium, high and very high risk as shown in Table 8, highlighting areas for possible intervention aimed at strengthening governance architecture. In particular, as illustrated in Figure 7, biodiversity arrangements appear to have the lowest level of completeness in their policy cycles while fisheries arrangements tend to have the highest level, especially those in which agreements are binding, particularly those for highly migratory species and other specifically-targeted species.

This assessment also served to identify the complete absence of arrangements addressing key transboundary issues in five of the 13 geographic regions (North Atlantic, South-East Atlantic, South-West Atlantic, North-East Pacific and South-East Asia), pointing to potential areas for intervention in LME-level governance (Figure 9).

The analysis of completeness score and ranking provides a tool by which LMEs can be monitored over time and as agreements are added or arrangements strengthened. The current literature on governance architecture suggests that effort should be made to increase the level of completeness of the policy cycle for any arrangement. This is seen as critical as it strengthens and facilitates the flow of valuable data and information into the analysis and advice stage of the cycle which in turn provides the structures that contributes to informed decision-making, implementation and review. Finally, it can also be assumed that complete policy cycles demonstrate implementation of key principles associated with good governance and which have become the norm in many multinational and national governance instruments. These include principles of transparency and integration in decision making, inclusivity and participation in the provision of policy-relevant and management level advice from a cross section of stakeholders to inform decision making, collaboration and efficiency to assist with implementation, and accountability and adaptive management in terms of monitoring and evaluation.

### 4.3.1 Level of integration as a proxy for implementing an EBM approach

As noted in the methodology section describing the calculation of an overall score for level of integration among arrangements in the LME, there is no *a priori* criterion for the extent of clustering that would be considered optimal. Nonetheless, the assumption underpinning the scoring was based on an expectation that without considerable attention to linkages and interaction among arrangements, it would be difficult to have the integrated approach within a system that is needed to achieve EBM. At the other end of the scale, in a system with highly diverse issues, one would not normally expect to find them all covered by the same

responsible bodies. In fact, depending on complexity and capability, it may be more effective and flexible for arrangements to have common responsible organizations at policy setting stages, but different responsible organisations at technical and operational policy cycle stages. The results for integration across the LMEs provide some evidence that both scenarios are in play.

In general, the arrangements in place for addressing transboundary areas of concern shared few organizations across similar stages of the different policy cycles and some 22 LMEs are ranked as having the highest level of risk with respect to this indicator of governance (Table 9). This suggests that the different origins and timing of development of the arrangements may be a factor, arising from the individual and often-times 'silo' approach for developing and implementing issue-specific agreements. This may help target interventions to seize opportunities on how best to achieve EBM goals within the LME, especially if agreements allow for such amendments to be made.

Similarly, LMEs showing a high degree of integration, while a preliminary indication of good architectural design, also require further analysis to understand exactly what this scoring means. It may be due to the fact that only a small number of issues are dealt with by a small number of individual arrangements, as is the case for the Sea of Okhotsk, or it may be that genuine effort is being made to practice EBM within the LME by recognizing the context-specificity with the LME, as might be the case in the LMEs bordering European countries. This appeared to be the case for fourteen of the LMEs assessed where increased attention to the principles of integration and EBM in recent times have led to the establishment of an integrating policy-setting mechanism that serves as an umbrella for the different issue-specific arrangements in the LME. The benefits to be gained and the challenges arising from such an approach will need to be determined for each LME. This will require additional input from regional experts to determine whether this should be pursued as a goal across all LMEs or whether once again, context will serve to limit its application in some LMEs.

### 4.3.2 The role of country engagement in the assessment of 'good' governance

Engagement by countries in agreements addressing transboundary areas of concern within a given LME revealed none of the 50 LMEs had average engagement levels of less than 40%. Using the five-point scale to assess the level of potential risk, the assessed levels of engagement corresponded to potential risk levels ranging from very low to medium for all 50 LMEs (Table 10).

However, the analysis suggests that in general, binding agreements have a lower level of engagement than non-binding agreements regardless of the type of issue the agreement is meant to address (Figure 14). The level of effort or accountability needed by countries engaged in binding agreements to comply with the conditions of the agreement may explain this finding but this still needs to be verified. Despite this, the research has identified that the overwhelming majority of agreements formulated to address transboundary issues are binding. This trend is consistent, regardless of the issue being addressed by the agreement, as evidenced by all of the pollution arrangements being binding, along with 88% of all fisheries arrangements and 70% of those addressing biodiversity concerns.

Once again, the evidence obtained from an assessment of engagement speaks to the need to understand why there is the sense amongst the drafters of policy instruments that binding agreements are preferred over non-binding ones even in the face of a lower level of engagement by countries. The literature on governance complexity would suggest that rather than generalising that one form of agreement is better over another, a far more effective, albeit demanding, approach is to examine the context specificity of each LME or groupings of LMEs, prior to establishing the nature of agreements set up to address transboundary issues (Mahon et al. 2010). Such an approach should also be informed by thinking on governance going back some 20 years which highlights the fact that 'governance is more than just government'

(Rosenau 1995). It should also include an examination of the cultural, geopolitical and socio-economic factors, among others, that may influence the architecture of governance responses in some LMEs, (e.g. those in South-East Asia and the Caribbean) where the preferred choice seems to follow a collaborative, polycentric networked approach (Ostrom 2010). Following the thinking of governance theorists, such an analysis would suggest that context-specific conditions affecting the level of vulnerability of both the human and natural subsystems being governed should influence the responses put in place by those who govern (Jentoft 2007).

To summarize, a detailed understanding of what the findings on engagement suggest requires a closer examination of the rationale used by countries for determining their level of engagement for binding versus non-binding issue-specific types of agreements. This would be further informed by analysis of the arrangements in place to implement the agreement in terms of the completeness of their policy cycles as it relates to engagement. One could speculate that an arrangement with a low level of completeness across its policy cycle stages, suggestive of possible fractures in the policy process, may prove less effective in achieving its governance objectives even with a 100% engagement by the countries involved than one in which completeness is higher. This applies regardless of the binding or non-binding nature of the agreement.

Finally, a word must be said about situations in which some countries are excluded from participating in agreements that can potentially affect the success of efforts aimed at addressing issues of regional concern. The analysis found several cases where this situation arose, ranging from just a single country in a given LME to as much as 20 countries, depending on the specific agreement. In many of these instances, the explanation was mostly due to the sub-LME nature of the agreement. However, it would seem appropriate for efforts to be made to examine the consequences of all such omissions identified in this analysis. If deemed negative, effort should be made to avoid such situations from occurring, by rectifying existing agreements and ensuring new agreements prevent such situations from arising. Where relevant, input from LME-level experts should be sought on this issue.

### 4.3.3 'Fit' of arrangements for governance of transboundary issues

Governance scholars have written extensively on the notion of the 'fit' of area of competence of institutions to the area of the issue (Young 2002, Young et al. 2007); an idea which also applies to LMEs. When this idea is coupled with the notion of LMEs as rational management units for addressing ecosystem-level, transboundary concerns, the obvious question to be asked is whether LMEs are in fact being used as a spatial unit for managing these issues and if not, why not? Furthermore, what exactly are the implications, if any, if the answer is found to be negative, given the focus by GEF on supporting LMEs as management units? Obviously timing will play a role in answering this question as agreements concluded prior to the LME boundary delimitation could not be included in an assessment aimed at answering the posed question, although the data collection for this analysis did include noting whether agreements had included articles for amendment.

The results indicate that, to an overwhelming degree (96%), LME boundaries played little role in influencing the areas of competence for agreements, suggesting that what is lacking may be more than the *"political will... to apply the LME concept for the sustainable development... in many parts of the World Ocean.*" (Sherman and Hempel 2009, p.9). The majority of the agreements were deemed to be supra-LME in scope, either inclusive of but extending beyond the boundaries of the LME or covering only a part of the LME while extending to other areas outside of the LME (Figure 18). Furthermore, there were examples at the other end of the spectrum in which agreements were restricted to subregions within LMEs.

These findings are significant from an LME governance architectural perspective if LMEs are to be used as rational units of EBM. For supra-LME arrangements, the potential exists for countries outside of an LME to be able to exercise influence, either directly or indirectly, that

is contrary to the needs of those within the LME. For example, in the Caribbean and Bay of Bengal LME, the needs of the countries in terms of management of 'regional' pelagic species by the International Commission for the Conservation of Atlantic Tunas (ICCAT) are superseded, if not undermined, by those outside of the region, resulting in low priority to addressing these species. This suggests that lower level governance mechanisms are needed, nested within these supra-LME arrangements, to serve LME level concerns. Again, this provides a cautionary reminder of the limitations of the 'one size fits all' approach when it comes to dealing with the complexity and scale issues inherent in ocean systems.

The potential for challenges associated with 'fit' is also demonstrated when arrangements are offset from the LME scale. This is exemplified by the Guinea Current LME (GCLME) with the Subregional Fisheries Commission (SRFC) where some countries are inside the GCLME and some in the neighbouring Canary Current LME. Whether this would result in challenges to 'good' governance cannot be answered at this stage of analysis and experts from the regions should provide the guidance necessary to better understand this situation.

However, it is worth noting that preventing a country from participating is notably different from countries choosing not to be engaged at a subregional level. An example of this in practice are the mechanisms for addressing shrimp and groundfish and flyingfish in the North Brazil Shelf and Caribbean LMEs where subregional working groups of interested countries are involved in the management of these species under umbrella arrangements.

## 4.4 LMEs in the global governance system

The observation that the majority of arrangements assessed are larger than and/or offset from LMEs calls for reflection on the role of LMEs in the overall arrangements for governance of the oceans. Current thinking of governance arrangements address issues of fit and scale through the conceptual lens of multi-scale, multi-level clusters or networks of arrangements (Young 2002, Ostrom 2010, de Búrca, Keohane and Sabel 2013, Wyborn and Bixler 2013, Gruby and Basurto 2014, Newig and Koontz 2014). From this perspective, LMEs appear as a level between national and the large-scale regional clusters described by Mahon et al. (2014 in press). It appears that there may often be a sub-LME level as well, when issues requiring governance involve only a subarea of the LME or a subset of the countries within an LME. Thus for oceans, the scale gradation would be: global>regional cluster> LME>sub-LME> national> local. The relative emphasis on these will vary among regions. However, in all regions there will be the need to consider the relative roles of institutions at all levels, their relationship to the issues to be governed and their interactions among each other (Fanning et al 2007). This will lead to a nested polycentric perspective on governance such as was developed for the Caribbean and North Brazil LMEs which are nested within the Wider Caribbean Region (Mahon et al. 2014). It will also lead to an emphasis on rationalising roles and responsibilities as well as linkages within the nested system.

## 4.5 Comparison across key indicators of governance architecture

In terms of monitoring progress towards 'good' governance, this analysis identified three indicators of comparison that may be useful in assessing governance from a structural design perspective at the LME level, in addition to assessing the level of 'fit' of a given arrangement to the areal extent of an LME discussed in section 4.2.4. These three are indicators of completeness, integration and engagement, a comparison of which is depicted in Table 12, based on the placement of scores obtained and ranking of potential risk for individual LMEs in Tables 8, 9 and 10, using the legend below.

| Risk level | Completeness Indicator Range | Integration Indicator Range | Engagement Range |
|---|---|---|---|
| 1 –Very low | 80-100% | 0.80-1.0 | 80-100% |
| 2 - Low | 60-80% | 0.6 -0.8 | 60-80% |
| 3 - Medium | 40-60% | 0.4-0.6 | 40-60% |
| 4 - High | 20-40% | 0.2-0.4 | 20-40% |
| 5 – Very High | 0-20% | 0.0-0.2 | 0-20% |

While plausible explanations may be offered for the current ranking obtained for each indicator for each LME, the plethora of combinations across the three indicators for individual LMEs suggests the need for further exploration to determine whether there are correlations between these indicators and to what extent context specificity influenced the rankings. However, based on the overall analysis, it would appear that the Mediterranean Sea LME shows the least level of risk across the three indicators, with high completeness scores and very high integration and engagement scores due in large measure to the nature and presence of an overarching integrating mechanism in place to address transboundary areas of concern.

Of greater concern is the very low level of integration scores obtained for well over half of all LMEs assessed, posing a potential very high risk to the adoption of EBM in these LMEs and the principle of integration as a key characteristic of good governance. This is primarily due to the significant disconnect between organizations involved with fisheries issues in these LMEs and those involved in pollution and biodiversity issues, thereby providing opportunities to focus effort on greater collaboration among these and/or the creation of overarching integrating mechanisms. Furthermore, the LME governance assessment results for the three indicators provide the opportunity to compare the findings for the additional categories of indicators in Figure 2 to see whether achievement of downstream objectives related to outputs, outcomes and impacts are dependent on these rankings.

**Table 12.** Comparison of completeness, integration and engagement scores and potential risk level for LMEs

| LME # | LME Name | # of Arrange-ments | Complete-ness % | Integration (0.0-1.0) | Engage-ment (%) |
|---|---|---|---|---|---|
| 1 | East Bering Sea | 7 | 70 | 0.1 | 93 |
| 3 | California Current | 6 | 50 | 0 | 89 |
| 5 | Gulf of Mexico | 7 | 58 | 0.2 | 81 |
| 6 | Southeast U.S. Continental Shelf | 4 | 65 | 0.2 | 81 |
| 7 | Northeast US Continental Shelf | 6 | 49 | 0 | 75 |
| 8 | Scotian Shelf | 6 | 50 | 0 | 63 |
| 9 | Newfoundland-Labrador Shelf | 6 | 50 | 0 | 63 |
| 11 | Pacific Central American Coastal | 9 | 65 | 0.1 | 85 |
| 12 | Caribbean Sea | 9 | 60 | 0.2 | 68 |
| 13 | Humboldt Current | 8 | 68 | 1 | 88 |
| 14 | Patagonian Shelf | 7 | 82 | 0.2 | 58 |
| 15 | South Brazil Shelf | 4 | 36 | 0 | 100 |
| 17 | North Brazil Shelf | 8 | 58 | 0.2 | 74 |
| 18 | Canadian Eastern Arctic - West Greenland | 7 | 72 | 1 | 80 |
| 19 | Greenland Sea | 13 | 74 | 0.1 | 75 |
| 20 | Barents Sea | 11 | 74 | 0.1 | 75 |
| 21 | Norwegian Sea | 8 | 76 | 0.1 | 83 |
| 22 | North Sea | 11 | 73 | 0.1 | 62 |

| | | | | | |
|---|---|---|---|---|---|
| 23 | Baltic Sea | 5 | 61 | 0.1 | 61 |
| 24 | Celtic-Biscay Shelf | 9 | 74 | 1 | 59 |
| 25 | Iberian Coastal | 9 | 74 | 1 | 44 |
| 26 | Mediterranean | 9 | 78 | 1 | 85 |
| 27 | Canary Current | 7 | 46 | 0.2 | 80 |
| 28 | Guinea Current | 6 | 54 | 0.2 | 78 |
| 29 | Benguela Current | 6 | 80 | 1 | 71 |
| 30 | Agulhas -Somali Current | 7 | 47 | 0.1 | 69 |
| 32 | Arabian Sea | 9 | 45 | 0.1 | 86 |
| 33 | Red Sea | 5 | 52 | 0.2 | 65 |
| 34 | Bay of Bengal | 10 | 50 | 0.1 | 87 |
| 35 | Gulf of Thailand | 6 | 50 | 0.1 | 75 |
| 36 | South China Sea | 6 | 50 | 0.1 | 68 |
| 37 | Sulu-Celebes Sea | 6 | 50 | 0.1 | 71 |
| 38 | Indonesian Sea | 7 | 52 | 0.1 | 56 |
| 39 | North Australian Shelf | 6 | 51 | 0.1 | 80 |
| 47 | East China Sea | 5 | 43 | 0.1 | 83 |
| 48 | Yellow Sea | 5 | 33 | 0.5 | 83 |
| 49 | Kuroshio Current | 3 | 56 | 0.3 | 100 |
| 50 | Sea of Japan | 5 | 30 | 0.5 | 88 |
| 51 | Oyashio Current | 3 | 30 | 0.3 | 100 |
| 52 | Sea of Okhotsk | 2 | 38 | 0.9 | 100 |
| 53 | West Bering Sea | 4 | 60 | 0.3 | 100 |
| 54 | North Bering - Chukchi Sea | 5 | 69 | 1 | 100 |
| 55 | Beaufort Sea | 3 | 67 | 1 | 100 |
| 59 | Iceland Shelf | 10 | 78 | 0.1 | 90 |
| 60 | Faroe Plateau | 8 | 77 | 1 | 71 |
| 61 | Antarctica | 8 | 70 | 1 | 59 |
| 62 | Black Sea | 6 | 77 | 0.1 | 74 |
| 64 | Central Arctic Ocean | 11 | 73 | 1 | 78 |
| 66 | Canadian High Arctic North Greenland Shelf | 10 | 77 | 1 | 75 |
| 99 | Pacific Warm Pool | 5 | 51 | 1 | 64 |

## 5 Conclusion

There is clearly much complexity in terms of placed-based context that makes it difficult to generalise governance structure or architecture across the LMEs. Mahon et al. (2010) questioned whether LMEs might be so complex that a diversity of approaches to governance might be required. Their analysis demonstrated that there is considerable heterogeneity among LMEs with regard to characteristics that would be expected to affect governability and that several governance approaches will be required to cope with this heterogeneity. However, they also concluded that LMEs can be grouped according to these characteristics, suggesting that different approaches could be considered for clusters rather than for individual LMEs and that there can be sharing of experience and learning within clusters (Mahon et al. 2010).

From a substantive perspective, this assessment of governance arrangements for the 50 multi-country LMEs appears to be supportive of the conclusion of heterogeneity among LMEs. At the same time, it is suggestive of some aspects of commonality across LMEs, particularly those relating to the level of completeness of policy cycles to facilitate 'good' governance. The level of engagement by countries which affect or are affected by transboundary issues within the LME also appears to be a cross-cutting factor for 'good' governance. However, this indicator may be driven by the binding or non-binding nature of an agreement, the type of issue that the agreement and its arrangement is established to address and the area of competence or 'fit' for 'good' governance to be realised.

In addition to its substantive contribution in preliminarily identifying the status of baseline governance indicators across LMEs, the potential of this LME level governance arrangements

assessment to inform process may prove to be equally valuable. First, it would be of benefit to determine whether actors involved in addressing these issues at the transboundary level see the potential of the TWAP Level 1 Methodology as providing the context or framework within which a structured discussion about governance arrangements within their LME can take place. Second, by using a common framework and methodology, key actors within each LME can have a more informed perspective of their LME's position relative to other LMEs and to the broader suite of both regional and global governance mechanisms in place for addressing similar issues. This could potentially serve to facilitate learning across relevant LMEs from exposure to both failure and successes in governance processes being used.

In summary, while rankings of indicators of governance architecture are possible and progress can be made towards enhancing these by direct intervention by GEF, other donor agencies and regional organisations, it is essential to reiterate that governance success requires a detailed understanding of the complexity of the system to be governed. Any preliminary conclusion of ranking of any indicator for any LME must be seen as simply a flag to determine whether the assessment points to the need for intervention or whether the identified ranking is in fact appropriate for the system.

## 6 References

Biermann, F. 2007. 'Earth system governance' as a crosscutting theme of global change research. Global Environmental Change. 17: 326–337.

Biermann, F. and P. Pattberg [eds]. 2012. Global environmental governance reconsidered. MIT Press, Cambridge.

de Búrca,G., R.O. Keohane and C. F. Sabel. 2013. New Modes of Pluralist Global Governance. New York University School of Law, Public Law & Legal Theory Reesarch Paper Series, Working Paper No. 13-08. Available at: http://ssrn.com/abstract=2225603

Duda, A.M and K. Sherman. 2002. A new imperative for improving management of large marine ecosystems. Ocean and Coastal Management 45: 797-833.

Duda, A. 2002. Monitoring and Evaluation Indicators for GEF International Waters Projects. Global Environment Facility Monitoring and Evaluation Working Paper 10: 11 p.

Duda, A. and A. C. Hume. 2013. A new imperative to harness sound science in the GEF International Waters focal area. Environmental Development 7: 102-108.

Fanning L, R. Mahon, P. McConney, J. Angulo, F. Burrows, et al. A large marine ecosystem governance framework. Marine Policy 2007; 31:434–43.

Fanning L, R. Mahon and P. McConney. 2013. Applying the large marine ecosystem (LME) governance framework in the Wider Caribbean Region. Marine Policy 2013; 42:99-110.

Gruby, R. and X. Basurto. 2014. Multi-level governance for large marine commons: Politics and polycentricity in Palau's protected area network. Environmental Science & Policy 36: 48-60.

Hennessey, T. and J. Sutinen J. 2005. Sustaining large marine ecosystems: the human dimension. Large Marine Ecosystems Series. Amsterdam: Elsevier, 286 pp.

Hoagland, P. and D. Jin. 2008. Accounting for marine economic activities in large marine ecosystems. Ocean and Coastal Management 51:246–58.

Honey, K. T. and K. Sherman. 2013. The Western Pacific Warm Pool Assessment Approach for the Transboundary Waters Assessment. Background Brief. NOAA Large Marine Ecosystem Program, Narragansett, RI, USA.

Jeftic, L., P. Glennie, L. Talaue-McManus and J. A. Thornton (Eds.). 2011. Volume 1. Methodology and Arrangements for the GEF Transboundary Waters Assessment Programme, United Nations Environment Programme, Nairobi, 61 pp.

Jentoft, S. 2007. Limits of governability: Institutional implications for fisheries and coastal governance. Marine Policy 31: 360-370.

Kooiman, J., M. Bavinck, S. Jentoft and R. Pullin. 2005. Fish for Life. Interactive Governance for Fisheries. MARE Publication Series No. 3. Amsterdam University Press, Amsterdam, 427 pp.

Lemos, M. C., and A. Agrawal. 2006. Environmental governance. Annual Review of Environment and Resources 31:297–325.

Lockwood, M., J. Davidson, A. Curtis, E. Stratford and R. Griffith. 2010. Governance principles for natural resource management. Society and Natural Resources, 23:1–16.

Longhurst, A. 1998. Ecological geography of the sea, Academic Press, San Diego, California. 560 pp.

Mahon, R., L. Fanning, P. McConney and R. Pollnac. 2010. Governance Characteristics of Large Marine Ecosystems. Marine Policy 34:919–927.

Mahon, R, L. Fanning and P. McConney. 2011a. Observations on governance in the Global Environment Facility (GEF) International Waters (IW) Programme. CERMES Technical Report No. 45, 36 pp. (www.cavehill.uwi.edu\cermes)

Mahon, R., L. Fanning, and P. McConney. 2011b. TWAP common governance assessment. Pp. 55-61. In: L. Jeftic, P. Glennie, L. Talaue-McManus, and J. A. Thornton (Eds.). Volume 1. Methodology and Arrangements for the GEF Transboundary Waters Assessment Programme, United Nations Environment Programme, Nairobi, 61 pp.

Mahon, R., A. Cooke, L. Fanning and P. McConney. 2013. Governance arrangements for marine ecosystems of the Wider Caribbean Region. Centre for Resource Management and Environmental Studies, University of the West Indies, Cave Hill Campus, Barbados. CERMES Technical Report No 60. 99p.

Mahon, R., L. Fanning, K. M. Gjerde, O. Young, M. Reid, S. Douglas. in press. Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean: Vol 2 – areas beyond national jurisdiction (ABNJ). IOC Technical Series 115.

Mahon, R., L. Fanning, P. McConney. 2014. Assessing and facilitating emerging regional ocean governance arrangements in the Wider Caribbean region. Ocean Yearbook 28: 631-671.

Newig, J. and T.M. Koontz. 2014. Multi-level governance, policy implementation and participation: the EU's mandated participatory planning approach to implementing environmental policy. Journal of European Public Policy, 21(2): 248–267.

Olsen, S.B., J.G. Sutinen, L. Juda, T.M. Hennessey and T.A. Grigalunas. A handbook on governance and socioeconomics of large marine ecosystems. Coastal Resources Center: University of Rhode Island; 2006 95 pp.

Ostrom, E. 2010. Polycentric systems for coping with collective action and global environmental change. Global Environmental Change 20: 550-557.

Rosenau, J.N. (1995). Governance in the Twenty-First Century. Global Governance, 1:13-43.

Rothwell, D. and T. Stephens. 2010. The International Law of the Sea. Hart Publishing, Oxford, UK.

Sherman, K. 1994. Sustainability, biomass yields, and health of coastal ecosystems: an ecological perspective. Marine Ecology Progress Series 112: 277-301

Sherman, K. 1999. Modular approach to the monitoring and assessment of large marine ecosystems. In Kumpf H, Steidinger K, Sherman K. Editors. The Gulf of Mexico large marine ecosystem: assessment, sustainability and management. Vol. 3, Maiden, MA: Blackwell Science, p 34-63.

Sherman, K. and A.M. Duda. 1999. An ecosystem approach to global assessment and management of coastal waters. Marine Ecology Progress Series 190: 271-287.

Sherman, K, M. Sissenwine, V. Christensen, A. Duda, G. Hempel, et al. 2005. A global movement toward an ecosystem approach to management of marine resources. Marine Ecology progress Series 300: 275-279.

Sherman K and G. Hempel. 2009. The UNEP large marine ecosystem report: a perspective on changing conditions in LMEs of the world's Regional Seas. UNEP Regional Seas Report and Studies No. 182. Nairobi: UNEP, pp.872

United Nations Environment Programme (UNEP). 2010. Modalities for advancing cross-sectoral cooperation in managing marine areas beyond national jurisdiction. Discussion paper, 12th Global Meeting of the Regional Seas Conventions and Action Plans, Bergen, Norway, 20th – 22nd September 2010. UNEP (DEPI)/RS.12 /8, 27 p.

Wyborn, C. And R. P. Bixler. 2013. Collaboration and nested environmental governance: Scale dependency, scale framing, and cross-scale interactions in collaborative conservation. Journal of Environmental Management, 123:58-67

Young O. R. 1999. The effectiveness of international environmental regimes: causal connections and behavioural mechanisms. MIT Press, Cambridge, MA.

Young, O. R. 2002. The institutional dimensions of environmental change: fit interplay and scale. London: MIT Press, 221 pp.

Young, O. R., G. Osherenko, J. Ekstrom, L.B. Crowder, J. Ogden, et. al. 2007. Solving the crisis in ocean governance: place-based management of marine ecosystems. Environment, 49 (4): 20–32.

Young, O. R. 2013. Effectiveness of international environmental regimes: Existing knowledge, cutting-edge themes, and research strategies. Proceedings of the National Academy of Sciences. 108(50):19853-19860.

## Appendix 1 – List of all agreements relevant to identified transboundary issues in Multi-Country LMEs

| **Non-Binding Agreements** | **Short Name of Agreement** |
|---|---|
| ACPB-Alaska/Chukotka | MOU under Agreement on Conservation of Polar Bears |
| Arctic Council | Arctic Council |
| BIMSTEC | Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) Working Committee on Fisheries |
| CECAF | Fishery Committee for the Eastern Central Atlantic |
| COBSEA | Coordinating Body on the Seas of East Asia |
| CRFM | Agreement establishing the Caribbean Regional Fisheries Mechanism |
| Dugong CMS/MOU | Convention on Migratory Species of Wild Animals – Dugong MOU South East Asia |
| IOSEA | The Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia |
| NOWPAP | Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region |
| PEMSEA | Partnerships in Environmental Management for the Seas of East Asia |
| PIF | Pacific Island Forum |
| SACEP | South Asian Cooperative Environment Programme |
| SEAFDEC | South East Asian Fisheries Development Center |
| SEA-RPOA | Regional Plan of Action (RPOA) to Promote Responsible Fishing Practices (including Combating IUU Fishing) in the Region (South East Asia) |
| SPC | Secretariat of the Pacific Community |
| SWIOFC | Southwest Indian Ocean Fisheries Commission |
| WECAFC | Western Central Atlantic Fisheries Commission |
| **Binding Agreements** | **Short Name of Agreement** |
| Abidjan Convention | Abidjan Convention and 3 protocols, LBS and MBS Emergency |
| Antigua Convention | Antigua Convention |
| ACCOBAMS | Agreement on the Conservation of Cetaceans in the Black Sea Mediterranean Sea and Contiguous Atlantic Area |
| ACPB | Agreement on Conservation of Polar Bears |
| APFIC | Asia Pacific Fisheries Commission |
| ASCOBANS | Agreement on the Conservation of Small Cetaceans in the Baltic, North East Atlantic, Irish and North Seas |
| ATS | Antarctic Treaty System and Environment Protocol |

| | |
|---|---|
| Barcelona Convention | Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and 7 protocols: Dumping Protocol (from ships and aircraft;) Prevention and Emergency Protocol (pollution from ships and emergency situations); Land-based Sources and Activities Protocol; Specially Protected Areas and Biological Diversity Protocol; Offshore Protocol (pollution from exploration and exploitation); Hazardous Wastes Protocol; Protocol on Integrated Coastal Zone Management (ICZM) |
| BCC | Benguela Current Convention |
| BOB-IGO | Agreement on the Institutionalisation of the Bay of Bengal Programme as an Inter-Governmental Organisation |
| Bonn | Agreement for cooperation in dealing with pollution of the North Sea by oil and other harmful substances |
| Bucharest Convention | Convention on the Protection of the Black Sea against Pollution - Bucharest Convention and 4 protocols for LBS, MBS, Dumping and Emergencies |
| Cartagena Convention | Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region and 3 protocols, LBS, MBS and SPAW (Habitat) |
| CCAMLR | Convention for the Conservation of Antarctic Marine Living Resources |
| CCAS | Convention for the Conservation of Antarctic Seals |
| CCBSP | Convention on the Conservation & Management of Pollock Resources in the Central Bering Sea |
| CCSBT | Convention for the Conservation of the Southern Bluefin Tuna |
| COMHAFAT | Ministerial Conference on Fisheries Cooperation among African States Bordering the Atlantic (ATLAFCO/COMHAFAT) |
| COREP+ | Convention Concerning the Regional Development of Fisheries in the Gulf of Guinea and the Regional Fisheries Committee for the Gulf of Guinea (COREP) |
| CPPS | Permanent Commission of the South Pacific |
| EU-CFP | European Union - Common Fisheries Policy |
| FCWC | Convention for the establishment of Fishery Committee of the West Central Gulf of Guinea |
| FFA | Pacific Islands Forum Fisheries Agency/South Pacific Forum Fisheries Agency Convention |
| GFCM | Agreement for the establishment of the General Fisheries Commission for the Mediterranean |
| Helsinki | Convention on the Protection of the Marine Environment of the Baltic Sea Area - Helsinki Convention and its annexes (HELCON) |
| IAC | Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC) |

| | |
|---|---|
| IATTC | Convention for the Strengthening of the Inter-American Tropical Tuna Commission |
| ICCAT | International Convention for the Conservation of Atlantic Tunas |
| ICES | Convention for the International Council for the Exploration of the Sea |
| IOTC | Agreement for the establishment of the Indian Ocean Tuna Commission (IOTC) |
| IPHC | International Pacific Halibut Commission (IPHC)/Convention for the Preservation of the Halibut Fishery |
| Jeddah Convention | Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment - The Jeddah Convention and its 2 protocols on LBS and MBS |
| Kuwait Convention | Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution – Kuwait Convention and its 3 protocols, LBS, MBS and Emergencies |
| Lima Convention | Convention for the Protection of the Marine Environment and Coastal Areas of the South-East Pacific - The Lima Convention and its 4 protocols, LBS, MBS, Emergencies and Radioactive Substance |
| MEX-US | Agreement of Cooperation between the US and Mexico regarding Pollution of the Marine Environment by Discharges of Hydrocarbons and other Hazardous Substances |
| NAFO | Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries |
| Nairobi Convention | Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the West Indian Ocean and its 3 protocols on LBS, MBS and Emergencies |
| NAMMCO | Agreement on Cooperation in Research, Conservation and Management of Marine Mammals in the North Atlantic |
| NASCO | Convention for the Conservation of Salmon in the North Atlantic Ocean |
| NEAFC | North-East Atlantic Fisheries Commission |
| Noumea Convention | Convention for the Protection of the Natural Resources and Environment of the South Pacific and its 2 protocols on LBS, Emergencies and Dumping |
| NPAFC | Convention for the Conservation of Anadromous Stocks in The North Pacific Ocean |
| OLDEPESCA | Agreement instituting the Latin American Organization for Fisheries Development |
| OSPAR | Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) and its annexes |

| | |
|---|---|
| OSPESCA | Central America Fisheries and Aquaculture Organization |
| PICES | Convention establishing a Marine Science Organization for the North Pacific |
| PSC | Pacific Salmon Commission |
| RECOFI | Partnerships in Environmental Management for the Seas of East Asia |
| Rio de la plata | Treaty of the Rio de la Plata and its Maritime Front |
| SEAFO | The Convention on the Conservation and Management of Fishery Resources in the South East Atlantic Ocean |
| SIOFA | South Indian Ocean Fisheries Agreement |
| SPRFMO | Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean |
| SRFC | Sub-Regional Fisheries Commission |
| WCPFC | Convention on the Conservation and Management of High Migratory Fish Stocks in the Western and Central Pacific Ocean |

## Appendix 2 - Summary data for engagement by countries in each LME for each relevant agreement

| LME | Agreement | Binding | Issue Category | # of Countries | # Ineligible | # engaged | % engaged |
|---|---|---|---|---|---|---|---|
| Agulhas-Somali Current | Dugong MOU | - | Biodiversity | 10 | - | 8 | 80 |
| | IOSEA | - | Biodiversity | 10 | - | 9 | 90 |
| | SWIOFC | - | Fisheries | 10 | - | 10 | 100 |
| | Nairobi PA/biodiversity protocol | 1 | Biodiversity | 10 | - | 4 | 40 |
| | IOTC | 1 | Fisheries | 10 | - | 8 | 80 |
| | SIOFA | 1 | Fisheries | 10 | 3 | 2 | 29 |
| | Nairobi | 1 | General | 10 | - | 8 | 80 |
| | Nairobi Emergency protocol | 1 | Pollution | 10 | - | 4 | 40 |
| | Nairobi LBS Protocol | 1 | Pollution | 10 | - | 8 | 80 |
| Antarctica | ICCAT | 1 | Fisheries | 50 | - | 16 | 32 |
| | ATS | 1 | General | 50 | - | 50 | 100 |
| | ATS Environmental Protocol | 1 | General | 50 | - | 35 | 70 |
| | CCAMLR | 1 | General | 50 | - | 27 | 54 |
| | CCAS | 1 | General | 50 | - | 20 | 40 |
| Arabian Sea | Dugong MOU | - | Biodiversity | 14 | - | 6 | 43 |
| | IOSEA | - | Biodiversity | 14 | 3 | 9 | 82 |
| | SACEP | - | General | 14 | 11 | 3 | 100 |
| | IOTC | 1 | Fisheries | 14 | - | 6 | 43 |
| | RECOFI | 1 | Fisheries | 14 | 6 | 8 | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Jeddah | 1 | Pollution | 14 | 10 | 4 | 100 |
| | Jeddah MBS Protocol | 1 | Pollution | 14 | 10 | 4 | 100 |
| | Kuwait | 1 | Pollution | 14 | 6 | 8 | 100 |
| | Kuwait LBS Protocol | 1 | Pollution | 14 | 6 | 6 | 75 |
| | Kuwait MBS Protocol | 1 | Pollution | 14 | 6 | 8 | 100 |
| | Kuwait Oil Spill Protocol | 1 | Pollution | 14 | 6 | 8 | 100 |
| ATSEA-North Australia Shelf | Dugong MOU | - | Biodiversity | 4 | - | 2 | 50 |
| | IOSEA | - | Biodiversity | 4 | - | 3 | 75 |
| | SE Asia RPOA | - | Fisheries | 4 | - | 4 | 100 |
| | COBSEA | - | General | 4 | 2 | 2 | 100 |
| | PEMSEA | - | General | 4 | 2 | 2 | 100 |
| | APFIC | 1 | Fisheries | 4 | - | 3 | 75 |
| | FFA | 1 | Fisheries | 4 | - | 2 | 50 |
| | IOTC | 1 | Fisheries | 4 | 2 | 2 | 100 |
| | WCPFC | 1 | Fisheries | 4 | 1 | 2 | 67 |
| Baltic Sea | ASCOBANS | 1 | Biodiversity | 9 | - | 6 | 67 |
| | NAMMCO | 1 | Biodiversity | 9 | - | - | - |
| | EU-CFP | 1 | Fisheries | 9 | - | 8 | 89 |
| | NASCO | 1 | Fisheries | 9 | - | 2 | 22 |
| | HELCON | 1 | General | 9 | - | 9 | 100 |
| | ICES | 1 | General | 9 | - | 9 | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | OSPAR | 1 | General | 9 | 4 | 4 | 80 |
| | Bonn Agreement | 1 | Pollution | 9 | - | 3 | 33 |
| Barents Sea | Arctic Council | - | General | 3 | - | 3 | 100 |
| | ACPB | 1 | Biodiversity | 3 | - | 3 | 100 |
| | NAMMCO | 1 | Biodiversity | 3 | - | 1 | 33 |
| | ICCAT | 1 | Fisheries | 3 | - | 2 | 67 |
| | NASCO | 1 | Fisheries | 3 | - | 2 | 67 |
| | NEAFC | 1 | Fisheries | 3 | - | 2 | 67 |
| | ICES | 1 | General | 3 | - | 3 | 100 |
| | OSPAR | 1 | General | 3 | - | 2 | 67 |
| Bay of Bengal | Dugong MOU | - | Biodiversity | 8 | - | 5 | 63 |
| | IOSEA | - | Biodiversity | 8 | - | 8 | 100 |
| | SEAFDEC | - | Fisheries | 8 | 4 | 4 | 100 |
| | BIMSTEC | - | General | 8 | 3 | 5 | 100 |
| | COBSEA | - | General | 8 | 5 | 3 | 100 |
| | SACEP | - | General | 8 | 4 | 4 | 100 |
| | APFIC | 1 | Fisheries | 8 | - | 7 | 88 |
| | BOBP-IGO | 1 | Fisheries | 8 | - | 4 | 50 |
| | IOTC | 1 | Fisheries | 8 | 1 | 6 | 86 |
| Beaufort Sea | Arctic Council | - | General | 2 | - | 2 | 100 |
| Benguela Current | COMHAFAT | 1 | Fisheries | 3 | 1 | 2 | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ICCAT | 1 | Fisheries | 3 | - | 3 | 100 |
| | SEAFO | 1 | Fisheries | 3 | - | 3 | 100 |
| | Abidjan Convention | 1 | General | 3 | - | 1 | 33 |
| | Benguela Current Convention | 1 | General | 3 | - | 3 | 100 |
| | Abidjan Convention Emergency Protocol | 1 | Pollution | 3 | - | 1 | 33 |
| | Abidjan Convention LBSA Protocol | 1 | Pollution | 3 | - | 1 | 33 |
| Black Sea | ACCOBAMS | 1 | Biodiversity | 6 | - | 4 | 67 |
| | Bucharest Biodiversity & Landscape Protocol | 1 | Biodiversity | 6 | 1 | 4 | 80 |
| | EU-CFP | 1 | Fisheries | 6 | - | 3 | 50 |
| | GFCM | 1 | Fisheries | 6 | - | 3 | 50 |
| | ICCAT | 1 | Fisheries | 6 | 4 | 2 | 100 |
| | Bucharest Convention | 1 | General | 6 | - | 6 | 100 |
| | Bucharest Dumping Protocol | 1 | Pollution | 6 | - | 6 | 100 |
| | Bucharest Emergency Protocol | 1 | Pollution | 6 | - | 6 | 100 |
| | Bucharest LBS Protocol | 1 | Pollution | 6 | - | 1 | 17 |
| California Current | IAC | 1 | Biodiversity | 2 | - | 2 | 100 |
| | IATTC | 1 | Fisheries | 2 | - | 2 | 100 |
| | IPHC | 1 | Fisheries | 2 | 1 | 1 | 100 |
| | MEX-US | 1 | Fisheries | 2 | | 2 | 100 |
| | NPAFC | 1 | Fisheries | 2 | 1 | 1 | 100 |
| | OLDEPESCA | 1 | Fisheries | 2 | 1 | 1 | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | PSC | 1 | Fisheries | 2 | 1 | 1 | 100 |
| | Antigua | 1 | General | 2 | 1 | - | - |
| | PICES | 1 | General | 2 | 1 | 1 | 100 |
| Canadian Eastern Arctic - West Greenland | Arctic Council | - | General | 2 | - | 2 | 100 |
| | NAMMCO | 1 | Biodiversity | 2 | - | 1 | 50 |
| | ICCAT | 1 | Fisheries | 2 | - | 1 | 50 |
| | NAFO | 1 | Fisheries | 2 | - | 2 | 100 |
| | NASCO | 1 | Fisheries | 2 | - | 2 | 100 |
| Canadian High Arctic North Greenland Shelf | Arctic Council | - | General | 2 | - | 2 | 100 |
| | NAMMCO | 1 | Biodiversity | 2 | - | 1 | 50 |
| | ICCAT | 1 | Fisheries | 2 | - | 1 | 50 |
| | NAFO | 1 | Fisheries | 2 | - | 2 | 100 |
| | NASCO | 1 | Fisheries | 2 | - | 2 | 100 |
| | NEAFC | 1 | Fisheries | 2 | 1 | 1 | 100 |
| | ICES | 1 | General | 2 | - | 1 | 50 |
| | OSPAR | 1 | General | 2 | - | 1 | 50 |
| Canary Current | CECAF | - | Fisheries | 7 | - | 7 | 100 |
| | COMHAFAT | 1 | Fisheries | 7 | 1 | 6 | 100 |
| | ICCAT | 1 | Fisheries | 7 | - | 4 | 57 |
| | SRFC | 1 | Fisheries | 7 | 2 | 5 | 100 |
| | Abidjan Convention | 1 | General | 7 | 2 | 4 | 80 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Abidjan Emergency Protocol | 1 | Pollution | 7 | 2 | 4 | 80 |
| | Abidjan LBSA Protocol | 1 | Pollution | 7 | 2 | 2 | 40 |
| Caribbean | CRFM | - | Fisheries | 27 | 13 | 14 | 100 |
| | WECAFC | - | Fisheries | 27 | 2 | 23 | 92 |
| | Cartagena SPAW Protocol | 1 | Biodiversity | 27 | - | 14 | 52 |
| | IAC | 1 | Biodiversity | 27 | - | 8 | 30 |
| | ICCAT | 1 | Fisheries | 27 | - | 14 | 52 |
| | OLDEPESCA | 1 | Fisheries | 27 | 11 | 7 | 44 |
| | OSPESCA | 1 | Fisheries | 27 | 20 | 7 | 100 |
| | Cartagena Convention | 1 | General | 27 | - | 25 | 93 |
| | Cartegena LBS Protocol | 1 | Pollution | 27 | - | 10 | 37 |
| | Catagena Oil Spill Protocol | 1 | Pollution | 27 | - | 23 | 85 |
| Celtic-Biscay Shelf | ASCOBANS | 1 | Biodiversity | 3 | - | 2 | 67 |
| | NAMMCO | 1 | Biodiversity | 3 | - | - | - |
| | EU-CFP | 1 | Fisheries | 3 | - | 3 | 100 |
| | ICCAT | 1 | Fisheries | 3 | - | 2 | 67 |
| | NASCO | 1 | Fisheries | 3 | - | - | - |
| | NEAFC | 1 | Fisheries | 3 | - | - | - |
| | ICES | 1 | General | 3 | - | 3 | 100 |
| | OSPAR | 1 | General | 3 | - | 3 | 100 |
| | Bonn Agreement | 1 | Pollution | 3 | - | 3 | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Central Arctic | Arctic Council | - | General | 4 | - | 4 | 100 |
| | ACPB | 1 | Biodiversity | 4 | 1 | 3 | 100 |
| | NAMMCO | 1 | Biodiversity | 4 | - | 2 | 50 |
| | ICCAT | 1 | Fisheries | 4 | - | 3 | 75 |
| | NASCO | 1 | Fisheries | 4 | - | 4 | 100 |
| | NEAFC | 1 | Fisheries | 4 | 1 | 3 | 100 |
| | ICES | 1 | General | 4 | - | 3 | 75 |
| | OSPAR | 1 | General | 4 | - | 1 | 25 |
| East Bering Sea | Arctic Council | - | General | 2 | - | 2 | 100 |
| | ACPB | 1 | Biodiversity | 2 | - | 2 | 100 |
| | CCBSP | 1 | Fisheries | 2 | - | 2 | 100 |
| | IPHC | 1 | Fisheries | 2 | 1 | 1 | 100 |
| | NPAFC | 1 | Fisheries | 2 | - | 2 | 100 |
| | WCPFC | 1 | Fisheries | 2 | - | 1 | 50 |
| | PICES | 1 | General | 2 | - | 2 | 100 |
| East China Sea | Dugong MOU | - | Biodiversity | 4 | 1 | - | - |
| | NOWPAP | - | General | 4 | 1 | 3 | 100 |
| | PEMSEA | - | General | 4 | 1 | 3 | 100 |
| | APFIC | 1 | Fisheries | 4 | 1 | 3 | 100 |
| | WCPFC | 1 | Fisheries | 4 | 1 | 3 | 100 |
| | PICES | 1 | General | 4 | 1 | 3 | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Faroe Plateau | Arctic Council | - | General | 2 | 1 | 1 | 100 |
| | NAMMCO | 1 | Biodiversity | 2 | 1 | 1 | 100 |
| | ICCAT | 1 | Fisheries | 2 | - | 1 | 50 |
| | NASCO | 1 | Fisheries | 2 | - | 1 | 50 |
| | NEAFC | 1 | Fisheries | 2 | - | 1 | 50 |
| | ICES | 1 | General | 2 | - | 1 | 50 |
| | OSPAR | 1 | General | 2 | - | 2 | 100 |
| Greenland Sea | Arctic Council | - | General | 3 | - | 3 | 100 |
| | ASCOBANS | 1 | Biodiversity | 3 | - | 1 | 33 |
| | NAMMCO | 1 | Biodiversity | 3 | - | 2 | 67 |
| | EU-CFP | 1 | Fisheries | 3 | - | 2 | 67 |
| | ICCAT | 1 | Fisheries | 3 | - | 2 | 67 |
| | NASCO | 1 | Fisheries | 3 | 1 | 1 | 50 |
| | NEAFC | 1 | Fisheries | 3 | - | 3 | 100 |
| | ICES | 1 | General | 3 | - | 3 | 100 |
| | OSPAR | 1 | General | 3 | - | 3 | 100 |
| | Bonn Agreement | 1 | Pollution | 3 | - | 2 | 67 |
| Guinea Current | CECAF | - | Fisheries | 17 | - | 17 | 100 |
| | COMHAFAT | 1 | Fisheries | 17 | 1 | 15 | 94 |
| | COREP | 1 | Fisheries | 17 | 12 | 5 | 100 |
| | FCWC | 1 | Fisheries | 17 | 11 | 6 | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ICCAT | 1 | Fisheries | 17 | - | 10 | 59 |
| | SRFC | 1 | Fisheries | 17 | 13 | 4 | 100 |
| | Abidjan Convention | 1 | General | 17 | - | 13 | 76 |
| | Abidjan Emergency Protocol | 1 | Pollution | 17 | - | 13 | 76 |
| | Abidjan LBS Protocol | 1 | Pollution | 17 | - | - | - |
| Gulf of Mexicio | WECAFC | - | Fisheries | 3 | - | 3 | 100 |
| | Cartagena SPAW | 1 | Biodiversity | 3 | - | 2 | 67 |
| | IAC | 1 | Biodiversity | 3 | - | 2 | 67 |
| | ICCAT | 1 | Fisheries | 3 | - | 2 | 67 |
| | MEX-US | 1 | Fisheries | 3 | 1 | 2 | 100 |
| | OLDEPESCA | 1 | Fisheries | 3 | 1 | 2 | 100 |
| | Cartagena Convention | 1 | General | 3 | - | 3 | 100 |
| | Cartagena LBS Protocol | 1 | Pollution | 3 | - | 1 | 33 |
| | Cartagena Oil Spills Protocol | 1 | Pollution | 3 | - | 3 | 100 |
| Gulf of Thailand | Dugong MOU | - | Biodiversity | 4 | - | 1 | 25 |
| | IOSEA | - | Biodiversity | 4 | - | 4 | 100 |
| | SEAFDEC | - | Fisheries | 4 | - | 4 | 100 |
| | COBSEA | - | General | 4 | - | 4 | 100 |
| | PEMSEA | - | General | 4 | - | 4 | 100 |
| | APFIC | 1 | Fisheries | 4 | - | 4 | 100 |
| | FFA | 1 | Fisheries | 4 | - | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Humboldt Current | IAC | 1 | Biodiversity | 3 | - | 3 | 100 |
| | Lima Management of CMPAs Protocol | 1 | Biodiversity | 3 | 1 | 2 | 100 |
| | IATTC | 1 | Fisheries | 3 | 2 | 1 | 100 |
| | OLDEPESCA | 1 | Fisheries | 3 | - | 1 | 33 |
| | SPRFMO | 1 | Fisheries | 3 | 1 | 1 | 50 |
| | CPPS | 1 | General | 3 | 1 | 2 | 100 |
| | Lima Convention | 1 | General | 3 | 1 | 2 | 100 |
| | Lima Hydrocarbons Protocol | 1 | Pollution | 3 | 1 | 2 | 100 |
| | Lima LBS Protocol | 1 | Pollution | 3 | 1 | 2 | 100 |
| | Lima Radioactive Protocol | 1 | Pollution | 3 | 1 | 2 | 100 |
| Iberian Coastal | ASCOBANS | 1 | Biodiversity | 3 | - | 1 | 33 |
| | NAMMCO | 1 | Biodiversity | 3 | - | - | - |
| | EU-CFP | 1 | Fisheries | 3 | - | 3 | 100 |
| | ICCAT | 1 | Fisheries | 3 | - | 1 | 33 |
| | NASCO | 1 | Fisheries | 3 | - | - | - |
| | NEAFC | 1 | Fisheries | 3 | - | - | - |
| | ICES | 1 | General | 3 | - | 3 | 100 |
| | OSPAR | 1 | General | 3 | - | 3 | 100 |
| | Bonn Agreement | 1 | Pollution | 3 | - | 1 | 33 |
| Iceland Shelf | Arctic Council | - | General | 3 | - | 3 | 100 |
| | NAMMCO | 1 | Biodiversity | 3 | - | 3 | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ICCAT | 1 | Fisheries | 3 | - | 2 | 67 |
| | NASCO | 1 | Fisheries | 3 | - | 3 | 100 |
| | NEAFC | 1 | Fisheries | 3 | - | 3 | 100 |
| | ICES | 1 | General | 3 | - | 2 | 67 |
| | OSPAR | 1 | General | 3 | - | 3 | 100 |
| Indonesian Sea | Dugong MOU | - | Biodiversity | 2 | - | - | - |
| | IOSEA | - | Biodiversity | 2 | - | 1 | 50 |
| | SEAFDEC | - | Fisheries | 2 | 1 | 1 | 100 |
| | COBSEA | - | General | 2 | 1 | 1 | 100 |
| | PEMSEA | - | General | 2 | - | 2 | 100 |
| | APFIC | 1 | Fisheries | 2 | - | 2 | 100 |
| | FFA | 1 | Fisheries | 2 | 1 | - | - |
| | IOTC | 1 | Fisheries | 2 | - | 1 | 50 |
| | WCPFC | 1 | Fisheries | 2 | 1 | - | - |
| Kuroshio Current | NOWPAP | - | General | 3 | 2 | 1 | 100 |
| | APFIC | 1 | Fisheries | 3 | 1 | 2 | 100 |
| | WCPFC | 1 | Fisheries | 3 | 1 | 2 | 100 |
| | PICES | 1 | General | 3 | 2 | 1 | 100 |
| Mediterranean Sea | ACCOBAMS | 1 | Biodiversity | 21 | - | 18 | 86 |
| | Barcelona ICZM Protocol | 1 | Biodiversity | 21 | - | 14 | 67 |
| | Barcelona SPA Protocol | 1 | Biodiversity | 21 | - | 19 | 90 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | EU-CFP | 1 | Fisheries | | 21 | 11 | 10 | 100 |
| | GFCM | 1 | Fisheries | | 21 | - | 17 | 81 |
| | ICCAT | 1 | Fisheries | | 21 | - | 14 | 67 |
| | Barcelona Convention and Protocols | 1 | General | | 21 | - | 21 | 100 |
| | Barcelona Dumping Protocol | 1 | Pollution | | 21 | - | 20 | 95 |
| | Barcelona Emergency protocol | 1 | Pollution | | 21 | - | 20 | 95 |
| | Barcelona Hazardous Protocol | 1 | Pollution | | 21 | - | 14 | 67 |
| | Barcelona LBS Protocol | 1 | Pollution | | 21 | - | 21 | 100 |
| | Barcelona Offshore Protocol | 1 | Pollution | | 21 | - | 14 | 67 |
| Newfoundland-Labrador Shelf | NAMMCO | 1 | Biodiversity | | 2 | - | - | - |
| | ICCAT | 1 | Fisheries | | 2 | - | 2 | 100 |
| | NAFO | 1 | Fisheries | | 2 | - | 2 | 100 |
| | NASCO | 1 | Fisheries | | 2 | - | 1 | 50 |
| North Bering - Chukchi Sea | ACPB & Alaska-Chukotka | - | Biodiversity | 2 | | - | 2 | 100 |
| | Arctic Council | - | General | | 2 | - | 2 | 100 |
| | IPHC | 1 | Fisheries | | 2 | 1 | 1 | 100 |
| | PICES | 1 | General | | 2 | - | 2 | 100 |
| North Brazil Shelf | CRFM | - | Fisheries | | 7 | 1 | 5 | 83 |
| | WECAFC | - | Fisheries | | 7 | - | 7 | 100 |
| | Cartagena SPAW Protocol | 1 | Biodiversity | | 7 | 1 | 5 | 83 |
| | ICCAT | 1 | Fisheries | | 7 | - | 5 | 71 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | OLDEPESCA | 1 | Fisheries | 7 | 1 | 2 | 33 |
| | Cartagena Convention | 1 | General | 7 | 1 | 5 | 83 |
| | Cartagena LBS Protocol | 1 | Pollution | 7 | 1 | 3 | 50 |
| | Cartagena Oil Spill Protocol | 1 | Pollution | 7 | 1 | 5 | 83 |
| North Sea | ASCOBANS | 1 | Biodiversity | 9 | - | 7 | 78 |
| | NAMMCO | 1 | Biodiversity | 9 | - | 3 | 33 |
| | EU-CFP | 1 | Fisheries | 9 | - | 6 | 67 |
| | ICCAT | 1 | Fisheries | 9 | 3 | 3 | 50 |
| | NASCO | 1 | Fisheries | 9 | - | 4 | 44 |
| | NEAFC | 1 | Fisheries | 9 | - | 3 | 33 |
| | ICES | 1 | General | 9 | - | 7 | 78 |
| | OSPAR | 1 | General | 9 | - | 9 | 100 |
| | Bonn Agreement | 1 | Pollution | 9 | - | 7 | 78 |
| Northeast US Continental Shelf | NAMMCO | 1 | Biodiversity | 2 | - | - | - |
| | ICCAT | 1 | Fisheries | 2 | - | 2 | 100 |
| | NAFO | 1 | Fisheries | 2 | - | 2 | 100 |
| | NASCO | 1 | Fisheries | 2 | - | 2 | 100 |
| Norwegian Sea | Arctic Council | - | General | 5 | 1 | 4 | 100 |
| | NAMMCO | 1 | Biodiversity | 5 | - | 3 | 60 |
| | ICCAT | 1 | Fisheries | 5 | - | 4 | 80 |
| | NASCO | 1 | Fisheries | 5 | - | 3 | 60 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NEAFC | 1 | Fisheries | 5 | - | | 4 | 80 |
| | ICES | 1 | General | 5 | - | | 5 | 100 |
| | OSPAR | 1 | General | 5 | - | | 5 | 100 |
| Oyashio Current | PICES | 1 | General | 2 | - | | 2 | 100 |
| Pacific Central American | IAC | 1 | Biodiversity | 10 | - | | 7 | 70 |
| | Lima Management of CMPAs Protocol | 1 | Biodiversity | 10 | 6 | | 4 | 100 |
| | IATTC | 1 | Fisheries | 10 | 1 | | 9 | 100 |
| | OLDEPESCA | 1 | Fisheries | 10 | - | | 7 | 70 |
| | OSPESCA | 1 | Fisheries | 10 | 4 | | 6 | 100 |
| | Antigua | 1 | General | 10 | - | | - | - |
| | CPPS | 1 | General | 10 | 7 | | 3 | 100 |
| | Lima | 1 | General | 10 | 6 | | 4 | 100 |
| | Lima Hydrocarbons Protocol | 1 | Pollution | 10 | 6 | | 4 | 100 |
| | Lima LBS Protocol | 1 | Pollution | 10 | 6 | | 4 | 100 |
| | Lima Radioactive Protocol | 1 | Pollution | 10 | 6 | | 4 | 100 |
| Pacific Warm Pool | SPC | - | Fisheries | 26 | - | | 25 | 96 |
| | PIF | - | General | 26 | 10 | 16 | | 100 |
| | FFA | 1 | Fisheries | 26 | - | | 17 | 65 |
| | SPRFMO | 1 | Fisheries | 26 | - | | 4 | 15 |
| | WCPFC | 1 | Fisheries | 26 | 8 | | 18 | 100 |
| | Noumea Convention | 1 | General | 26 | - | | 12 | 46 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Noumea Dumping protocol | 1 | Pollution | 26 | - | 12 | 46 |
| | Noumea Emergency Protocol | 1 | Pollution | 26 | - | 12 | 46 |
| Patagonian Shelf | IAC | 1 | Biodiversity | 3 | - | 2 | 67 |
| | CCSBT | 1 | Fisheries | 3 | - | - | - |
| | ICCAT | 1 | Fisheries | 3 | - | 2 | 67 |
| | Rio de la Plata Treaty | 1 | General | 3 | 1 | 2 | 100 |
| Red Sea | Dugong MOU | - | Biodiversity | 9 | - | 5 | 56 |
| | IOTC | 1 | Fisheries | 9 | 3 | 3 | 50 |
| | Jeddah | 1 | General | 9 | - | 7 | 78 |
| | Jeddah Oil Spill Protocol | 1 | Pollution | 9 | - | 7 | 78 |
| Scotian Shelf | NAMMCO | 1 | Biodiversity | 2 | | - | - |
| | ICCAT | 1 | Fisheries | 2 | - | 2 | 100 |
| | NAFO | 1 | Fisheries | 2 | | 2 | 100 |
| | NASCO | 1 | Fisheries | 2 | | 1 | 50 |
| Sea of Japan | NOWPAP | - | General | 4 | - | 4 | 100 |
| | PICES | 1 | General | 4 | - | 3 | 75 |
| Sea of Okhotsk | Arctic Council | - | General | 2 | 1 | 1 | 100 |
| | NOWPAP | - | General | 2 | - | 2 | 100 |
| | PICES | 1 | General | 2 | - | 2 | 100 |
| South Brazil Shelf | IAC | 1 | Biodiversity | 2 | - | 2 | 100 |
| | ICCAT | 1 | Fisheries | 2 | - | 2 | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| South China Sea | Dugong MOU | - | Biodiversity | 7 | 1 | 1 | 17 |
| | IOSEA | - | Biodiversity | 7 | 3 | 4 | 100 |
| | SEAFDEC | - | Fisheries | 7 | 2 | 5 | 100 |
| | COBSEA | - | General | 7 | 1 | 6 | 100 |
| | PEMSEA | - | General | 7 | 1 | 6 | 100 |
| | APFIC | 1 | Fisheries | 7 | 1 | 5 | 83 |
| | FFA | 1 | Fisheries | 7 | - | - | - |
| | WCPFC | 1 | Fisheries | 7 | 2 | 2 | 40 |
| Southeast US Continental LME | CRFM | - | Fisheries | 2 | 1 | 1 | 100 |
| | WECAFC | - | Fisheries | 2 | - | 2 | 100 |
| | Cartagena SPAW | 1 | Biodiversity | 2 | - | 1 | 50 |
| | IAC | 1 | Biodiversity | 2 | - | 1 | 50 |
| | ICCAT | 1 | Fisheries | 2 | - | 1 | 50 |
| | Cartagena Convention | 1 | General | 2 | - | 2 | 100 |
| | Cartagena LBS Protocol | 1 | Pollution | 2 | - | 2 | 100 |
| | Cartagena Oil Spill Protocol | 1 | Pollution | 2 | - | 2 | 100 |
| Sulu-Celebes Sea | Dugong MOU | - | Biodiversity | 3 | - | 1 | 33 |
| | IOSEA | - | Biodiversity | 3 | - | 3 | 100 |
| | SEAFDEC | - | Fisheries | 3 | - | 3 | 100 |
| | COBSEA | - | General | 3 | - | 3 | 100 |
| | PEMSEA | - | General | 3 | - | 3 | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | APFIC | 1 | Fisheries | 3 | - | 3 | 100 |
| | FFA | 1 | Fisheries | 3 | - | - | - |
| | WCPFC | 1 | Fisheries | 3 | - | 1 | 33 |
| West Bering Sea | Arctic Council | - | General | 2 | - | 2 | 100 |
| | ACPB | 1 | Biodiversity | 2 | | 2 | 100 |
| | PICES | 1 | General | 2 | - | 2 | 100 |
| Yellow Sea | NOWPAP | - | General | 3 | - | 3 | 100 |
| | PICES | 1 | General | 3 | - | 2 | 67 |

**IOC Technical Series**

| No. | Title | Languages |
|---|---|---|
| 1 | Manual on International Oceanographic Data Exchange. 1965 | (out of stock) |
| 2 | Intergovernmental Oceanographic Commission (Five years of work). 1966 | (out of stock) |
| 3 | Radio Communication Requirements of Oceanography. 1967 | (out of stock) |
| 4 | Manual on International Oceanographic Data Exchange - Second revised edition. 1967 | (out of stock) |
| 5 | Legal Problems Associated with Ocean Data Acquisition Systems (ODAS). 1969 | (out of stock) |
| 6 | Perspectives in Oceanography, 1968 | (out of stock) |
| 7 | Comprehensive Outline of the Scope of the Long-term and Expanded Programme of Oceanic Exploration and Research. 1970 | (out of stock) |
| 8 | IGOSS (Integrated Global Ocean Station System) - General Plan Implementation Programme for Phase I. 1971 | (out of stock) |
| 9 | Manual on International Oceanographic Data Exchange - Third Revised Edition. 1973 | (out of stock) |
| 10 | Bruun Memorial Lectures, 1971 | E, F, S, R |
| 11 | Bruun Memorial Lectures, 1973 | (out of stock) |
| 12 | Oceanographic Products and Methods of Analysis and Prediction. 1977 | E only |
| 13 | International Decade of Ocean Exploration (IDOE), 1971-1980. 1974 | (out of stock) |
| 14 | A Comprehensive Plan for the Global Investigation of Pollution in the Marine Environment and Baseline Study Guidelines. 1976 | E, F, S, R |
| 15 | Bruun Memorial Lectures, 1975 - Co-operative Study of the Kuroshio and Adjacent Regions. 1976 | (out of stock) |
| 16 | Integrated Ocean Global Station System (IGOSS) General Plan and Implementation Programme 1977-1982. 1977 | E, F, S, R |
| 17 | Oceanographic Components of the Global Atmospheric Research Programme (GARP) . 1977 | (out of stock) |
| 18 | Global Ocean Pollution: An Overview. 1977 | (out of stock) |
| 19 | Bruun Memorial Lectures - The Importance and Application of Satellite and Remotely Sensed Data to Oceanography. 1977 | (out of stock) |
| 20 | A Focus for Ocean Research: The Intergovernmental Oceanographic Commission - History, Functions, Achievements. 1979 | (out of stock) |
| 21 | Bruun Memorial Lectures, 1979: Marine Environment and Ocean Resources. 1986 | E, F, S, R |
| 22 | Scientific Report of the Interealibration Exercise of the IOC-WMO-UNEP Pilot Project on Monitoring Background Levels of Selected Pollutants in Open Ocean Waters. 1982 | (out of stock) |
| 23 | Operational Sea-Level Stations. 1983 | E, F, S, R |
| 24 | Time-Series of Ocean Measurements. Vol.1. 1983 | E, F, S, R |
| 25 | A Framework for the Implementation of the Comprehensive Plan for the Global Investigation of Pollution in the Marine Environment. 1984 | (out of stock) |
| 26 | The Determination of Polychlorinated Biphenyls in Open-ocean Waters. 1984 | E only |
| 27 | Ocean Observing System Development Programme. 1984 | E, F, S, R |
| 28 | Bruun Memorial Lectures, 1982: Ocean Science for the Year 2000. 1984 | E, F, S, R |
| 29 | Catalogue of Tide Gauges in the Pacific. 1985 | E only |
| 30 | Time-Series of Ocean Measurements. Vol. 2. 1984 | E only |
| 31 | Time-Series of Ocean Measurements. Vol. 3. 1986 | E only |
| 32 | Summary of Radiometric Ages from the Pacific. 1987 | E only |
| 33 | Time-Series of Ocean Measurements. Vol. 4. 1988 | E only |
| 34 | Bruun Memorial Lectures, 1987: Recent Advances in Selected Areas of Ocean Sciences in the Regions of the Caribbean, Indian Ocean and the Western Pacific. 1988 | Composite E, F, S |
| 35 | Global Sea-Level Observing System (GLOSS) Implementation Plan. 1990 | E only |

*(continued)*

| | | |
|---|---|---|
| 36 | Bruun Memorial Lectures 1989: Impact of New Technology on Marine Scientific Research. 1991 | Composite E, F, S |
| 37 | Tsunami Glossary - A Glossary of Terms and Acronyms Used in the Tsunami Literature. 1991 | E only |
| 38 | The Oceans and Climate: A Guide to Present Needs. 1991 | E only |
| 39 | Bruun Memorial Lectures, 1991: Modelling and Prediction in Marine Science. 1992 | E only |
| 40 | Oceanic Interdecadal Climate Variability. 1992 | E only |
| 41 | Marine Debris: Solid Waste Management Action for the Wider Caribbean. 1994 | E only |
| 42 | Calculation of New Depth Equations for Expendable Bathymerographs Using a Temperature-Error-Free Method (Application to Sippican/TSK T-7, T-6 and T-4 XBTS. 1994 | E only |
| 43 | IGOSS Plan and Implementation Programme 1996-2003. 1996 | E, F, S, R |
| 44 | Design and Implementation of some Harmful Algal Monitoring Systems. 1996 | E only |
| 45 | Use of Standards and Reference Materials in the Measurement of Chlorinated Hydrocarbon Residues. 1996 | E only |
| 46 | Equatorial Segment of the Mid-Atlantic Ridge. 1996 | E only |
| 47 | Peace in the Oceans: Ocean Governance and the Agenda for Peace; the Proceedings of *Pacem in Maribus* XXIII, Costa Rica, 1995. 1997 | E only |
| 48 | Neotectonics and fluid flow through seafloor sediments in the Eastern Mediterranean and Black Seas - Parts I and II. 1997 | E only |
| 49 | Global Temperature Salinity Profile Programme: Overview and Future. 1998 | E only |
| 50 | Global Sea-Level Observing System (GLOSS) Implementation Plan-1997. 1997 | E only |
| 51 | L'état actuel de 1'exploitation des pêcheries maritimes au Cameroun et leur gestion intégrée dans la sous-région du Golfe de Guinée *(cancelled)* | F only |
| 52 | Cold water carbonate mounds and sediment transport on the Northeast Atlantic Margin. 1998 | E only |
| 53 | The Baltic Floating University: Training Through Research in the Baltic, Barents and White Seas - 1997. 1998 | E only |
| 54 | Geological Processes on the Northeast Atlantic Margin (8$^{th}$ training-through-research cruise, June-August 1998). 1999 | E only |
| 55 | Bruun Memorial Lectures, 1999: Ocean Predictability. 2000 | E only |
| 56 | Multidisciplinary Study of Geological Processes on the North East Atlantic and Western Mediterranean Margins (9$^{th}$ training-through-research cruise, June-July 1999). 2000 | E only |
| 57 | Ad hoc Benthic Indicator Group - Results of Initial Planning Meeting, Paris, France, 6-9 December 1999. 2000 | E only |
| 58 | Bruun Memorial Lectures, 2001: Operational Oceanography – a perspective from the private sector. 2001 | E only |
| 59 | Monitoring and Management Strategies for Harmful Algal Blooms in Coastal Waters. 2001 | E only |
| 60 | Interdisciplinary Approaches to Geoscience on the North East Atlantic Margin and Mid-Atlantic Ridge (10$^{th}$ training-through-research cruise, July-August 2000). 2001 | E only |
| 61 | Forecasting Ocean Science? Pros and Cons, Potsdam Lecture, 1999. 2002 | E only |
| 62 | Geological Processes in the Mediterranean and Black Seas and North East Atlantic (11$^{th}$ training-through-research cruise, July- September 2001). 2002 | E only |
| 63 | Improved Global Bathymetry – Final Report of SCOR Working Group 107. 2002 | E only |
| 64 | R. Revelle Memorial Lecture, 2006: Global Sea Levels, Past, Present and Future. 2007 | E only |
| 65 | Bruun Memorial Lectures, 2003: Gas Hydrates – a potential source of energy from the oceans. 2003 | E only |
| 66 | Bruun Memorial Lectures, 2003: Energy from the Sea: the potential and realities of Ocean Thermal Energy Conversion (OTEC). 2003 | E only |

| | | |
|---|---|---|
| 67 | Interdisciplinary Geoscience Research on the North East Atlantic Margin, Mediterranean Sea and Mid-Atlantic Ridge (12th training-through-research cruise, June-August 2002). 2003 | E only |
| 68 | Interdisciplinary Studies of North Atlantic and Labrador Sea Margin Architecture and Sedimentary Processes (13th training-through-research cruise, July-September 2003). 2004 | E only |
| 69 | Biodiversity and Distribution of the Megafauna / Biodiversité et distribution de la mégafaune. 2006<br>Vol.1 The polymetallic nodule ecosystem of the Eastern Equatorial Pacific Ocean / Ecosystème de nodules polymétalliques de l'océan Pacifique Est équatorial<br>Vol.2 Annotated photographic Atlas of the echinoderms of the Clarion-Clipperton fracture zone / Atlas photographique annoté des échinodermes de la zone de fractures de Clarion et de Clipperton<br>Vol.3 Options for the management and conservation of the biodiversity — The nodule ecosystem in the Clarion Clipperton fracture zone: scientific, legal and institutional aspects | E F |
| 70 | Interdisciplinary geoscience studies of the Gulf of Cadiz and Western Mediterranean Basin (14th training-through-research cruise, July-September 2004). 2006 | E only |
| 71 | Indian Ocean Tsunami Warning and Mitigation System, IOTWS. Implementation Plan, 7–9 April 2009 (2nd Revision). 2009 | E only |
| 72 | Deep-water Cold Seeps, Sedimentary Environments and Ecosystems of the Black and Tyrrhenian Seas and the Gulf of Cadiz (15th training-through-research cruise, June–August 2005). 2007 | E only |
| 73 | Implementation Plan for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS), 2007–2011. 2007 *(electronic only)* | E only |
| 74 | Bruun Memorial Lectures, 2005: The Ecology and Oceanography of Harmful Algal Blooms – Multidisciplinary approaches to research and management. 2007 | E only |
| 75 | National Ocean Policy. The Basic Texts from: Australia, Brazil, Canada, China, Colombia, Japan, Norway, Portugal, Russian Federation, United States of America. (Also Law of Sea Dossier 1). 2008 | E only |
| 76 | Deep-water Depositional Systems and Cold Seeps of the Western Mediterranean, Gulf of Cadiz and Norwegian Continental margins (16th training-through-research cruise, May–July 2006). 2008 | E only |
| 77 | Indian Ocean Tsunami Warning and Mitigation System (IOTWS) – 12 September 2007 Indian Ocean Tsunami Event. Post-Event Assessment of IOTWS Performance. 2008 | E only |
| 78 | Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE EWS) – Implementation Plan 2013–2017 (Version 2.0). 2013 | E only |
| 79 | Filling Gaps in Large Marine Ecosystem Nitrogen Loadings Forecast for 64 LMEs – GEF/LME global project Promoting Ecosystem-based Approaches to Fisheries Conservation and Large Marine Ecosystems. 2008 | E only |
| 80 | Models of the World's Large Marine Ecosystems. GEF/LME Global Project Promoting Ecosystem-based Approaches to Fisheries Conservation and Large Marine Ecosystems. 2008 | E only |
| 81 | Indian Ocean Tsunami Warning and Mitigation System (IOTWS) – Implementation Plan for Regional Tsunami Watch Providers (RTWP). 2008 | E only |
| 82 | Exercise Pacific Wave 08 – A Pacific-wide Tsunami Warning and Communication Exercise, 28–30 October 2008. 2008 | E only |
| *83.* | *Cancelled* | |
| 84. | Global Open Oceans and Deep Seabed (GOODS) Bio-geographic Classification. 2009 | E only |
| 85. | Tsunami Glossary | E, F, S |
| 86 | Pacific Tsunami Warning System (PTWS) Implementation Plan | *Electronic publication* |

*(continued)*

| | | |
|---|---|---|
| 87. | Operational Users Guide for the Pacific Tsunami Warning and Mitigation System (PTWS) – Second Edition. 2011 | E only |
| 88. | Exercise Indian Ocean Wave 2009 (IOWave09) – An Indian Ocean-wide Tsunami Warning and Communication Exercise – 14 October 2009. 2009 | E only |
| 89. | Ship-based Repeat Hydrography: A Strategy for a Sustained Global Programme. 2009 | E only |
| 90. | 12 January 2010 Haiti Earthquake and Tsunami Event Post-Event Assessment of CARIBE EWS Performance. 2010 | E only |
| 91. | Compendium of Definitions and Terminology on Hazards, Disasters, Vulnerability and Risks in a coastal context | *Under preparation* |
| 92. | 27 February 2010 Chile Earthquake and Tsunami Event – Post-Event Assessment of PTWS Performance (Pacific Tsunami Warning System). 2010 | E only |
| 93. | Exercise CARIBE WAVE 11 / LANTEX 11—A Caribbean Tsunami Warning Exercise, 23 March 2011 | |
| | Vol. 1 Participant Handbook / Exercise CARIBE WAVE 11 —Exercice d'alerte au tsunami dans les Caraïbes, 23 mars 2011. Manuel du participant / Ejercicio Caribe Wave 11. Un ejercicio de alerta de tsunami en el Caribe, 23 de marzo de 2011. Manual del participante. 2010 | E/F/S |
| | Vol. 2 Report. 2011 | E only |
| | Vol. 3 Supplement: Media Reports. 2011 | E/F/S |
| 94. | Cold seeps, coral mounds and deep-water depositional systems of the Alboran Sea, Gulf of Cadiz and Norwegian continental margin (17th training-through-research cruise, June–July 2008) | E only |
| 95. | International Post-Tsunami Survey for the 25 October 2010 Mentawai, Indonesia Tsunami | E only |
| 96. | Pacific Tsunami Warning System (PTWS) 11 March 2011 Off Pacific coast of Tohoku, Japan, Earthquake and Tsunami Event. Post-Event Assessment of PTWS Performance | E only |
| 97. | Exercise PACIFIC WAVE 11: A Pacific-wide Tsunami Warning and Communication Exercise, 9–10 November 2011 | |
| | Vol. 1 Exercise Manual. 2011 | E only |
| | Vol. 2 Report. 2013 | E only |
| 98. | Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and connected seas. First Enlarged Communication Test Exercise (ECTE1). Exercise Manual and Evaluation Report. 2011 | E only |
| 99. | Exercise INDIAN OCEAN WAVE 2011 – An Indian Ocean-wide Tsunami Warning and Communication Exercise, 12 October 2011 | E only |
| | Vol. 1 Exercise Manual. 2011<br>Supplement: Bulletins from the Regional Tsunami Service Providers | |
| | Vol. 2 Exercise Report. 2013 | |
| 100. | Global Sea Level Observing System (GLOSS) Implementation Plan – 2012. 2012 | E only |
| 101. | Exercise Caribe Wave/Lantex 13. A Caribbean Tsunami Warning Exercise, 20 March 2013. Volume 1: Participant Handbook. 2012 | E only |
| 102. | Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas — Second Enlarged Communication Test Exercise (CTE2), 22 May 2012. | E only |
| | Vol. 1 Exercise Manual. 2012 | |
| | Vol. 2 Evaluation Report. 2014 | |
| 103. | Exercise NEAMWAVE 12. A Tsunami Warning and Communication Exercise for the North-eastern Atlantic, the Mediterranean, and Connected Seas Region, 27–28 November 2012. | E only |
| | Vol. 1: Exercise Manual. 2012 | |
| | Vol. 2: Evaluation Report. 2013 | |
| 104. | Seísmo y tsunami del 27 de agosto de 2012 en la costa del Pacífico frente a El Salvador, y seísmo del 5 de septiembre de 2012 en la costa del Pacífico frente a Costa Rica. Evaluación subsiguiente sobre el funcionamiento del Sistema de Alerta contra los Tsunamis y Atenuación de sus Efectos en el Pacífico. 2012 | Español solamente (resumen en inglés y francés) |
| 105. | Users Guide for the Pacific Tsunami Warning Center Enhanced Products for the Pacific Tsunami Warning System, August 2014. Revised Edition. 2014 | E, S |

| | | |
|---|---|---|
| 106. | Exercise Pacific Wave 13. A Pacific-wide Tsunami Warning and Enhanced Products Exercise, 1–14 May 2013.<br>Vol. 1 Exercise Manual. 2013<br>Vol. 2 Summary Report. 2013 | E only |
| 107. | Tsunami Public Awareness and Educations Strategy for the Caribbean and Adjacent Regions. 2013 | E only |
| 108. | Pacific Tsunami Warning and Mitigation System (PTWS) Medium-Term Strategy, 2014−2021. 2013 | E only |
| 109. | Exercise Caribe Wave/Lantex 14. A Caribbean and Northwestern Atlantic Tsunami Warning Exercise, 26 March 2014.<br>Vol. 1 Participant Handbook. 2014 | E/S |
| 110. | Directory of atmospheric, hydrographic and biological datasets for the Canary Current Large Marine Ecosystem. 2014 | E only |
| 111. | Integrated Regional Assessments in support of ICZM in the Mediterranean and Black Sea Basins. 2014 | E only |
| 112. | 11 April 2012 West of North Sumatra Earthquake and Tsunami Event - Post-event Assessment of IOTWS Performance | E only |
| 113. | Exercise Indian Ocean Wave 2014: An Indian Ocean-wide Tsunami Warning and Communication Exercise. | E only |
| 114. | Exercise NEAMWAVE 14. A Tsunami Warning and Communication Exercise for the North-Eastern Atlantic, the Mediterranean, and Connected Seas Region, 28–30 October 2014<br>Vol. 1 Manual<br>Vol. 2 Evaluation Report – Supplement: Evaluation by Message Providers and Civil Protection Authorities | E only |
| 115. | Oceanographic and Biological Features in the Canary Current Large Marine Ecosystem. 2015 | E only |
| 116. | Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas. Third Enlarged Communication Test Exercise (CTE3), 1st October 2013.<br>Vol. 1 Exercise Manual<br>Vol. 2 Evaluation Report | E only |
| 117. | Exercise Pacific Wave 15. A Pacific-wide Tsunami Warning and Enhanced Products Exercise, 2–6 February 2015<br>Vol. 1: Exercise Manual; Vol. 2: Summary Report | E only |
| 118. | Exercise Caribe Wave/Lantex 15. A Caribbean and Northwestern Atlantic Tsunami Warning Exercise, 25 March 2015 (SW Caribbean Scenario)<br>Vol. 1: Participant Handbook | E only |
| 119. | Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean<br>Vol 1: Transboundary Large Marine Ecosystems<br>Vol 2: Areas Beyond National Jurisdiction | E only |
| 120. | Status and Trends in Primary Productivity and Chlorophyll from 1996 to 2014 in Large Marine Ecosystems and the Western Pacific Warm Pool, Based on Data from Satellite Ocean Colour Sensors | *In preparation* |

United Nations
Educational, Scientific and
Cultural Organization

Intergovernmental
Oceanographic
Commission

Technical Series 119

# Transboundary Waters Assessment Programme (TWAP)
# Assessment of Governance Arrangements for the Ocean
## Volume 2 • Areas Beyond National Jurisdiction

CERMES UWI
DALHOUSIE UNIVERSITY Inspiring Minds
UNEP
gef
TWAP TRANSBOUNDARY WATERS ASSESSMENT PROGRAMME

**Intergovernmental Oceanographic Commission**

**Technical Series 119**

# Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean

## Volume 2

## Areas Beyond National Jurisdiction

Robin Mahon
Lucia Fanning
Kristina M. Gjerde
Oran Young
Michael Reid
Selicia Douglas


**UNESCO 2015**

**Disclaimer**

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariats of UNESCO and IOC concerning the legal status of any country or territory, or its authorities, or concerning the delimitation of the frontiers of any country or territory.

The authors are responsible for the choice and the presentation of the facts contained in this publication and for the opinions expressed therein, which are not necessarily those of UNESCO and do not commit the Organization.

**For bibliographic purposes, this document should be cited as:** Robin Mahon[1], Lucia Fanning[2], Kristina M. Gjerde[3], Oran Young[4], Michael Reid[2], Selicia Douglas[2]. 2015. *Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean, Volume 2: Areas Beyond National Jurisdiction*. UNESCO-IOC, Paris. IOC Technical Series, 119: 91 pp.

[1] Centre for Resource Management and Environmental Studies (CERMES), University of the West Indies, Cave Hill Campus, St. Michael, Barbados

[2] Marine Affairs Program, Dalhousie University, Halifax, Nova Scotia, Canada B3H 3R2

[3] Senior High Seas Advisor, IUCN Global Marine and Polar Programme, 105 Irving St. Cambridge, MA, USA

[4] Bren School of Environmental Science and Management, University of California, Santa Barbara, Santa Barbara, CA 93106-5131, USA.

## Additional information:

This report is one of three supplementary reports produced by the IOC/UNESCO through the Transboundary Waters Assessment Programme (TWAP), which was supported by the Global Environment Facility. The other reports in this series are: Assessment of Governance Arrangements for the Ocean, Volume 1: Transboundary Large Marine Ecosystems. (IOC Technical Series 119 Vol 1); and Status and Trends in Primary Productivity and Chlorophyll from 1996 to 2014 in Large Marine Ecosystems and the Western Pacific Warm Pool, Based on Data from Satellite Ocean Colour Sensors (IOC Technical Series 120).

Published in 2015
by United Nations Educational, Scientific
and Cultural Organization
7, Place de Fontenoy, 75352 Paris 07 SP
UNESCO 2015
(

(IOC/2015/TS/119 Vol.2)

## Preface

This report is an output of the Open Ocean Component of the Global Environment Facility (GEF) Transboundary Waters Assessment Programme (TWAP) (2013-2015). TWAP conducted indicator-based assessments for transboundary water systems in five categories: aquifers, rivers, lakes, Large Marine Ecosystems (LMEs) and Open Ocean. These included assessment of governance arrangements and overall architecture for transboundary systems. This report covers the arrangements for the Open Ocean with a focus on areas beyond national jurisdiction (ABNJ), while its companion (Volume 1) covers arrangement for LMEs. Each report is summarised as a chapter in the overall assessment report for the respective water category (Open Ocean and LME).

The database of agreements that formed the basis of this report is available online as part of the GEOWOW/TWAP OneSharedOcean.org initiative (hosted by the UNESCO-IOC International Oceanographic Data and Information Exchange (IODE)). It will provide a focal access point for ocean scientists and policy makers to retrieve and share data. This will also include an interactive website where the agreements and regional clusters can be explored spatially.

The authors thank Kimberley Baldwin for conducting the GIS analyses used in this report and Katherine Blackman for assistance with compiling data on governance agreements. We also wish to thank the reviewers Julian Rochette and Jakob Granit for their valuable comments. We are grateful to UNESCO-IOC for the opportunity to carry out this work.

We take this opportunity to let readers know that this report covers primarily the extent to which arrangements are in place and appear to conform to widely accepted governance norms. It does not assess the performance or effectiveness of these arrangements. It also examines the extent to which the set of arrangements for ABNJ have an overall pattern that might be useful in understanding them, and how they relate to arrangements for areas within national jurisdiction (AWNJ). Assessment of the performance or effectiveness of these arrangements and how these relate to the presence of ‘good governance’ characteristics should be the next stage of this work.

RM, LF

## Contents

## Summary

The ocean area beyond national jurisdiction (ABNJ) covers about half of the surface of planet Earth, with those within national jurisdiction (AWNJ) covering a further 20 percent. ABNJ provide many important ecosystem services. These ecosystem services are increasingly under threat from a diversity of anthropogenic impacts arising from fisheries, land and marine-based sources of pollution, and climate change. Several recent high-level meetings and reports have concluded that poor governance is a root cause of unsustainability of ecosystem services from the global ocean. Current thinking about governance suggests that addressing this root cause will require much more than the conventional historical focus on regulatory processes and enforcement. It recognizes that governance is much broader than this and encompasses the private sector, civil society and resource users of all kinds. This has led to increased attention to the institutional arrangements and structures within which governance processes play out.

The global governance arrangements for the ocean fall under the constitutive framework of the 1982 United Nations Convention on the Law of the Sea (UNCLOS). The preamble to UNCLOS acknowledges that 'the problems of ocean space are closely interrelated and need to be considered as a whole'. This perception of the need to manage ocean issues in an integrated and coordinated manner runs throughout the Convention. However, despite the large array of global and regional conventions, treaties and other arrangements for governance of the major ocean issues, coordination and integration among issues such as biodiversity, fisheries, pollution and climate are often weak.

As with other social-ecological systems, governance of the ocean involves much more than these global conventions. It includes governmental structures, markets, and civil society arrangements. Thus, in deciding where future interventions can help to mediate the relationship between human and natural systems and increase human well-being, both the existing global legal framework and linkages with other critical components and actors of the system will need to be fully appreciated by the Global Environment Facility (GEF) and other stakeholders. Given the interconnectedness of the world's ocean, linkages to national and even local level governance processes will also play critical roles in the governance of ocean areas beyond national jurisdiction (ABNJ).

This report examines the plethora (over 100) of international agreements comprising the global ocean governance architecture for the key issues, fisheries, pollution, biodiversity and climate change, in ABNJ. Indeed, these issues are critical for all ocean areas, so the report also considers the linkages of governance arrangements in ABNJ with those for areas within national jurisdiction (AWNJ). This study confirms that there is indeed considerable room for improvement in integration at the global and regional levels, and that there are significant gaps in coverage of issues, especially biodiversity. It provides indications of where interventions may be needed and proposes an overall structure to make ocean governance architecture more approachable.

It is important to note that the assessment is intended to look only at governance arrangements and architecture. Due to limitations in time and resources, it does not examine governance effectiveness, important as assessment of effectiveness may be.

## Approach to the assessment

The approach to the assessment was to assemble all governance agreements that were found to have relevance to the four issues of concern in the ABNJ: fisheries, biodiversity, pollution, and climate change. These agreements were compiled into a database to facilitate assessment of the extent to which the issues are covered either globally or regionally. An arrangement is any multilateral agreement, together with organizational structures and processes in place to give effect to it[1]. The assessment also examined each arrangement to determine whether policy processes considered to be adequate for good governance are in place. The arrangements are

[1] In the governance literature the term 'regime' is also often used to refer to arrangements as defined here.

also examined from a spatial perspective to determine geographical overlaps and gaps as well as the extent to which ABNJ are covered by governance arrangements.

The determination of direct relevance is based on whether the agreement is intended to address an ABNJ or straddling issue. On this basis, all relevant global agreements were included as well as many regional ones, such as regional fisheries conventions and Regional Seas Programme conventions that address ABNJ. With regard to fisheries, all agreements for Regional Fishery Management Organisations (RFMOs) and Regional Fisheries Bodies (RFBs) with responsibility extending into ABNJ or for highly migratory or straddling stocks were included. It should be noted that this includes a wide diversity of types of fisheries bodies with mandates ranging from purely advisory to those with the capacity to make binding decisions on fisheries management. With regard to pollution, all land-based sources of pollution (LBS) impacting ABNJ pass through coastal waters. Therefore, regional agreements addressing LBS were considered to be directly relevant to ABNJ. Most marine-based sources of pollution (MBS) may also be transported by currents from EEZs into ABNJ. This approach leads to a preponderance of pollution-oriented agreements which are primarily aimed at addressing coastal pollution problems. For biodiversity, the inclusion of agreements oriented towards national waters was considered. These are primarily protocols arising from Regional Seas conventions. It was thought that while the inclusion of pollution agreements under Regional Seas conventions was important for the reasons given above, the case for inclusion of biodiversity agreements was less clear. Most Regional Seas-based biodiversity agreements only relate to ABNJ when protected areas or other measures provide protection for straddling or highly migratory species (HMS) such as sea turtles, seabirds, and marine mammals. It was decided that including these agreements would provide a biased picture regarding biodiversity conservation in ABNJ.

For each of the agreements included in the database, a variety of information was obtained. The primary sources for the information included in the database were the actual conventions and agreements, rules of procedure for the organisations and secretariats for the agreements, and organisational websites. When the desired information could not be found in these sources, other documentation and websites were explored. Typically, intergovernmental agreements fall into two categories: (1) constituting agreements[2] and (2) implementing or operational agreements. Constituting agreements are aimed at setting the broad context and issues for cooperation, with the expectation that these will be further refined and made actionable by operating agreements. The operating agreements are aimed at giving specific effect to the broader objectives of constituting agreements. They often appear as protocols or annexes to constituting agreements. In this study, protocols are treated as separate agreements as they often have different membership and timeframes to their constituting agreements, whereas annexes are part of the constituting agreement.

## Findings

Overall, 100 arrangements were considered to be relevant to ABNJ with regard to the four issues of concern (Table A). Of these, 18 are constituting agreements and 82 are operational. The majority of the arrangements address pollution (55) and fisheries (43), with far fewer for biodiversity (25) and climate change (8). Of the entire set of arrangements, 23 are global in scope, with the remainder being specific to individual oceans or marine regions. The number of regional agreements varies widely among ocean regions, from 25 in the North Atlantic and adjacent seas (Mediterranean, Caribbean, Baltic, Black) to 8 in the South Atlantic. The polar regions also have relatively few agreements, with six for the Southern Ocean and three for the Arctic Ocean. However, the assessment identifies the set of governance arrangements for the Southern Ocean to be among the most comprehensive for any region.

Regional agreements are considered to be important means of translating global agreements to specific geographical areas, which is essential for an ecosystem approach. A closer look at the

[2] Also sometimes referred to as framework agreements.

coverage of issues by regional agreements reveals some of the gaps (Table A). For example, there are several regions with no agreement of any kind for biodiversity. Several of the biodiversity agreements are also species (polar bears) or taxon (seals, albatrosses and petrels, sea turtles) specific and do not provide broad coverage of habitats and communities. In the case of climate change, there are two global agreements, the UNFCCC and its Kyoto Protocol, and six combined issue regional agreements in which climate change is identified only as a factor that must be taken into consideration in dealing with the other issues.

## Assessment of policy cycles

Scoring criteria were used to assign each arrangement a score for each of the stages of its policy cycle. The advisory and decision-making stages of the policy cycle are each considered in two modes -- policy mode and management mode -- making a total of seven stages to be assessed: (1) Provision of policy advice, (2), Policy decision-making, (3) Provision of management advice, (4) Management decision-making, (5) Management implementation, (6) Management review, and (7) Data and information management. Provision for carrying out each of these policy cycle stages is considered to be an important component of the institutional arrangements needed for good. The scores in each case ranged from 0 to 3 and are intended to reflect the institutional strength of the arrangement for transboundary governance at that particular policy cycle stage. An overall policy cycle score is derived from the scores of the individual stages and expressed as a percent completeness. It is important to note that a high completeness score means that the arrangements are specified on paper but does not mean that they are operating in practice.

**Table A.** Numbers of arrangements by issues, types and regions (B = biodiversity, F = fisheries, P = pollution, C = climate change)

| Region | Type of arrangement | Issues covered | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | F | P | B | C | FP | FB | PB | PC | BP | FPB | PBC | FPBC | |
| Overall | Constituting | 0 | 10 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 18 |
| | Operational | 27 | 34 | 5 | 1 | 0 | 6 | 2 | 1 | 1 | 0 | 0 | 5 | 82 |
| | Total | 27 | 44 | 6 | 2 | 1 | 8 | 2 | 1 | 1 | 2 | 1 | 5 | 100 |
| Global | Constituting | 0 | 2 | 1 | 1 | | 2 | 0 | 0 | | 1 | | | 7 |
| | Operational | 3 | 8 | 1 | 1 | | 1 | 1 | 1 | | 0 | | | 16 |
| | Total | 3 | 10 | 2 | 2 | | 3 | 1 | 1 | | 1 | | | 23 |
| Atlantic | Operational | 1 | | 1 | | | | | | | | | | 2 |
| North Atlantic | Constituting | 0 | 3 | 0 | | | 0 | 0 | | 0 | | | 0 | 3 |
| | Operational | 4 | 10 | 1 | | | 2 | 1 | | 1 | | | 1 | 20 |
| | Total | 4 | 13 | 1 | | | 2 | 1 | | 1 | | | 1 | 23 |
| South Atlantic | Constituting | 0 | 1 | | | | 0 | | | | | | | 1 |
| | Operational | 2 | 2 | | | | 1 | | | | | | | 5 |
| | Total | 2 | 3 | | | | 1 | | | | | | | 6 |
| North Pacific | Constituting | 0 | | | | | | | | | 1 | | 0 | 1 |
| | Operational | 4 | | | | | | | | | 0 | | 1 | 5 |
| | Total | 4 | | | | | | | | | 1 | | 1 | 6 |
| South Pacific | Constituting | 0 | 1 | | | | | | | | | 1 | 0 | 2 |
| | Operational | 9 | 5 | | | | | | | | | 0 | 1 | 15 |
| | Total | 9 | 6 | | | | | | | | | 1 | 1 | 17 |
| Indian Ocean | Constituting | 0 | 3 | | | | 0 | | | | | | | 3 |
| | Operational | 2 | 8 | | | | 1 | | | | | | | 11 |
| | Total | 2 | 11 | | | | 1 | | | | | | | 14 |
| Arctic Ocean | Operational | 1 | | 1 | | | | | | | | | 1 | 3 |
| Southern Ocean | Constituting | 0 | 0 | 0 | | 1 | 0 | | | | | | 0 | 1 |
| | Operational | 1 | 1 | 1 | | 0 | 1 | | | | | | 1 | 5 |
| | Total | 1 | 1 | 1 | | 1 | 1 | | | | | | 1 | 6 |

The analysis of policy cycle stage scores shows differences in strength among the policy cycle stages, and between constituting and operational agreements. Both types of agreements score higher for the advisory stages, where the majority score 3, than for the decision-making stages, where the majority score 1. This is because while the majority of arrangements do have clearly identified mechanisms for both policy and management advice, the decisions made are predominantly recommendations which contracting parties may or may not choose to implement. As might be expected, the extent to which decisions made are binding is considerably higher for operational agreements than for constituting agreements. As regards implementation, the peak for operational agreements is 0, which means that it is entirely up to the member countries. It is only slightly higher for constitution agreements with a peak at 1 indicating that there is some secretariat support for implementation. Overall, the picture for most policy cycle stages, and for overall completeness, is that there is clearly considerable scope for strengthening most stages of the policy cycles for both types of agreement.

The analysis of policy cycle scores by issue also shows some differences in strength among the issues. For both policy and management advice, the distribution of scores appears similar among issues, although advisory mechanism scores in fisheries and biodiversity arrangements were higher than for pollution. For decision-making, fisheries arrangements clearly scored highest, with decisions made for pollution being primarily in the form of recommendations for contracting parties. In contrast, fisheries arrangements scored lowest for implementation, which is predominantly at the level of contracting parties. Biodiversity and pollution arrangements (primarily within national waters) were considerably more likely to have regional level support.

### Overall structure of arrangements

The analysis of the entire set of global and regional arrangements for ABNJ governance reveals an overall pattern that may provide a useful framework for identifying gaps and weak areas and for developing interventions to address them. The overall picture is one of two complementary sets of networks (Figure A). The first set is the ‘global-to-regional issue-based networks’. They are shown as vertical rectangles which reflect the major global arrangements for each of the four issues of fisheries, pollution, biodiversity and climate change. The second set is the crosscutting ‘regional intersectoral clusters/networks’. They are illustrated in Figure A by horizontal rectangles representing five hypothetical ‘regional intersectoral clusters/networks’ (Regions A-E). The solid circles indicate that representation of ‘global-to-regional issue-based networks’ is incomplete in the regional clusters, reflecting gaps to be filled.

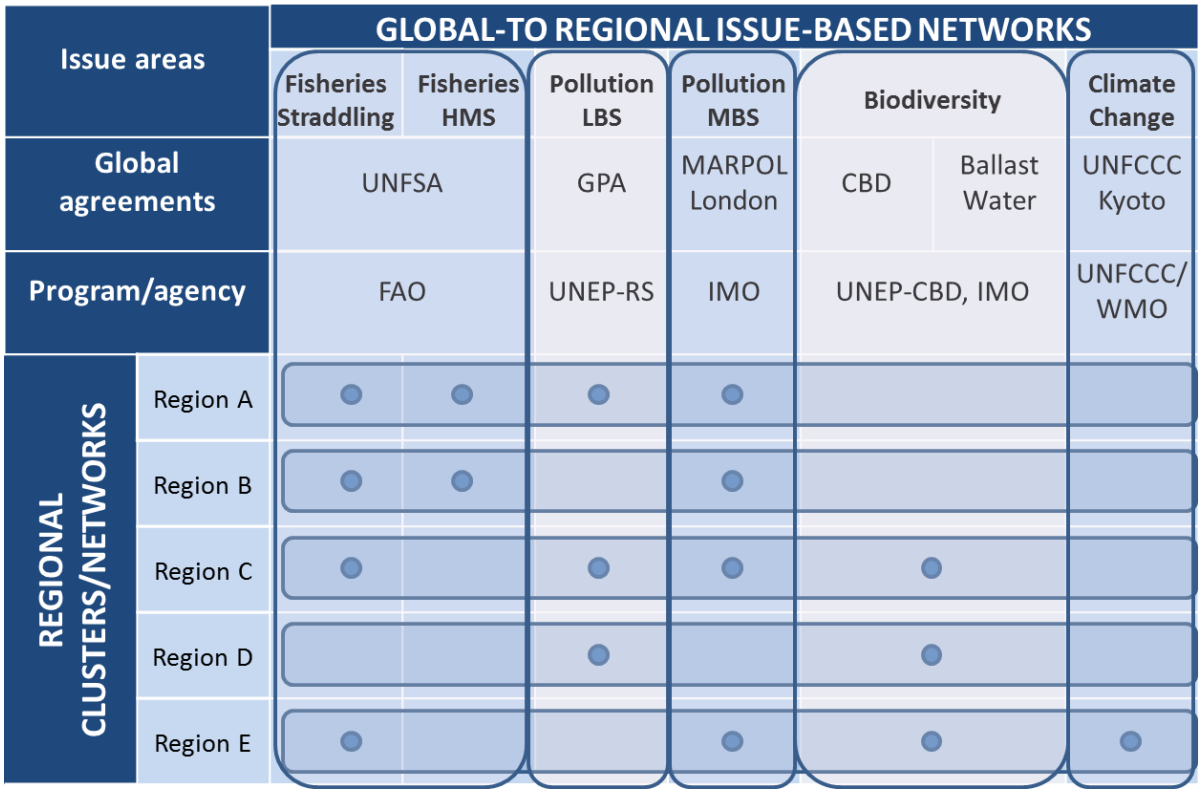



**Figure A.** The global ocean governance structure comprising 'global-to-regional issue-based networks' of arrangements and complementary 'crosscutting regional intersectoral networks' of arrangements illustrated here for five hypothetical regions A-E. The solid circles indicate that the issue covered by the global-regional network is reflected in the arrangements comprising the regional cluster.

### Global-to-regional issue-based networks

The global-to-regional issue-based networks comprise constituting and operational agreements at global and regional levels. They provide the potential for vertical interplay between regional and global arrangements. The majority of the arrangements that have been included in the database are either directly administered by, or associated with, the programmes of a relatively small number of UN agencies and programs which serve to anchor these networks as shown in Figure A. It should be noted that the United Nations Convention on the Law of the Sea (UNCLOS) is a constituting agreement that provides an overarching framework for governance of the ocean, including ABNJ, and so is not shown in Figure B. It should also be noted that not all agreements with relevance ABNJ are connected to UNCLOS, e.g. CITES, CBD, GPA.

For fisheries, the UN Fish Stocks Agreement (UNFSA), along with the FAO Compliance Agreement and FAO Code of Conduct are the major global constituting agreements, with the FAO being the agency responsible for promoting implementation of its Code of Conduct and Compliance Agreement and the UN General Assembly (UNGA) being responsible for the UNFSA. To some extent, the Committee of Fisheries (COFI), a subsidiary body of the FAO Council, can be seen as an overarching policy setting body for RFBs globally, although none of the agreements or the voluntary code explicitly identifies COFI as playing this role.

The International Maritime Organisation (IMO) is home to another cluster of arrangements pertaining largely to pollution. It provides the secretariat for six global level operational agreements relating to marine based pollution and one relating to biodiversity - the Ballast Water Management Convention (BWMC). Given that these relate to global shipping, there is less imperative for them to be reflected in regional level arrangements. The IMO itself promotes implementation of these agreements at the regional level through five IMO Regional Presence

initiatives. Perhaps more significantly, the promotion and implementation of IMO arrangements is often facilitated at the regional level through Regional Seas Programme protocols. It should be noted that there are global level pollution arrangements that are not part of the IMO cluster: The Vienna Convention/Montréal Protocol, and the Stockholm Convention.

The Regional Seas Programme of UNEP, which began in 1974, is the most extensive initiative promoting regional implementation of global arrangements. There are 18 Regional Seas areas of which 17 are indirectly or directly connected to ABNJ. One of the most prominent activities across Regional Seas areas is implementation of the 1995 Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) (UNEP/GPA 2006). This is approached through 11 regional protocols addressing land-based sources of pollution and activities (LBSA).

While the networks described above help to make global level fisheries and pollution arrangements applicable at the regional level, there is no comparable network or institutional arrangement for place-based biodiversity conservation in ABNJ. Several important biodiversity arrangements may be facilitated at the regional level under the Regional Seas Secretariats but these are almost entirely within areas under national jurisdiction. The 2008 effort under the CBD to address this gap is focused on cataloguing and describing Ecologically or Biologically Significant Areas (EBSAs) and is aimed at providing scientific information and advice for place-based biodiversity conservation in both AWNJ and ABNJ. However, there is still a lack of a complete global level policy process for ABNJ that can make decisions about which areas should be protected, and the regional institutional arrangements needed for implementation.

Climate change, the fourth issue to be addressed, is in some ways qualitatively different from the other three. Its effects will be experienced in all regions and ecosystems of the planet. Thus far, discussions about mitigation have taken place in global level arenas and do not appear to have a regional implementation component with an ocean focus. Adaptation on the other hand will need to be implemented at regional, national and local levels. Only three regional agreements could be found that made reference to addressing climate change adaptation or vulnerability in ABNJ - the Antarctic Treaty System, the Arctic Council, and the Pacific Islands Forum - of which the latter two are constituting agreements. It is not clear from the agreements examined how climate change will be dealt with at the regional level. It is likely that it will e dealt with largely as a crosscutting issue in sectoral agreements.

The ‘global-to-regional issue-based networks’ above play an important role in facilitating lateral linkages among regional organisations and connecting them with the global level arrangements. However, they are largely sector or issue specific, leaving the question as to how integration across issues and sectors is structured for ocean governance. It can be argued that there is a need for integration at both global and regional levels. It is the role of UN-Oceans to provide effective, transparent and regular inter-agency coordination on ocean and coastal issues among the 15 UN bodies involved in ocean affairs. An evaluation of UN-Oceans concluded that due to its ad hoc structure and lack of dedicated human and financial resources, it was ineffective, and unlikely to be able to achieve its objectives. The review recommended that UN-Oceans be provided with a Secretariat and that it be institutionalised with clear procedures for program development and decision-making. New Terms of Reference for UN-Oceans were approved by the UNGA in 2013. What is not clear is whether the mechanism will be provided with the resources needed to be effective.

### Regional clusters for EBM

At the regional level, there appear to be 16 regions in the world where arrangements pertaining to ABNJ issues (and often to ocean issues in general) overlap and interact (Figure B). These clusters of arrangements provide potential for improving regional or ‘place-based’ implementation of global arrangements. They also provide potential arenas for horizontal interplay needed for integration across issues, and for the integration of regional issue-specific arrangements with the wider spectrum of regional economic cooperation activities

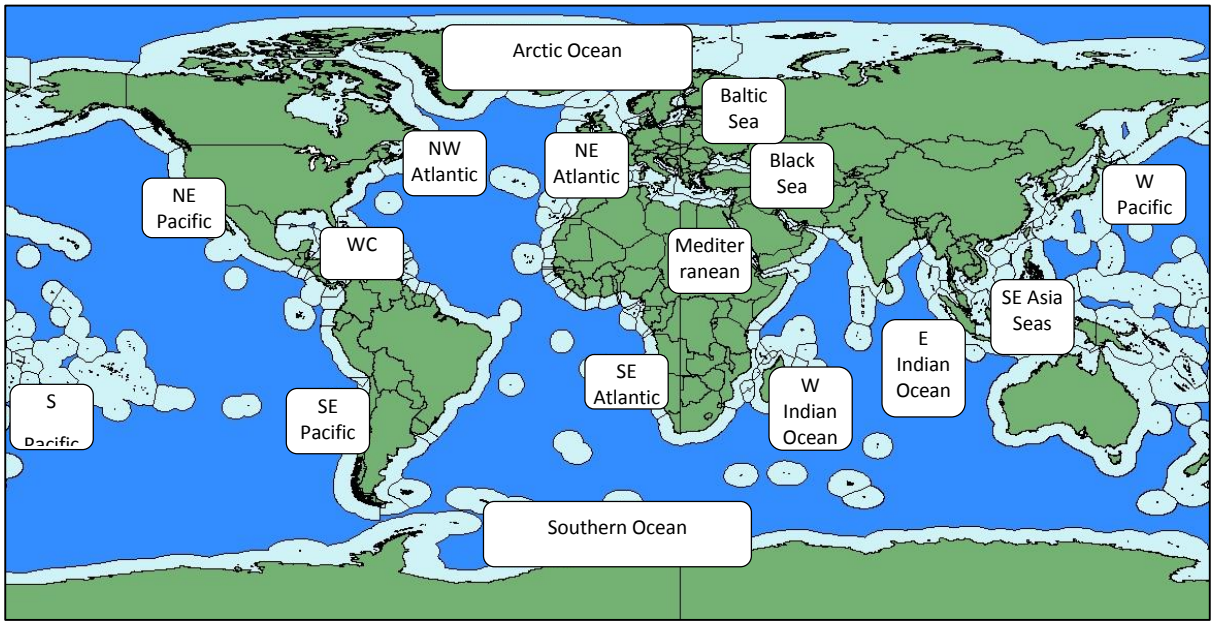



**Figure B.** The 16 regional clusters identified.

## Discussion

This study has focused on the governance arrangements and architecture for ocean ABNJ taking a structural approach to the many arrangements that relate to governance of ABNJ and the way that they appear to be interrelated, globally and regionally. It has looked at the individual arrangements from the perspective of whether they have been established in such a way as to be able to carry out the full policy process considered necessary for 'good governance'. The study has also looked for any patterns among organisations at global and regional levels that may relate to governance functioning and that may also make it easier for stakeholders to understand and interact with global ocean governance. Attention was paid to science-policy interfaces, and the extent to which there appeared to be separate sets of governance arrangements for areas under and areas beyond national jurisdiction.

## Good governance and effective governance

The assessment of the individual arrangements indicated areas of weakness in the policy cycle stages for ocean governance arrangements. A key challenge in this study was to deal with governance arrangements and architecture without venturing into the assessment of governance effectiveness. This limitation was necessary because assessing governance effectiveness would involve evaluation of outcomes and impacts that require a substantial amount of physical, ecological, social and economic information over appropriate periods of time. Much of what was assessed in the policy cycle scoring process can be considered as reflecting whether 'good governance' practices are in place. For example, having clearly specified processes and mechanisms across the seven policy cycle stages is seen as likely to improve characteristics of 'good governance' such as transparency, accountability, and ease with which stakeholders can engage with the process. Ultimately, these characteristics might be expected to produce better governance results, and are often cited as being desirable characteristics of governance processes in their own right. However, the state of governance research is such that it is not possible to be definitive about the relationship between these 'good governance' characteristics and governance effectiveness.

## The global architecture for ocean governance

This study takes a holistic perspective of global architecture for ocean governance as comprising 'issue-based global-regional networks' and cross-cutting 'regional intersectoral clusters/networks'. This structure may be seen as emerging, but far from complete and with much

dysfunctionality. It is thought that the holistic perspective provided here can move the global-regional ocean governance community towards a better understanding of what has been achieved over the past several decades, where the major gaps are, and what the critical next steps may be to address these gaps and strengthen the entire system. This holistic perspective is thought to be of value in helping those working within parts of the system to see the full picture and especially those working outside the system to engage with what has been described as a very complex, disordered and fragmented set of arrangements for the ocean.

The ideas relating to networks, nesting of arrangements, the importance of scale and interplay among arrangements underpinning this perspective are prominent in conceptual discourses on governance. Polycentric approaches such as regional clusters juxtaposed with global clusters facilitate achieving benefits at multiple scales as well as experimentation and learning from experience with diverse policies. There is also an ongoing discourse about how lessons learned from research on governing 'the commons' at smaller scales might inform approaches at regional and global levels. However, much of this thinking has failed to gain traction in the world of practitioners and institution builders for global environmental governance. It is thought that this study can make a contribution towards bringing those working at the conceptual level together with those responsible for making regimes work in practice.

### Characteristics and potential role of regional clusters

The 16 regional clusters for ocean governance reflect a diversity of regional level approaches to pursuing (or not) intersectoral integration and ecosystem-based management for the ocean. They vary widely with regard to: spatial extent, the extent to which there appears to be overarching integration, what is in place for each of the four issues, and relevance to ABNJ. Within the clusters identified, interaction appears highest among fisheries management arrangements. In many instances Regional Seas conventions and action plans are also active in integrating pollution and biodiversity aspects, although few include ABNJ. In most clusters, the FAO Ecosystem Approach to Fisheries (EAF) and the UNFSA mandate to protect marine biodiversity are obvious starting points for building capacity for EBM and would require linkages with Regional Seas and other non-fisheries arrangements in the cluster. One can envisage the strengthening of clusters to the level where the full range of ocean governance interests, including biodiversity and pollution in ABNJ, is engaged and integrated.

Few of the clusters were found to have clearly identifiable overarching mechanisms for integrated policy development and coordination. The Pacific Islands Forum (PIF) and its Council of Regional Organisations of the Pacific (CROP) is the most prominent example of such a mechanism. Two other mechanisms developed with the express purpose of coordination are the Antarctic Treaty System and the Arctic Council. In the Mediterranean, coordination for sustainable development is approached through the establishment of the Mediterranean Commission on Sustainable Development (MCSD) in 1996, in association with the Barcelona Convention. The Secretariat of the Barcelona Convention supports the activities of the MCSD. In the southeast Pacific, the interaction between the FAO and CPPS, which also serves as the Secretariat for the Lima Convention, has the potential to promote EBM. In Southeast Asia, PEMSEA, a home-grown coordination body emerged as a bottom-up response to a perceived lack of regional policy/coordination capability. In other regions, an ocean specific mechanism for overarching policy development and coordination is either absent or is partially taken up by the Secretariat of the Regional Seas Conventions (or its counterpart). However, this may mean that linkages between the major issues of Regional Seas Conventions, such as pollution and environment/biodiversity, with other sectors, notably fisheries, shipping and tourism, remain weak or absent.

In most clusters, provisions for technical advice appear to be largely by mechanisms that are internal to the individual arrangements that comprise them. A few of the regional clusters also appear to have crosscutting arrangements for the provision of technical advice involving separate bodies, namely PICES in the North Pacific, ICES in the North Atlantic, the SCAR in the Antarctic

and the IASC in the Arctic. Each of these technical advisory arrangements has a different history and relationship with the other arrangements in their cluster.

The extent to which the arrangements within regional clusters are integrated with the broader regional political economies undertaken by bodies such as ASEAN, SADC, SAARC, MERCOSUR and CARICOM is also of interest. Only the coordinating mechanisms for the Pacific Island Region and the Mediterranean Sea appear to have strong linkages with regional multipurpose political organisations. Some connectivity is evident in the Western Central Atlantic, the Bay of Bengal and southern Africa. For the most part, these mechanisms are focussed on areas within national jurisdiction. As indicated above, these are preliminary observations and will require further investigation.

The findings from this study indicate that despite their current deficiencies, regional clusters could have a potentially important role in implementing EBM in their respective regions, including ABNJ if their mandates are extended, and should be the focus of initiatives to build and strengthen them. The regional clusters would complement the desired 'global-to-regional, issue-based networks'. To pursue this, further work needs to be done on assessing their role and developing approaches and programs to strengthen them.

### Science-policy interfaces

The UNEP Foresight Process on Emerging Environmental Issues for the 21st century, concluded that the cross-cutting issue "Broken Bridges: Reconnecting Science and Policy" is the fourth most pressing one regarding efforts to achieve sustainable development. The panel noted that critical scientific knowledge is not being communicated effectively to audiences ranging from decision-makers to the general public. The importance of the science-policy interface is a main reason for the policy cycle based approach in this assessment and more explicitly the inclusion of the policy cycle stages relating to development and provision of policy and management advice.

It is also important to look beyond the mechanisms within individual arrangements to determine if there are identifiable overarching science-policy interfaces within the global and regional networks. These are thought to be essential for the network integration needed for EBM. There are science-policy interfaces at each of the three levels that require further investigation regarding the extent to which: The advisory mechanism is independent of the decision-making and implementation mechanisms; the policy advice tends to come from the same body that is providing technical/management advice; and the science-policy interface processes are adaptable with regard to being able to change the questions that are being put to advice providers.

### Assessment of current status

The evaluation of the strengths of the policy processes for arrangements for ABNJ and the overall global structure constitute an assessment of what is currently in place. This is a partial baseline assessment of ocean governance architecture. However, there are other aspects of governance architecture that could be pursued to develop a more comprehensive baseline, such as the extent to which there is: spatial fit of arrangements and regional clusters to the spatial issues; spatial coherence among arrangements within a regional cluster; engagement of countries in arrangements, regional clusters and global networks; progress within arrangements in moving towards EBM; a mechanism specified for integrating policy and management across issues within regional clusters and at the global level.

A comprehensive baseline for ocean governance architecture will also require considerably more detail on the structural aspects of the global framework for ocean governance described in this report. For example, the extent and nature of vertical and lateral interplay among arrangements is an important aspect of architecture that could not be adequately explored in this assessment. While the identification of networks and regional clusters is based on inferred linkages, a baseline that would provide a basis for monitoring change should include information on actual linkages. This requires a substantial investigation using approaches such as social network analysis.

## One ocean, one governance architecture?

The perspective on the overall, emerging, global architecture for ocean governance developed in this study provides the opportunity to take a holistic view of the entire set of arrangements and their interrelations. In some areas, there may be overlap between arrangements that pertain to ABNJ and those that pertain to AWNJ. Some regional regime clusters include a combination of arrangements with mandates for areas within EEZs, mandates for ABNJ and mandates for straddling issues. Consequently, it may be most appropriate to perceive ocean governance arrangements globally as a single set of integrated arrangements structured as described in this study: 'global-to-regional issue-based networks' complemented by 'regional intersectoral clusters'. This structure could reflect what is desirable and therefore needed to address governance in both ABNJ and AWNJ in an integrated and holistic fashion. The key point regarding structure is that it is more advanced for areas within national jurisdiction, and weak for ABNJ, particularly with regard to biodiversity and ecosystems.

From this perspective, the emphasis should then be on strengthening the existing set of global/regional arrangements to address deficiencies and fill gaps. This includes:

- Strengthening regional clusters (both mandate and capacity) to address issues in adjacent ABNJ.
- Strengthening the global level constituting and operational arrangements for biodiversity.
- Paying attention to structures that are needed to improve adaptive capacity.
- Exploring ways of strengthening lateral linkages among regional clusters.
- Subscribing to a general emerging set of principles, in particular conservation in addition to sustainable use, as well as the ecosystem and precautionary approaches, that cuts across AWNJ and ABNJ.

## Recommendations

Based on the analysis conducted for this study, recommendations can be made in three areas:

(1) Individual arrangements

(2) Regional intersectoral clusters

(3) Global-to-regional issue-based clusters.

At the level of individual arrangements, there is the need to support monitoring of the extent to which 'good governance' practices are observed and to assess how these practices relate to governance effectiveness. Monitoring of 'good governance' should be context specific, based on a common set of criteria. The refinement of 'good governance' criteria at the arrangement level will be an iterative process.

Strengthening regional clusters of agreements, particularly so that they can undertake EBM in offshore waters, including ABNJ, is seen as a critical component of strengthening ABNJ governance. This will include promotion of integration mechanisms, expansion of mandates to include biodiversity conservation in ABNJ, improvement of interplay among arrangements within clusters, as well as building new linkages with regional multipurpose organisations to increase political understanding of and support for ocean governance. Clearly this will also strengthen governance in AWNJ.

Vertical interplay between regional and global processes and the capacity to integrate at the global policy level is also weak and requires attention. UN-Oceans is currently the primary UN programme specialized to achieving such integration, and efforts to strengthen UN-Oceans appear to have stalled. However, the proposal for an UNCLOS Implementing Agreement, if it sets forth the conditions necessary for effective interplay, i.e. non-hierarchical organizations operating in sync based on a common purpose and set of principles, could improve vertical as well as regional horizontal interplay for the key issue of biodiversity.

## 1 Introduction

The ocean area beyond national jurisdiction (ABNJ) covers about half of the surface of planet Earth with those within national jurisdiction (AWNJ) covering a further 20 percent (Figure 1). While not as ecologically productive as Large Marine Ecosystems[3] (LMEs) – which are primarily associated with continental shelves but include the outer margins of boundary currents and provide over 80% of the world's total marine fish catches (FAO 2006, Garibaldi and Limongelli 2003, Sherman and Duda 1999) - ABNJ provide many important ecosystem services, including regulatory services, provision of food, energy, recreational and cultural services (UNEP 2006, UNESCO-IOC et al. 2011). These ecosystem services are increasingly under threat from many anthropogenic impacts arising from fisheries, land and marine-based sources of pollution, and climate change (GESAMP 2001). The monetary value of ecosystem services from ABNJ is poorly known, especially for nonmarket services such as their role in moderating climate change (Murillas-Maza 2011) but are thought to be huge (IPCC 2014). This lack of knowledge, combined with the vastness and remoteness of ABNJ, has resulted in inadequate attention to the protection and preservation of the ocean's capacity to deliver these services.

The global governance arrangements for the ocean fall under the constitutive framework of the 1982 UN Convention on the Law of the Sea (UNCLOS). The preamble to UNCLOS acknowledges that 'the problems of ocean space are closely interrelated and need to be considered as a whole'. This perception of the need to manage ocean issues in an integrated and coordinated manner runs throughout the Convention. **However, despite the large array of global and regional conventions, treaties and other arrangements for governance of the major ocean issues, coordination and integration among issues such as biodiversity, fisheries, pollution and climate are often weak** (Freestone 2010, Rothwell and Stephens 2010).

As with other social-ecological systems, governance of the ocean involves much more than these global conventions. It includes governmental structures, markets, and civil society arrangements. Thus, in deciding where future interventions can help to mediate this relationship between human and natural systems and increase human well-being, both the existing global legal framework and linkages with other critical components and actors of the system will need to be fully appreciated by the Global Environment Facility (GEF) and other stakeholders. Given the interconnectedness of the world's ocean, linkages to national and even local level governance processes may also play critical roles in the governance of ocean ABNJ.

There are many documents calling for improved governance arrangements for the ocean (UNESCO-IOC et al. 2011, Global Oceans Commission 2013, World Bank 2014). The 'Blueprint for Ocean and Coastal Sustainability' emphasises three areas: (i) the need for governance arrangements for biodiversity in ABNJ, (ii) the need for improved implementation capacity in Regional Fishery Management Organisations (RFMOs); and, (iii) the need for better coordination among UN agencies with responsibility for the ocean (UNESCO-IOC et al. 2011). The ocean section of the Rio+20 outcome document entitled 'The Future We Want' also provides a tour of the areas of ocean governance in need of critical attention (United Nations 2012).

[3] Large Marine Ecosystems (LMEs) are relatively large areas of ocean space of approximately 200,000 km² or greater, adjacent to the continents in coastal waters where primary productivity is generally higher than in open ocean areas. They produce about 80% of the annual world's marine fisheries catch; and are centres of coastal ocean pollution and nutrient over enrichment, habitat degradation, overfishing, biodiversity loss, and climate change effects. http://www.lme.noaa.gov/.

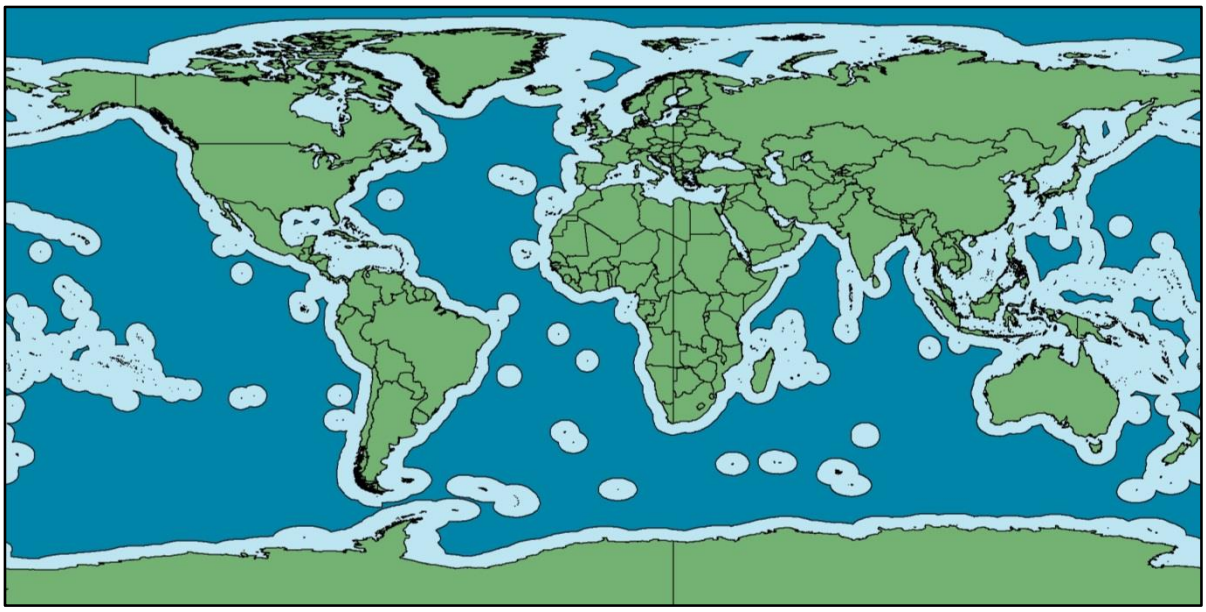


**Figure 1:** The 'high seas' (dark blue) are all parts of the sea that are not included in the exclusive economic zone (generally extending out to 200 nm), the territorial seas, and the internal waters of a State in the archipelagic waters of an archipelagic State (UNCLOS article 86). The 200 nm boundaries shown are this map are indicative only, and do not reflect the views of the authors, their institutions or GEF on the status of political boundaries. The figure is based on the equidistant EEZ boundaries from marineregions.org. Note that area is distorted in this projection.

This report examines the entirety of global and regional conventions, treaties and other arrangements for governance of ABNJ to determine if there is an emerging governance architecture for the ocean that can provide a basis for discussion of ocean governance needs, and interventions to meet these needs.

### 1.1 The GEF IW TWAP and the Open Ocean Assessment

The Global Environment Facility International Waters Programme (GEF-IW) supports projects and other activities aimed at improving the capacity of transboundary water systems to deliver ecosystem services. This programme has been active for over 20 years with considerable investments in these water systems (Duda and Hume 2013). The aim of the GEF-IW Transboundary Waters Assessment Programme Full-size Project (TWAP FSP) (2013-2015) is to produce the first truly global assessment of all five categories of transboundary water systems: (1) aquifers, (2) lake/reservoir basins, (3) river basins, (4) Large Marine Ecosystems (LMEs), and (5) open ocean (Jeftic et al. 2011). This will be accomplished by applying the methodologies developed during the TWAP Medium-sized Project (2009-2010) (Jeftic et al. 2011). At the same time, TWAP will formalize the network of partners involved in the assessment as a basis for future periodic assessments. A primary purpose of the TWAP FSP is to assist the GEF and other international organizations in priority setting by providing a baseline and priorities for intervention. The main assessment report arising from the TWAP FSP is also expected to provide a baseline for future periodic assessments.

The overall ABNJ assessment consists of two main components (UNESCO-IOC 2011b). The first component focuses on four major themes that are assessed through a suite of biophysical indicators aiming to reflect the status of:

- Climate change and variability in the global ocean, and their global and local impacts;
- Ocean ecosystems, habitats and biodiversity;
- Fisheries;
- Pollution as a stressor of the marine environment.

The second component focuses on governance that cuts across the four themes by examining current governance arrangements for ABNJ at the global level, and their links with regional and national arrangements. This crosscutting governance assessment for ABNJ is the subject of this report. The objective of this study is to assess global governance architecture for ABNJ governance and global governance aimed at mitigation of global environmental issues related to the ocean. Specifically, the assessment will:

- Address the four themes of the Open Ocean Assessment (climate, biodiversity and ecosystems, fisheries, and pollution);
- Focus on identifying the governance architecture (networks) and the roles of organizations and institutions in the policy cycle, identifying gaps and overlaps,
- Pay particular attention to science-policy interfaces,
- Note links to regional governance architectures, and
- Incorporate emerging global governance concepts and their application to the ocean.

It is important to note that the assessment is intended to look only at governance arrangements and architecture. Due to limitations in time and resources, it does not examine governance effectiveness, important as an assessment of effectiveness may be.

## 1.2 Assessing governance arrangements - where governance architecture fits

The assessment of governance arrangements and their effectiveness is a complex and multifaceted task (Young 2013). To facilitate evaluation, one perspective is to break what governance is expected to achieve into three components (Young 1999):

- The first is ‘outputs’, which are the arrangements that are put in place to translate agreements from paper to practice.
- The second is ‘outcomes’ which encompass changes in the behaviour of people that are the target of the arrangement.
- The third is ‘impact’ which represents changes in the state of the system that is the target of the arrangement.

These can be assessed separately, and in sequence, as it is likely that there will be time lags in changes in these components. This perspective is consistent with the formulation of the GEF IW programme approach to evaluation of its projects and intervention, which has been based on three categories of indicators: (1) process indicators, (2) stress reduction indicators and (3) environmental status indicators (Duda 2002).

Mahon et al. (2011a) noted that with the increased understanding of governance over the past decade, the GEF IW evaluative approach should be expanded to include four additional categories of indicators that are critical when assessing governance effectiveness for sustainable development. They proposed that for the indicator scheme to be in accord with current thinking regarding the goal of sustainable development, there should be additional categories of indicators for participation, social justice and human well-being that are in tandem with those for environment (Mahon et al. 2012) (Figure 2). They also proposed that assessment of the existing or proposed additional categories of indicators will be dependent upon the institutional structure in place to facilitate decision-making and that there is therefore the need for a fourth additional category of indicators that assesses governance architecture.

Accepting the assumption that an appropriate governance structure is a necessary but insufficient factor to successfully achieving improved human well-being, Mahon et al. (2011a, 2012) called for the assessment of governance architecture to precede the assessment of governance process. This is considered to be particularly important in the case of multilevel nesting typical of international environmental governance systems (Fanning et al. 2007, Biermann 2007). Biermann and Pattberg (2012 p.274) observe that "… increasingly the debate turns toward what we describe as an overarching 'architecture' of global environmental governance, that is, the entire interlocking web of widely shared principles institutions and practices that shape decisions by stakeholders at all levels in this field." This report is primarily concerned with assessing this specific category of institutional arrangements for governance of ocean ABNJ and its overarching 'architecture'.

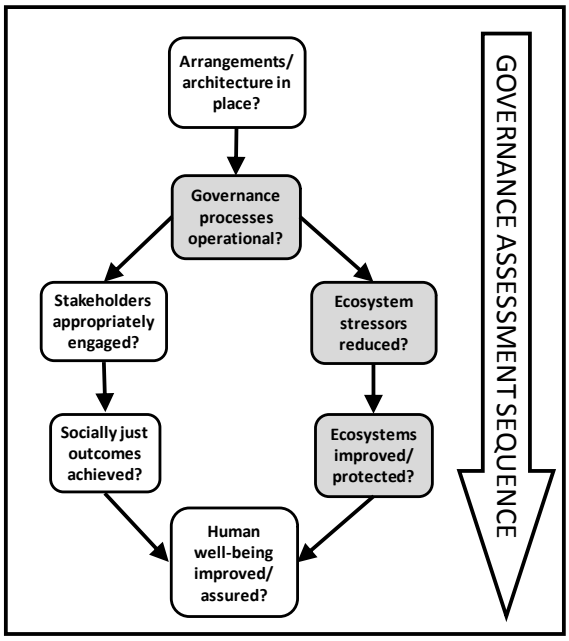



**Figure 2.** The expanded GEF IW indicator framework of Mahon et al. (2013). The original GEF IW indicator categories (Duda 2002) are shaded in grey. The additional indicator categories are unshaded.

### 1.3 The scope of and approach to the ABNJ governance assessment

Conventional definitions of ocean space are presented in Box 1. This assessment focusses on ABNJ which includes the High Seas and the Area which are politically defined areas beyond zones of national jurisdiction. Thus, its focus is slightly different than the focus of the TWAP Open Ocean Assessment. The definition of open ocean is more biophysical than political, and thus the term includes some areas under national jurisdiction, such as the many island EEZs in the large ocean basins, particularly in the tropical Pacific. It should be noted that the other GEF IW marine water system category, LMEs, may also include areas of open ocean under national jurisdiction, as well as ABNJ. Thus, there is spatial overlap between these two categories.

Scoped within the confines of the four main issue areas of climate, biodiversity and ecosystems, fisheries, and pollution, this assessment focuses on evaluating the entire set of transboundary governance arrangements that is in place globally for ABNJ. A primary aim of this assessment is to determine if there are broad or emerging patterns that could be useful in (a) understanding the governance status of ABNJ in particular or the ocean in general, (b) monitoring and communicating that status, and (c) designing interventions aimed at improving ocean governance.

**Box 1: Definitions (from UNEP 2010)**

**Areas beyond national jurisdiction (ABNJ):** includes the High Seas and the Area.

**The Area:** legal term for the seabed and ocean floor and subsoil thereof beyond the limits of national jurisdiction, as defined in the United Nations Convention on the Law of the Sea Article1(1)(1). Generally starts at 200 nm from coastal baselines, but may start 350 nm or beyond in certain circumstances.

**Deep Sea:** ocean waters and seafloor beyond the depth where photosynthesis can occur, generally below 200 m.

**High Seas:** legal term for waters beyond the zones of national jurisdiction: parts of the sea that are not included in the EEZ, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State (UNCLOS Article 86).

**Open Ocean:** ocean waters above and beyond the physical continental shelf. Often thought of as remote, in many places such as the western side of continents, or at heads of submarine canyons, or off volcanic islands, the open ocean begins just beyond the coastal zone.

A holistic perspective on ocean governance arrangements could significantly enhance our understanding of how best to implement governance of the ocean in the integrated and coordinated fashion envisaged by UNCLOS. This holistic perspective is approached by first exploring the entire set of arrangements to determine the issues they cover, the regions within which they operate, and the formal interrelations among them. Of particular interest is the organisational and geographical nesting of arrangements, and the horizontal and vertical interplay among them according to ideas developed by Young (2002).

Nesting and interplay are often closely connected with specific stages of the policy cycles that are central to most arrangements. Fanning et al. (2007) developed a conceptual model or Large Marine Ecosystem Governance Framework based on nested policy cycles at multiple levels (local to global), with vertical and horizontal linkages providing the basis for interplay. The policy cycles comprise five stages considered to be important for adaptive governance: (i) development and provision of advice, (ii) decision-making, (iii) implementation, (iv) review and (v) generation and management of data and information. While for conceptual simplicity the model depicts complete policy processes within levels, the reality is that policy, management planning, and implementation decisions for a particular issue may take place at different levels within the governance system. This is discussed and further illustrated using specific examples from fisheries and biodiversity in the Caribbean by Fanning et al. (2013).

This assessment of governance arrangements for the ocean includes an evaluation, based on criteria that are considered to reflect ‘good governance’, of the extent to which the stages of the policy process are in place for each arrangement. It must be emphasised that while the presence of policy processes that meet good governance criteria might be expected to result in better outcomes and impacts, the ultimate test of effective governance, a causal link between good governance processes and effective governance has not been demonstrated in the literature. The criteria for good governance that are used to evaluate the policy processes for the arrangements are largely based on operational principles, such as transparency, accountability, participation, and efficiency that are considered desirable and that appear in the preambles to many multilateral environmental agreements.

The approach taken to the assessment has been to assemble all governance arrangements that were found to have relevance to the four issues of concern in the ABNJ: fisheries, biodiversity, pollution, and climate change. These arrangements were then compiled into a database to facilitate assessment of the extent to which the issues are covered either globally or regionally. The assessment also examines each arrangement from the perspective of policy processes to determine whether processes considered to be adequate for good governance are in place as described above. The arrangements are also examined from a spatial perspective to determine geographical overlaps and gaps as well as the extent to which ABNJ are covered by governance arrangements.

## 2 Developing and analysing a database of governance arrangements for ABNJ

This assessment includes governance arrangements addressing any of the four issue areas that have direct relevance to ABNJ. An arrangement is any multilateral agreement, together with organizational structures and processes in place to give effect to it[4]. The determination of direct relevance is based on whether the agreement is intended to address an ABNJ or straddling issue. On this basis, all global agreements were included as well as many regional ones, such as regional fisheries conventions and Regional Seas Programme conventions that were considered to be relevant to ABNJ. The criteria for selection of regional arrangements to be included differed depending on the issue area. The nature of the issues differs to the extent that it was not possible to have a universal set of criteria that applied across them all.

With regard to fisheries, all Regional Fishery Management Organizations (RFMOs) and Regional Fisheries Bodies (RFBs) with responsibility extending into ABNJ or for highly migratory or straddling stocks were included. It should be noted that this includes a wide diversity of types of fisheries bodies with mandates ranging from purely advisory to the capacity to make binding decisions on fisheries management (Molenaar 2005, Freestone 2011).

With regard to pollution, the approach taken recognized that all land-based sources of pollution (LBS) impacting ABNJ pass through coastal waters. Therefore, regional arrangements addressing LBS were considered to be directly relevant to ABNJ. Most marine-based sources of pollution (MBS) also have the potential to be transported by currents from EEZs into ABNJ. The exception would be dumping of non-polluting non-soluble solids. However, dumping agreements also cover many kinds of wastes that can be transported by currents and were therefore included. From the outset, this approach leads to a preponderance of pollution-oriented arrangements which are primarily aimed at addressing coastal pollution problems.

For biodiversity, the inclusion of arrangements oriented towards national waters was considered. These are primarily protocols arising from Regional Seas conventions. It was thought that while the inclusion of pollution agreements under Regional Seas conventions was important for the reasons given above, the case for inclusion of biodiversity arrangements was less clear. For the majority of Regional Seas-based biodiversity agreements, the only connection with ABNJ would be when protected areas or other measures were established that provided protection for straddling or highly migratory species (HMS) such as sea turtles, seabirds, and marine mammals. It was decided that including these arrangements would provide a biased picture regarding biodiversity conservation on the High Seas. However, agreements and MOUs under the Convention on Migratory species which were aimed at protecting species throughout their range were included when the range extended into ABNJ, for example, the Agreement for the Conservation of Albatrosses and Petrels (ACAP)

The inclusion of shipping arrangements was also considered. For example, the IMO routing measures under the Safety of Life at Sea (SOLAS) Convention have been used to minimise impacts of shipping on biodiversity. However, it was agreed that these conventions could not be perceived as having a stated mandate for biodiversity conservation or ecosystem-based management (EBM), and that it should not be included in the database.

### 2.1 Developing the database of governance arrangements

The approach taken to the assessment was to compile a database of all the ABNJ relevant agreements based on the criteria provided above. Relevant agreements were sought in the

[4] In the governance literature the term ‘regime’ is also often used to refer to arrangements as defined here.

literature and on the Internet where several databases of international agreements can be found[5]. The process of identifying agreements continued until no new ones were encountered. For each of the agreements included in the database, a variety of information was compiled (Table 1). The first part of each database record includes basic background information on the agreement. The second part of each record includes information aimed at evaluating the policy processes that are intended to give effect to the agreement. Table 2 provides an explanation of the scoring assigned to each stage of the policy cycle.

**Table 1.** The information included in the database of arrangements for ABNJ

| Field | Description |
|---|---|
| Part 1 – Background information | |
| Acronym/Short name | The name used to refer to the arrangement |
| Full name | The complete formal name of the arrangement |
| Type | The arrangements were categorised as either - CN = Constituting (seeks to develop broad policy to address issues, to be later refined by specific agreements), or OP = Operational (aimed at putting regulations in place to reduce stressors and improve system state). See text for further explanation. |
| Purpose | A narrative summary of the purpose of the arrangement |
| Year opened | The year in which the arrangement was first available for signature |
| Year entered force | The year in which the arrangement entered into force |
| Year revised | The year, if any, in which the arrangement was revised |
| Ratification | Whether the arrangement could be ratified/acceded/accepted/approved (1) or only signed (0) |
| Responsible organisation and secretariat location | The major organisation under which the arrangement was developed. The location of the Secretariat and the number of professional-technical staff. |
| Geographical area of coverage | A brief description of the area of coverage, and indication of whether a geospatial shape file is available for it |
| Region | The global or regional geographic coverage of the arrangement (GO = Global, AT = Atlantic, AN = North Atlantic, AS = South Atlantic, IO = Indian Ocean, PN = North Pacific, PS = South Pacific, SO = Southern Ocean, AO = Arctic Ocean |
| Types of membership | The different types of membership permitted by the arrangement, e.g. full, associate, observer, etc., and the criteria for membership |
| States/organizations eligible for membership | The numbers of states and organisations that are eligible for membership in each of the above types (names provided in the comment) |
| States/organizations who are actual members | The numbers of states and organisations that are actually members in each of the above types (names provided in the comment) |
| High Seas/Straddling Issues covered | The ABNJ governance issues that are covered by the arrangement (e.g., fisheries - highly migratory species, straddling species, discrete High Seas stocks; pollution - marine-based sources, land-based sources; biodiversity - highly migratory species, general) |

[5] Mainly: ECOLEX http://www.ecolex.org/start.php; National University of Singapore http://cil.nus.edu.sg/2009/cil-documents-database/; University of Oslo, Faculty of Law, treaty database http://www.jus.uio.no/english/services/library/treaties/; International Environmental Agreements (IEA)
Database Project, http://iea.uoregon.edu/page.php?file=home.htm&query=static

| | |
|---|---|
| Principles | The explicitly stated principles upon which the arrangement is based. |
| Part 2 – Assessment of provisions for policy processes | |
| Provision of policy advice - responsible body and score | The body with primary responsibility for carrying out this policy stage scored using a scale of 0 to 3 (Table 2). |
| Policy decision-making - responsible body and score | The body with primary responsibility for carrying out this policy stage scored using a scale of 0 to 3 (Table 2). |
| Provision of management advice - responsible body and score | The body with primary responsibility for carrying out this policy stage scored using a scale of 0 to 3 (Table 2). |
| Management decision-making - responsible body and score | The body with primary responsibility for carrying out this policy stage scored using a scale of 0 to 3 (Table 2). |
| Management implementation - responsible body and score | The body with primary responsibility for carrying out this policy stage scored using a scale of 0 to 3 (Table 2). |
| Management review-responsible body and score | The body with primary responsibility for carrying out this policy stage scored using a scale of 0 to 3 (Table 2). |
| Data and information management - responsible body and score | The body with primary responsibility for carrying out this policy stage scored using a scale of 0 to 3 (Table 2). |
| Completeness and score | The narrative summary of the extent to which the arrangement is perceived to be complete and the score for overall completeness of the arrangement based on the sum of completeness scores for the seven policy cycle stages expressed as a percentage of the maximum possible score. |
| Dispute resolution | The presence of a mechanism for dispute resolution is explicitly identified in the arrangement (0 = none, 1 = present) |
| Adaptability - amendment provisions | The presence of provisions in the arrangement for its amendment (0 = none, 1 = present) |
| Linkages with other arrangements and agreements | The extent to which the arrangement stands alone and is self-sufficient or is connected with other arrangements and agreements to form a complete process. |

**Table 2.** The criteria used to assign scores to the policy cycles stages for each arrangement.

| | |
|---|---|
| Provision of policy advice - responsible body and score | 0 = No transboundary science policy mechanism, e.g. COP self advises[6]<br>1 = Science-policy interface mechanism unclear - irregular, unsupported by formal documentation<br>2 = Science-policy interface not specified in the agreement, but identifiable as a regular process<br>3 = Science-policy interface clearly specified in the agreement[7] |
| Policy decision-making - responsible body and score | 0 = No decision-making mechanism[8]<br>1 = Decisions are recommendations to countries<br>2 = Decisions are binding with the possibility for countries to opt out of complying<br>3 = Decisions are binding |
| Provision of management advice - responsible body and score | Same as for policy advice above |
| Management decision-making - responsible body and score | Same as for policy decision-making above |
| Management implementation - responsible body and score | 0 = Countries alone<br>1 = Countries supported by secretariat<br>2 = Countries and regional/global level support[9]<br>3 = Implemented through a coordinated regional/global mechanism[10] |
| Management review-responsible body and score | 0 = No review mechanism<br>1 = Countries review and self-report<br>2 = Agreed review of implementation at regime level<br>3 = Agreed compliance mechanism with repercussions |
| Data and information management - responsible body and score | 0 = No DI mechanism<br>1 = Countries provide DI which is used as is<br>2 = DI centrally coordinated, reviewed and shared[11]<br>3 = DI centrally managed and shared[12] |

[6] Nothing in the documentation indicates a mechanism by which scientific or policy advice is formulated at the transboundary level prior to consideration by the decision-making body.
[7] This can be internal or external.
[8] This refers to decisions on matters that will have a direct impact on ecosystem pressures or state. It does not refer to mechanisms for making decisions on the operation of the organization itself.
[9] This means support from regional programmes or partner organizations arranged via the secretariat.
[10] For example a coordinated enforcement system with vessels following a common protocol and flying a common flag identifying them as part of the mechanism, such as the Forum Fisheries Agency surveillance flag.
[11] For both 2 and 3 data are checked for quality and consistency, but for 3 there is a place where all the data can be found, whether as actual data or metadata.
[12] Here the regime could also be the actual collector and compiler of the data, as in the International Pacific Halibut Commission.

The primary sources for the information included in the database were the actual conventions and agreements, rules of procedure for the organisations and secretariats for the arrangements, and organisational websites. When all the desired information could not be found in these sources other documentation and websites were explored. The database is in the form of an Excel spreadsheet with the key information in the cells. Comment boxes are used to record details, such as excerpts from agreements that are considered necessary context for what was included in the table cells.

### 2.1.1 Levels of commitment to and types of arrangements

Several terms are used to indicate the level of commitment of a country to take part in an agreement[13]. While these have different legal meanings, two levels are recognised in this study and reflected in the database: (1) countries that have signed, indicating willingness to engage, and are referred to as signatories, and (2) countries which have ratified, acceded, approved or accepted, indicating commitment, and are referred to as contracting parties (CPs). It must be borne in mind that many agreements relating to ocean governance cannot be committed to at the second level and have only signatories. A further complication in interpreting country engagement with agreements is that some countries that have not signed an agreement may nonetheless accept and comply with many of its conditions as customary international law, for example, the USA with UNCLOS.

Typically, intergovernmental agreements fall into two categories: (1) constituting agreements and (2) implementing or operational agreements (Breitmeier et al. 2006). Constituting agreements are aimed at setting the broad context and issues for cooperation, with the expectation that these will be further refined and made actionable by operating agreements. The operating agreements are aimed at giving specific effect to the broader objectives of constituting agreements. They often appear as protocols or annexes to constituting agreements. In this study, protocols are treated as separate agreements as they often have different membership and timeframes to their constituting agreements, whereas annexes are part of the constituting agreement.

### 2.1.2 Scoring criteria for the policy cycle stages

Scoring criteria were used to assign each arrangement a score for seven policy cycle stages: (1) Provision of policy advice, (2), Policy decision-making, (3) Provision of management advice, (4) Management decision-making, (5) Management implementation, (6) Management review, and (7) Data and information management (Table 2). In this assessment the advisory and decision-making stages of the policy cycle (Figure 2) are each considered in two modes -- policy mode and management mode -- making a total of seven stages to be assessed. Provision for carrying out each of these policy cycle stages is considered to be an important component of the institutional arrangements needed for good governance (Fanning et al. 2007, Mahon et al. 2013). The scores in each case ranged from 0 to 3 and are intended to reflect the institutional strength of the arrangement for transboundary governance at that particular policy cycle stage. An overall policy cycle completeness score is derived from the sum of scores of the individual stages and expressed as a percentage of the highest score attainable[14].

### 2.1.3 Principles

The principles upon which arrangements are based are important indicators of the intent of the arrangement. When explicitly stated, principles provide a basis for assessing and adapting the institutional arrangements and practices for the arrangement. Explicit statement of principles also allows for the principles themselves to be revisited and adapted from time to

[13] https://treaties.un.org/pages/Overview.aspx?path=overview/glossary/page1_en.xml
[14] Note that a high score means that the arrangements are specified on paper but does not mean that they are operating in practice.

time. When there is the need for arrangements to work together, shared values and principles can be an important basis for collaboration (Orsini et al. 2013). Principles and values may also be implied in arrangements, but this is subject to interpretation. In developing the database, a list of principles was prepared, and only those that were explicitly stated were included in the database.

### 2.2 Database analysis

The database variables that were either numeric or could be categorised were converted into an SPSS database for analysis. This facilitated the preparation of a variety of tabular and graphical summaries.

### 2.3 Spatial analyses

GIS shape-files representing the area covered were acquired or developed for most of the agreements. These shape-files were used to estimate the spatial overlap for the regional agreements. A web-based interface has been developed that allows users to visually explore the spatial interrelationships among the arrangements and to graphically illustrate the extent of coverage of ABNJ by the arrangements[15]. The sources of information, the procedures used in developing new spatial files and the procedures of analysis are documented by Baldwin and Mahon (2014).

## 3 The characteristics of ABNJ governance arrangements

Overall, 100 arrangements were found that were considered to be relevant to ABNJ with regard to the four issues of concern (Table 3). Of these, 18 were constituting arrangements and 82 were operational (Table 3, top panel). The majority of arrangements address pollution (55) and fisheries (43), with far fewer dealing with biodiversity (25) and climate change (8)[16]. Of the entire set of arrangements, 23 are global in scope, with the remainder being specific to individual oceans or ocean regions. A breakdown of these arrangements by issue, type and region is provided in Table 3. A list of the arrangements included in the database can be found in Appendix 1 with their acronyms for ease of reference. The database can be accessed at http://onesharedocean.org/data.

The number of regional arrangements varies widely among ocean regions. The region with by far the most was the North Atlantic with 25 (includes arrangements that apply to the entire Atlantic), although it should be noted that this included adjacent seas (Baltic, Black, Caribbean, Mediterranean). In contrast, in the South Atlantic there are only seven arrangements (again includes entire Atlantic)). The polar regions also have relatively few arrangements, with six for the Southern Ocean and three for the Arctic Ocean. However, as will be discussed later, the set of governance arrangements for the Southern Ocean is among the most comprehensive for any region.

[15] http://onesharedocean.org/open_ocean/governance/regional_clusters
[16] Multiple-issue arrangements are counted for each issue, so the total exceeds 100.

**Table 3.** Numbers of arrangements by issues, types and regions (B = biodiversity, F = fisheries, P = pollution, C = climate change)

| Region | Type of arrangement | Issues covered | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | F | P | B | C | FP | FB | PB | PC | BP | FPB | PBC | FPBC | |
| Overall | Constituting | 0 | 10 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 18 |
| | Operational | 27 | 34 | 5 | 1 | 0 | 6 | 2 | 1 | 1 | 0 | 0 | 5 | 82 |
| | Total | 27 | 44 | 6 | 2 | 1 | 8 | 2 | 1 | 1 | 2 | 1 | 5 | 100 |
| Global | Constituting | 0 | 2 | 1 | 1 | | 2 | 0 | 0 | | 1 | | | 7 |
| | Operational | 3 | 8 | 1 | 1 | | 1 | 1 | 1 | | 0 | | | 16 |
| | Total | 3 | 10 | 2 | 2 | | 3 | 1 | 1 | | 1 | | | 23 |
| Atlantic | Operational | 1 | | 1 | | | | | | | | | | 2 |
| North Atlantic | Constituting | 0 | 3 | 0 | | | 0 | 0 | | 0 | | | 0 | 3 |
| | Operational | 4 | 10 | 1 | | | 2 | 1 | | 1 | | | 1 | 20 |
| | Total | 4 | 13 | 1 | | | 2 | 1 | | 1 | | | 1 | 23 |
| South Atlantic | Constituting | 0 | 1 | | | | 0 | | | | | | | 1 |
| | Operational | 2 | 2 | | | | 1 | | | | | | | 5 |
| | Total | 2 | 3 | | | | 1 | | | | | | | 6 |
| North Pacific | Constituting | 0 | | | | | | | | | 1 | | 0 | 1 |
| | Operational | 4 | | | | | | | | | 0 | | 1 | 5 |
| | Total | 4 | | | | | | | | | 1 | | 1 | 6 |
| South Pacific | Constituting | 0 | 1 | | | | | | | | | 1 | 0 | 2 |
| | Operational | 9 | 5 | | | | | | | | | 0 | 1 | 15 |
| | Total | 9 | 6 | | | | | | | | | 1 | 1 | 17 |
| Indian Ocean | Constituting | 0 | 3 | | | | 0 | | | | | | | 3 |
| | Operational | 2 | 8 | | | | 1 | | | | | | | 11 |
| | Total | 2 | 11 | | | | 1 | | | | | | | 14 |
| Arctic O. | Operational | 1 | | 1 | | | | | | | | | 1 | 3 |
| Southern Ocean | Constituting | 0 | 0 | 0 | | 1 | 0 | | | | | | 0 | 1 |
| | Operational | 1 | 1 | 1 | | 0 | 1 | | | | | | 1 | 5 |
| | Total | 1 | 1 | 1 | | 1 | 1 | | | | | | 1 | 6 |

Regional arrangements are considered to be important means of translating global arrangements to specific geographical areas, which is essential for an ecosystem approach (Crowder et al. 2006, Young et al. 2007, Rice et al. 2011); although not all regional arrangements are directly associated with global ones. A look at the coverage of issues by regional arrangements reveals some of the gaps (Table 4).

**Table 4.** Numbers of arrangements by issues and regions (B = biodiversity, F = fisheries, P = pollution, C = climate change).

| Issue | Region | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | Global | Atlantic | North Atlantic | South Atlantic | North Pacific | South Pacific | Indian Ocean | Arctic Ocean | Southern Ocean | |
| F | 3 | 1 | 4 | 2 | 4 | 9 | 2 | 1 | 1 | 27 |
| P | 10 | | 13 | 3 | | 6 | 11 | | 1 | 44 |
| B | 2 | 1 | 1 | | | | | 1 | 1 | 6 |
| C | 2 | | | | | | | | | 2 |
| FP | | | | | | | | | 1 | 1 |
| FB | 3 | | 2 | 1 | | | 1 | | 1 | 8 |
| PB | 1 | | 1 | | | | | | | 2 |
| PC | 1 | | | | | | | | | 1 |
| BP | | | 1 | | | | | | | 1 |
| FPB | 1 | | | | 1 | | | | | 2 |
| PBC | | | | | | 1 | | | | 1 |
| FPBC | | | 1 | | 1 | 1 | | 1 | 1 | 5 |
| Total | 23 | 2 | 23 | 6 | 6 | 17 | 14 | 3 | 6 | 100 |

For example, there are several regions with no arrangement of any kind for biodiversity. Several of the biodiversity arrangements are also species (polar bears) or taxon (seals, albatrosses and petrels, sea turtles) specific and do not provide broad coverage of habitats and communities. In the case of climate change, there are two global arrangements, the UNFCCC and its Kyoto Protocol, and six combined issue regional arrangements in which climate change is identified. In these, climate change is identified only as a factor that must be taken into consideration in dealing with the other issues rather than an issue to be addressed directly. This is not unexpected for an issue that is essentially global in nature.

### 3.1 Timeline of development of arrangements

Governance arrangements with relevance for the ocean first began to come into force in the late 1940s (Figure 3a). However, it was not until the late 70s that a proliferation of both constituting and operational arrangements occurred, with constituting arrangements peaking in the late 1980s. While the peak for operational arrangements also occurs then, they continue to come into force at for the next 15 years. Since the early 2000s, few constituting arrangements have come into force, while operational arrangements have continued to come into force, albeit at a lower rate.

An initial interpretation of the broad pattern for entry into force of arrangements could be that the majority of constituting arrangements originally considered necessary for governance of the ocean are already in place, and that much of what remains to be done is to give effect to them with operational arrangements. Even the numbers of operational arrangements coming into force appears to be tapering off (Figure 3a). Based on the above interpretation, it could be argued that the past 40 years represent an era of arrangement formation, and that the next decades should be a period of implementation, evaluation, adaptation and integration. However, as discussed above, a review of the completeness and coverage of the governance

arrangements for specific issues, such as biodiversity conservation for ABNJ, reveals significant gaps.

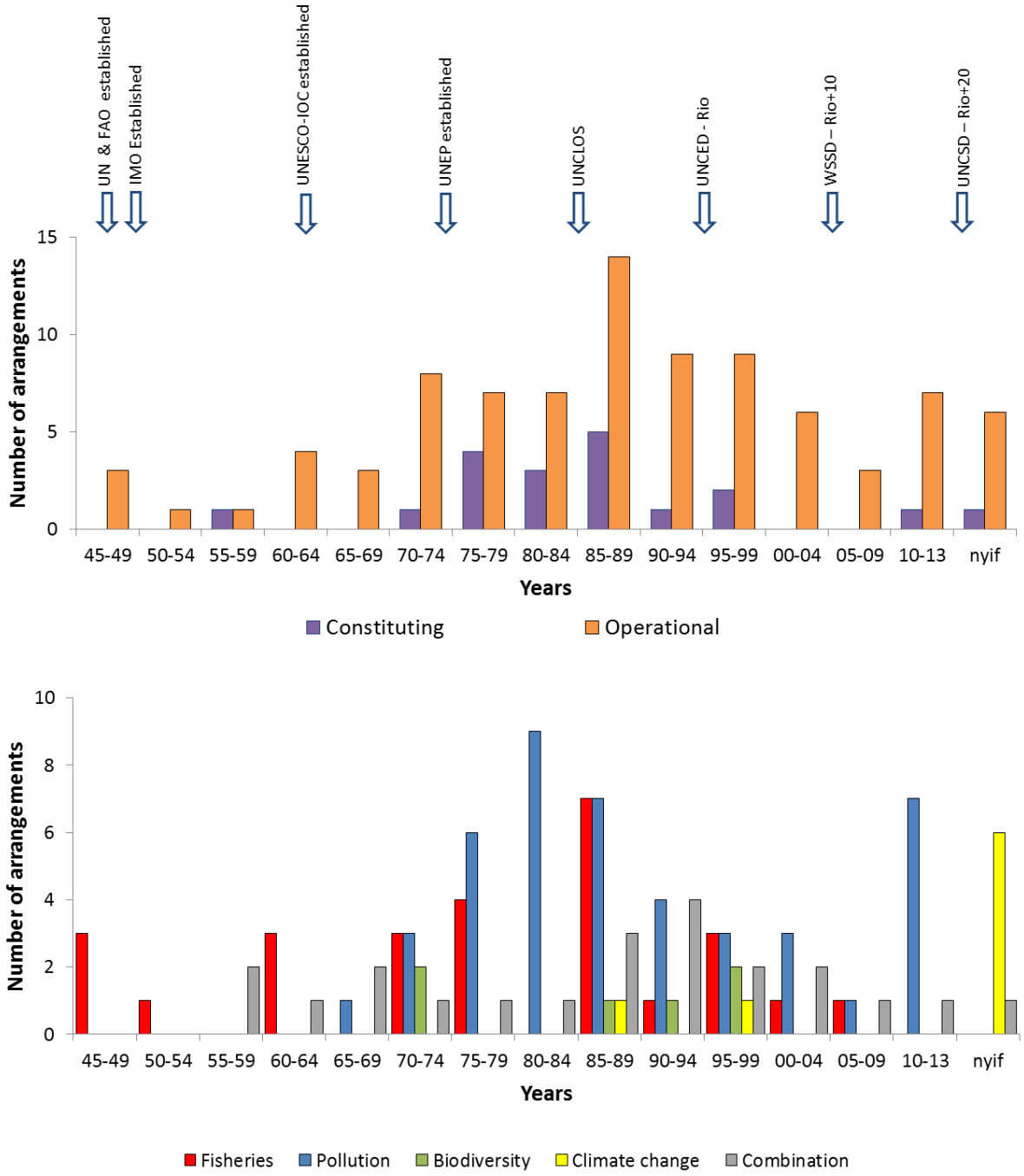



**Figure 3.** The timeline of development of ocean governance arrangements in five-year intervals by (a) type of arrangement, and (b) issues covered.

The timing of arrangements for the four issues shows that those for fisheries were the first to be put in place, with those for pollution and biodiversity only beginning to come into force in the late 1970s (Figure 3b). The majority of the pollution arrangements are associated with UNEP's Regional Seas Programme, launched in 1974. While the Convention on Biological Diversity (CBD) has not resulted in operational arrangements that are area specific, its goals, objectives and funding mechanisms have been frequently incorporated into the programmes of Regional Seas conventions and action plans. The CBD has also promoted efforts in cooperation with Regional Seas secretariats to describe Ecologically and Biologically

Significant Areas (EBSAs) in AWNJ and ABNJ (Gjerde et al. 2008, Druel 2012, Druel et al. 2012). As the CBD has no management authority, the management of EBSAs is up to States and competent intergovernmental organisations. This is an area of current high activity in ABNJ governance that will be taken up later in this report.

An aspect that must be kept in mind when looking for temporal patterns in the development of these arrangements is the length of time between adoption and entry into force (Figure 4). It is not uncommon for arrangements to take up to 10 years to enter into force, and some have taken longer. The average times for constituting and operational arrangements to come into force are 4.7 and 4.3 years.

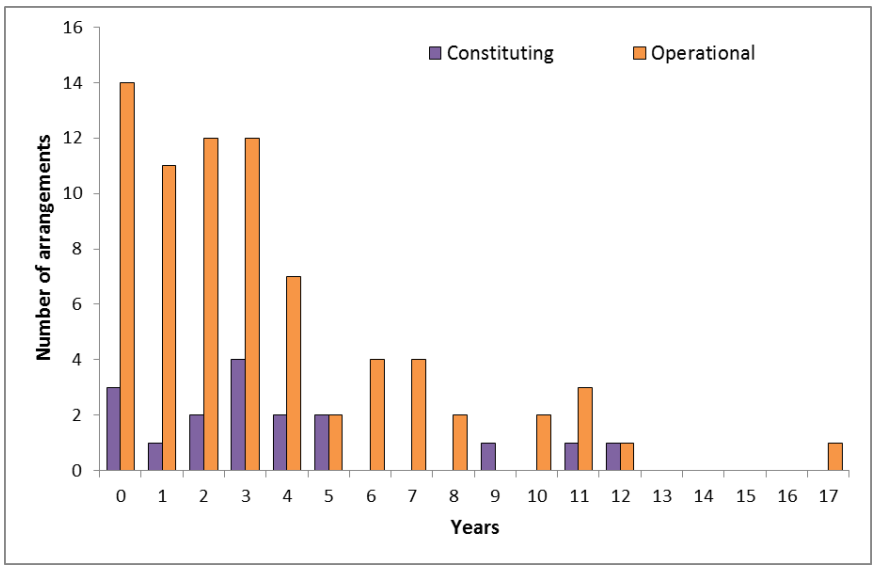



**Figure 4.** The number of years taken for arrangements to enter into force.

## 3.2 Policy cycle stage scores and the completeness of arrangements

The analysis of policy cycle stage scores shows differences in strength among the policy cycle stages, and between constituting and operational agreements (Figure 5). Both types of agreements score higher for the advisory stages, where the majority score 3, than for the decision-making stages, where the majority score 1. This is because while the majority of arrangements do have clearly identified mechanisms for both policy and management advice, the decisions made are predominantly recommendations which contracting parties may or may not choose to implement. As might be expected, the extent to which decisions made are binding is considerably higher for operational agreements than for constituting agreements. However, there is clearly considerable scope for strengthening both advisory and management decision-making stages.

The implementation stage scores lowest, with the majority of arrangements having implementation primarily at the level of the contracting parties with support from the arrangement secretariat (Figure 5). There are relatively few instances where arrangements have coordinated transboundary programs for implementation. It is also striking that for most operational arrangements, implementation is left entirely to the contracting parties. In contrast, for review of implementation, the large majority of both constituting and operational arrangements have clearly identified mechanisms at the transboundary level. Transboundary data and information management mechanisms score higher for operational arrangements than for constituting arrangements, as might also be expected.

The overall picture of completeness or strength of arrangements is illustrated in the final panel of Figure 5. It indicates that for both types of arrangements, there is substantial scope for

strengthening towards levels that could be considered to reflect good governance practices. That operational arrangements generally scored higher than constituting ones is to be expected given that the scope of the former is generally narrow and focused on specific aspects of an issue. **However, it should be noted that for constituting arrangements, clearly specified mechanisms based on sound information inputs are equally important, as this is the level at which policy adaptation and integration is most likely to take place.**

Global and regional levels of constituting and operational arrangements are compared in Figure 6. The distribution of policy cycle stage scores between global and regional arrangements is broadly similar, with the major differences being due to the aggregation of scores at a particular level. For example at the implementation stage for regional constituting arrangements there is an aggregation at score 1 while the scores for global constituting arrangements are distributed among scores 0-2. For constituting agreements, the completeness is slightly higher at the regional level than for constituting arrangements and the opposite is the case for operational arrangements. The differences between global and regional arrangements were not considered to be large enough to warrant interpretation.

The analysis of policy cycle scores by issue shows some differences in strength among the issues (Figure 7). For both policy and management advice, the distribution of scores appears similar among issues, although mechanisms may score a bit higher for fisheries and biodiversity than for pollution. For decision-making, fisheries arrangements clearly scored highest, with decisions for pollution being primarily in the form of recommendations for contracting parties. In contrast, fisheries arrangements scored lowest for implementation, which is predominantly at the level of contracting parties. Biodiversity and pollution arrangements were considerably more likely to have regional level support for implementation. The distribution of scores for review mechanisms is similar among issues, but only fisheries arrangements have review mechanisms with built-in repercussions for non-compliance, for example ICCAT, GFCM, IPHC and PNA (Figure 7). It is interesting that for data and information, biodiversity arrangements scored highest. Fisheries arrangements also scored high in this policy cycle stage, probably because for transboundary stocks, there is the need to bring data together into a single dataset if meaningful analysis is to be carried out. For pollution arrangements, national reporting and compilation of national reports predominates (Figure 7).

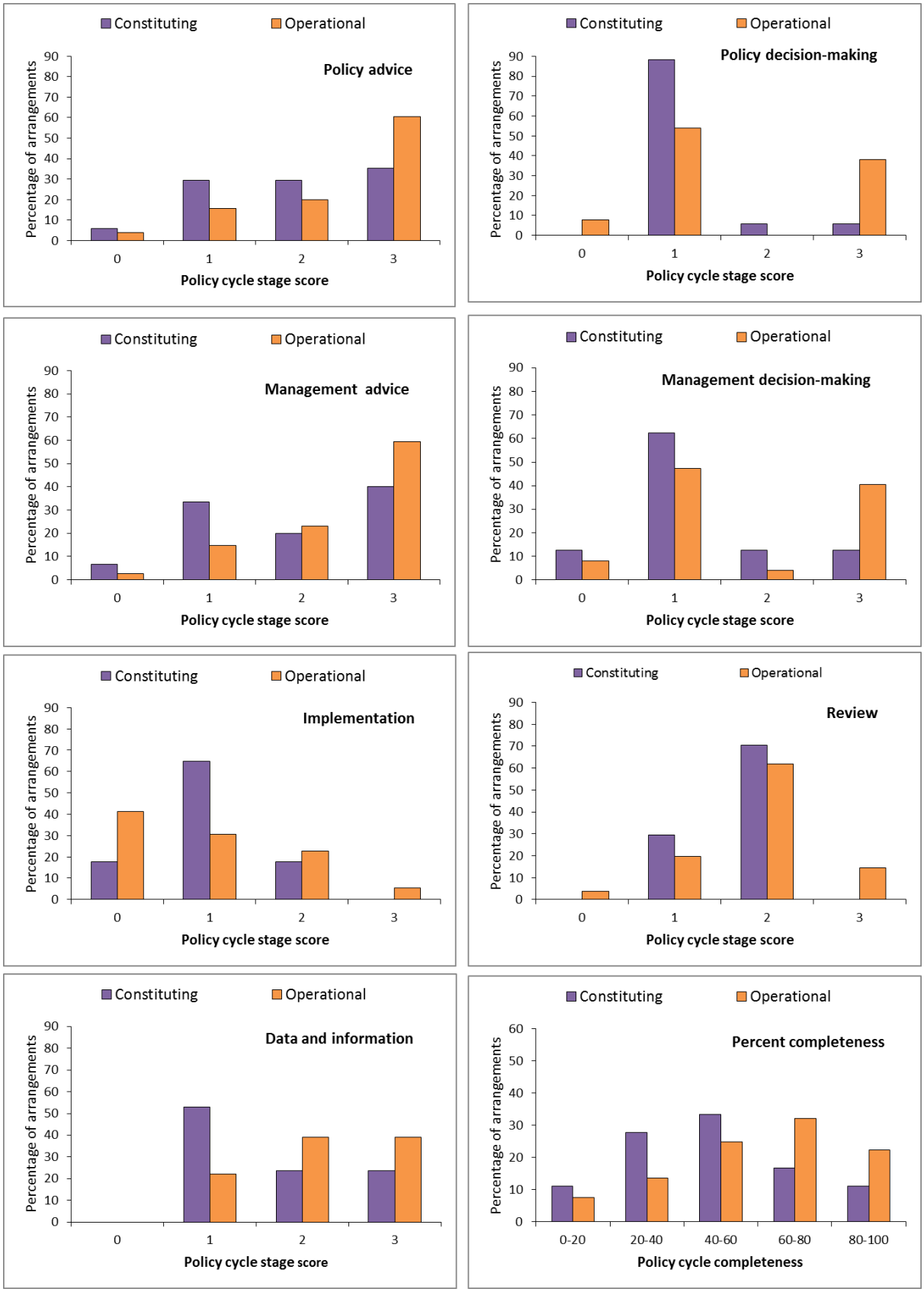



**Figure 5.** The distribution of scores for each of the seven policy cycle stages, and overall policy cycle completeness for the two major types of arrangements (see Table 2 for the scoring criteria).

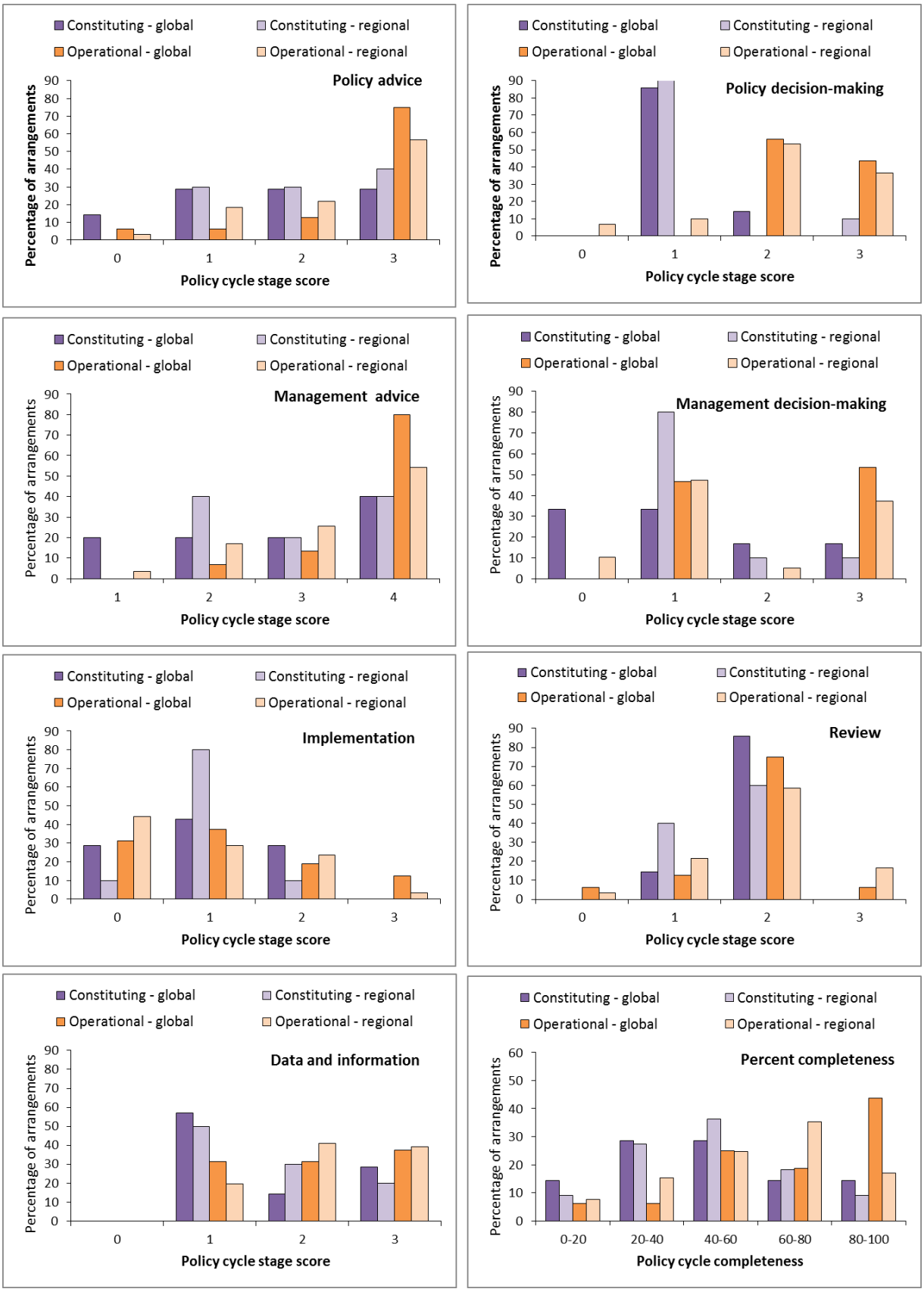



**Figure 6.** The distribution of scores for each of the seven policy cycle stages, and overall policy cycle completeness for constituting and operational arrangements at global and regional levels (see Table 2 for the scoring criteria).

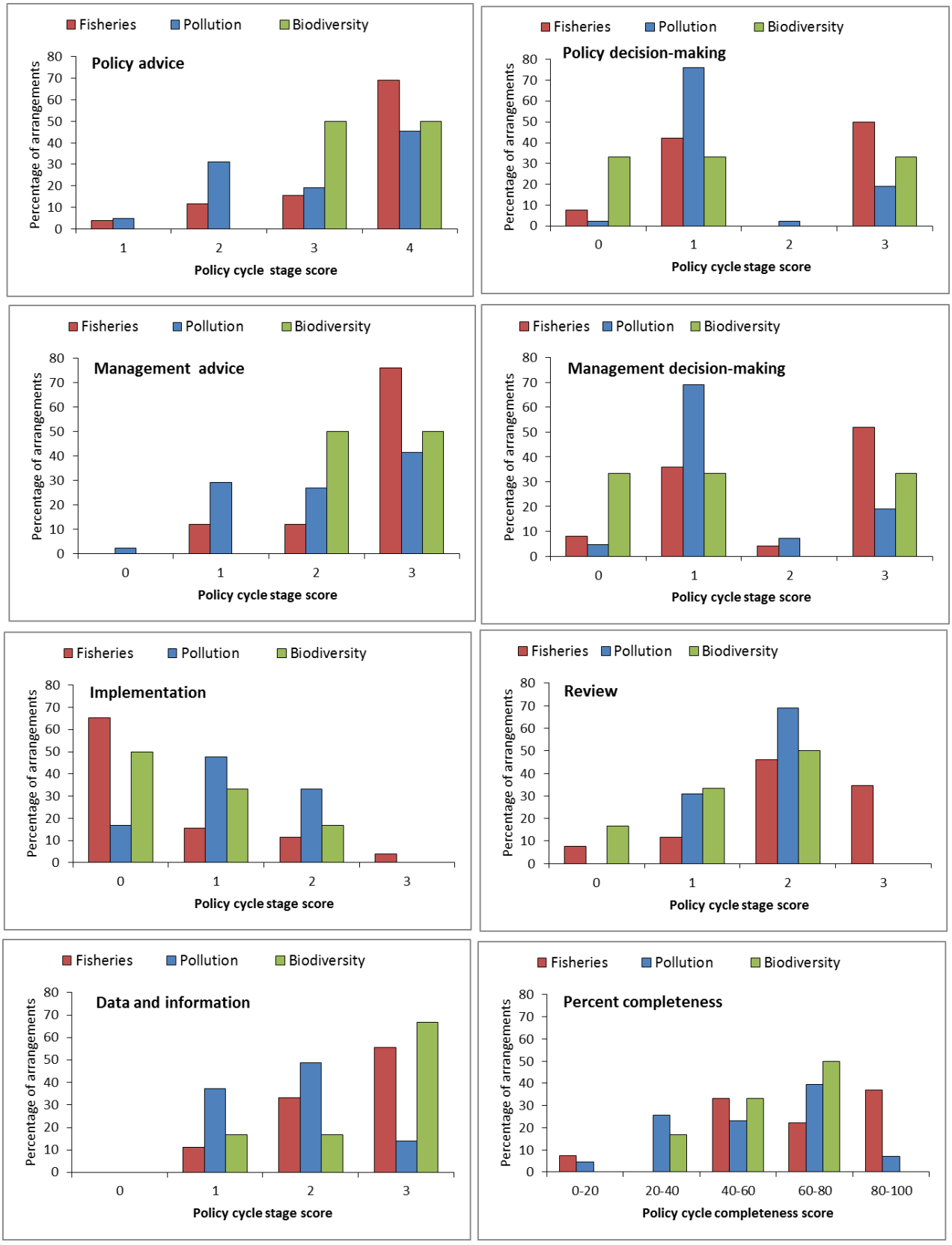



**Figure 7.** The distribution of scores by issues (fisheries, biodiversity and pollution) for each of the seven policy cycle stages, and overall policy cycle completeness. (see Table 2 for the scoring criteria).

The differences among policy cycle stages and issues shown in Figure 7 are thought to provide insight into where attention should be focussed in order to promote good governance. For fisheries, attention to collaboration in implementation of measures is clearly needed. For pollution the analysis points to the need for strengthening arrangements in the area of data and information reporting and the capacity building needed to support this function. For biodiversity the high proportions of agreements without either policy or management decision making mechanisms (about 30% in each case) is a serious shortcoming.

### 3.3 Principles

The formulation and explicit statement of principles that reflect foundational values upon which agreements are based are considered to be important aspects of institutional development. These can provide a basis for review of performance, adaptive revision, and for collaboration among arrangements. Ultimately, it was not possible to pursue a comprehensive assessment of the principles upon which arrangements are based. There were too many instances in which principles were not explicitly stated in agreements for this analysis to be feasible. The principles that were stated are compiled in Appendix 3 by issue area and time period.

Overall 24 different principles appeared in the 100 agreements reviewed. Of these, nine occurred in five or more agreements (numbers in parentheses): conservation (42), cooperation (31), sustainability (31), precaution (26), ecosystem approach (14), equity (9), participation (5), prevention of pollution (5), best available scientific evidence (5). It is important to distinguish between how the term ‘conservation’ is used. In some instances, it may refer to ‘conservation of fish stocks’ and in other instances refers to ‘conservation of living marine resources’ or biodiversity per se.

Several principles usually considered to be important for good governance did not appear in any agreement (efficiency, empowerment, rationality, representativeness, responsiveness, stewardship, subsidiarity).

Temporal patterns were expected in the prominence of various principles in agreements. For example, as the ecosystem and precautionary approaches became more widely accepted post UNCED, one would expect to see them more frequently stated in later agreements. However, the data are too sparse to reflect clear patterns over time for any of the principles encountered. Similarly, differences in frequency of occurrence among issues were not discernible, although as might be expected, sustainability ranked highest among fisheries agreements; cooperation was highest for pollution, and conservation was highest for biodiversity. The lack of clearly stated principles in agreements may reveal the lack of a set of common principles or even a shared purpose, which could hamper future efforts towards cooperation and integration in ABNJ.

### 3.4 Dispute resolution mechanisms

Dispute resolution mechanisms are considered to be an important component of transboundary agreements. Such mechanisms were observed to be present in the majority of constituting arrangements. However, only two thirds of operational arrangements had these mechanisms or were stated as relying on their constituting arrangements for this function (Table 5).

**Table 5.** The extent to which dispute resolution mechanisms are clearly identified in arrangements (percent (number)).

| Dispute resolution mechanism | Type of arrangement | | Total |
|---|---|---|---|
| | Constituting | Operational | |
| No mechanism | 11<br>(2) | 36<br>(29) | 32<br>(31) |
| Mechanism present | 89<br>(16) | 64<br>(51) | 68<br>(67) |
| Total | (18) | (89) | (98) |

### 3.5 Provisions for revision and amendment

The capacity to change in response to new information and changing circumstances is an important element in effective transboundary and ABNJ arrangements. The current awareness that climate change brings a high level of uncertainty into the global governance arena reinforces the need for this capacity. The completeness of the policy cycle reflected in Figures 5-7 is an important facet of adaptive capacity. In particular, mechanisms for policy review, advice and decision-making are key components. Adaptive capacity is further strengthened when arrangements clearly specify the process by which they can be revised and amended; albeit in a longer time frame than may be needed for adaptive management.

Provisions for revision and amendment were present in 89% of the arrangements. All 17 constituting arrangements had clearly identifiable mechanisms, as did the majority of operational arrangements (Table 6). As with other aspects of arrangements thought to reflect 'good governance', the presence of a revision and amendment mechanism does not mean that it is effectively used.

**Table 6.** The extent to which the mechanism for revision is clearly identified in the arrangement (percent (number)).

| Adaptive mechanism | Type of arrangement | | Total |
|---|---|---|---|
| | Constituting | Operational | |
| No mechanism | 6<br>(1) | 9<br>(7) | 118<br>(8) |
| Mechanism present | 94<br>(17) | 91<br>(74) | 92<br>(91) |
| Total | (18) | (81) | (99) |

## 4 The global structure of ocean governance

The analysis of the entire set of global and regional arrangements for ABNJ governance reveals an overall pattern that may provide a useful framework for identifying gaps and weak areas and for developing interventions to address them. The overall picture is one of two complementary sets of networks (Figure 8). The first set is the 'global-to-regional issue-based networks'. They are shown as vertical rectangles which reflect the major global arrangements for each of the four issues of fisheries, pollution, biodiversity and climate change. The second set is the crosscutting 'regional intersectoral clusters/networks'. They are illustrated in Figure 8 by horizontal rectangles representing five hypothetical 'regional intersectoral clusters/networks' (Regions A-E). The solid circles indicate that representation of 'global-to-regional issue-based networks' is incomplete in the regional clusters, reflecting gaps to be filled. The regional clusters of arrangements reflected in the rows in Figure 8 provide the

potential for horizontal interplay within regions that is needed for integration across issues, and for their integration with the wider spectrum of regional economic cooperation activities.

In the following sections, these two complementary sets of networks are examined in greater detail. Of particular interest is the extent to which the regional clusters can be viewed as networks that form the basis for integrated management or EBM. If so, they can be a locus for interventions aimed at filling gaps and building capacity to strengthen governance at the regional level.

## 4.1 Global-to-regional issue-based networks

The majority of the arrangements that have been included in the database are either directly administered by, or associated with, the programmes of a relatively small number of UN agencies and programs (Figure 8). These form the set of issue-based global-to-regional networks that will be examined in greater detail in this section.

### 4.1.1 The networks

For fisheries, the UN Fish Stocks Agreement (UNFSA), along with the FAO Compliance Agreement and FAO Code of Conduct are the major global constituting arrangements[17], with the FAO being the agency with responsibility for promoting implementation of the Code of Conduct and Compliance Agreement and the UNGA having responsibility for the UNFSA. Many of the Regional Fisheries Bodies (RFBs) and Regional Fisheries Management Organisations (RFMOs) in the database are established with reference to the Constitution of the FAO under Articles VI and XIV. Article XIV bodies are established by treaty, generally have a management mandate and are more independent than Article VI bodies (Freestone 2011). Other RFBs which are independently constituted by the contracting parties are also loosely associated with the FAO through an FAO-facilitated network of regional fisheries bodies' secretariats. To some extent, the Committee of Fisheries (COFI), a subsidiary body of the FAO Council, can be seen as an overarching policy setting body for RFBs globally, although none of the agreements or the voluntary code explicitly identified COFI as playing this role. COFI presently constitutes one of two[18] global inter-governmental fora where major international fisheries and aquaculture problems and issues are examined and recommendations addressed to governments, regional fishery bodies, NGOs, fishworkers, FAO and the international community, periodically on a world-wide basis. COFI has met 29 times to date. COFI has also been used as a forum in which global agreements and non-binding instruments were negotiated (FAO 2013). The RFB network first convened in 1999 as the 'Meeting of FAO and Non-FAO Regional Fishery Bodies or Arrangements' (FAO 1999) and met four times before changing its name in 2005 to the Regional Fishery Body Secretariats Network (RSN).

[17] Categorized as fisheries and biodiversity in Table 3 due to their ecosystem aspects.
[18] The UNGA also serves in this role both through its review conferences of FSA implementation and its annual sustainable fisheries resolution. FAO COFI is largely fisheries ministries, whereas the UNGA represents all nations and all interests.

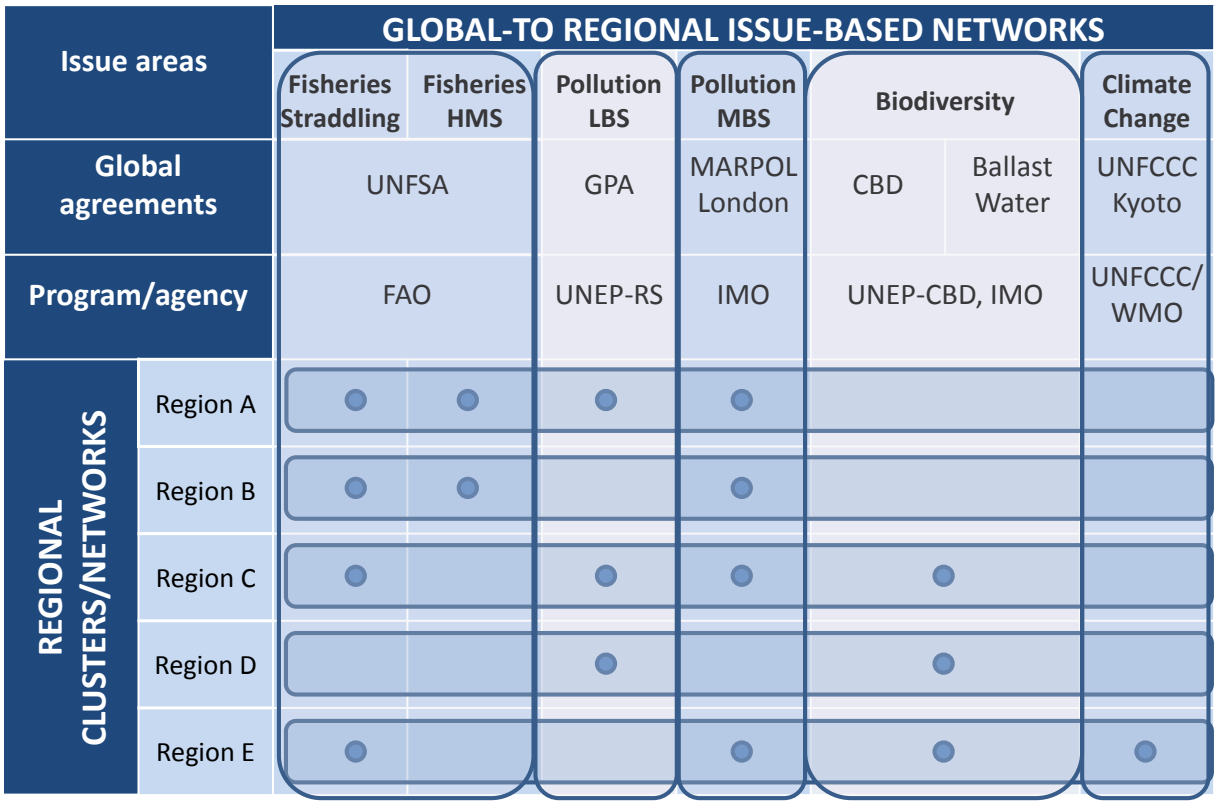



**Figure 8.** The global ocean governance structure comprising vertical 'global-to-regional issue-based networks' of arrangements and complementary horizontal 'crosscutting regional intersectoral networks' of arrangements (five hypothetical regions A-E are shown for illustration). The solid circles indicate that the issue covered by the global-regional network is reflected in the arrangements comprising the regional complex.

The RSN first met in 2007 (FAO 2007) and has met twice since. Since 2011, it has produced a regular newsletter. The RSN meetings, held in parallel with the FAO Committee on Fisheries (COFI) are not formal FAO meetings but provide the opportunity for exchange of experiences and best practices among RFBs. The 2007 meeting was attended by 18 marine RFBs as well as a number of RFBs for inland waters and several other related organisations such as the Southeast Asian Fisheries Development Center (SEAFDEC) and The International Council for Exploration of the Seas (ICES). The 2011 meeting issued a statement emphasising the important role that the RSN was playing in strengthening RFBs. In parallel with this, FAO has been promoting a series of performance reviews of RFBs with a view to developing guidelines for best practices (Ceo et al. 2012). It is evident from the above that there is in place a mechanism that could be used for networking regional fisheries bodies and linking them with the major global arrangements, but with a focus on fisheries. This mechanism could also link these regional and global arrangements with fisheries related NGOs and research entities, but to achieve this, the meetings would have to be opened up to these organisations. An assessment of the performance of this mechanism is beyond the scope of this study.

The International Maritime Organisation (IMO) is home to another cluster of arrangements pertaining largely to pollution. It provides the secretariat for six global operational arrangements relating to marine based pollution and one relating to biodiversity - the Ballast

Water Management Convention (BWMC)[19]. Given that these relate to global shipping, there is less imperative for them to be reflected in regional level arrangements. The IMO itself promotes implementation of these agreements at the regional level through IMO Regional Presence initiatives[20]. The promotion and implementation of IMO arrangements is also often facilitated at the regional level through Regional Seas Programme protocols relating to: ship generated waste (5), oil spills (3), disposal of hazardous waste at sea (3), dumping at sea (1), and contamination from exploration (1).

The Regional Seas Programme of UNEP, which began in 1974, is the most extensive initiative promoting implementation of global arrangements. There are 18 Regional Seas areas of which 17 are indirectly or directly connected to ABNJ (Table 7) and are included in the database. Of these, five are administered by UNEP, seven were constituted under UNEP but are managed by other organisations and four are entirely independent. However, all with secretariats take part in UNEP organised regional seas activities, such as the series of 15 global level meetings of Regional Seas Conventions and Action Plans (RSCAP) which began in 1998. The mandate of all but four of the Regional Seas Agreements is limited to waters within national jurisdiction.

One of the most prominent activities across Regional Seas areas is implementation of the 1995 Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) (UNEP/GPA, 2006). This is approached through regional protocols (11) addressing land-based sources of pollution and activities (LBSA) (Table 7). However, this is not the only global level agreement for which regional level implementation is pursued under the Regional Seas Programme and its conventions. As indicated above, several IMO based global agreements are reflected in Regional Seas protocols. Regional level implementation of the marine aspects of the major global biodiversity arrangements - Convention on Biological Diversity (CBD), Ramsar Convention, Convention on International Trade in Endangered Species (CITES), and Convention on Migratory Species (CMS) - is also pursued via Regional Seas protocols.

The dates in Table 7 show that in most cases the protocols relating to biodiversity are more recent than those for pollution. Thus, there has been gradual expansion and update of many of the regional seas agreements to include biodiversity. **However, few Regional Seas conventions or programmes directly address biodiversity in areas beyond national jurisdiction (Pacific Island Region, the Southern Ocean, Northeast Atlantic, Mediterranean**). The Lima Convention for the South-east Pacific does address pollution in adjacent ABNJ. Protocols and annexes relating to biodiversity are mainly focused on species and habitats in areas of national jurisdiction, usually through the establishment of protected areas. While these protected areas may at times protect straddling or highly migratory species such as sea turtles and sea birds, the respective protocols are not considered to be substantially related to ABNJ biodiversity conservation.

While the networks described above help to make global level fisheries and pollution arrangements applicable at the regional level, there is no comparable network or institutional arrangement for place-based biodiversity conservation in ABNJ. As indicated above, several important biodiversity arrangements may be facilitated at the regional level by Regional Seas Secretariats but these are almost entirely within areas under national jurisdiction. The 2008 effort under the CBD to address this gap is focused on describing Ecologically or Biologically Significant Areas (EBSAs) and is aimed at providing scientific information and advice for place-based biodiversity conservation in AWNJ and ABNJ. However, there is still a lack of a complete global level policy process for ABNJ that can make decisions about which areas

[19] It is due to the biodiversity focus of this arrangement that it is not included under MARPOL as an annex (Jose Matheickal, pers comm. February 2014)

[20] One Regional Maritime Adviser for the Caribbean, based in Trinidad and Tobago, and four Regional Coordinators based in: Côte d'Ivoire for West and Central Africa (Francophone), Ghana for West and Central Africa (Anglophone), Kenya for Eastern and Southern Africa and the Philippines for East Asia.

should be protected, and the regional institutional arrangements needed for implementation (Druel et al. 2013). This will be further discussed in a later section on science policy interfaces.

**Table 7.** The UNEP Regional Seas Programme, conventions and protocols/annexes

| Region | | Year in force | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Protocols/*annexes* | | | | | | | | |
| | | Convention | LBS | Ship waste | Oil spills | Emergency | Exploration/offshore activity | Dumping | Protected areas/biodiversity | Hazardous waste transport | Environmental Protection |
| Wider Caribbean Region - Cartagena Convention | UNEP | 1986 | NYIF | | 1986 | | | | 2000 | | |
| East Asian Seas - No convention | | | | | | | | | | | |
| Eastern Africa - Nairobi Convention[21] | | 1996 | NYIF | | | 1996 | | | 1996 | | |
| Mediterranean - Barcelona Convention | | 1976<br>2004 | 1983 | | | 2004 | NYIF | 1978[22] | 1982,<br>1995 | NYIF | |
| North-West Pacific - No convention | | | | | | | | | | | |
| Western Africa - Abidjan Convention | | 1984 | | | | 1984 | | | | | |
| Black Sea - Bucharest Convention | Other agency hosting | 1994 | NYIF | | | 1994 | | 1994 | NYIF | | |
| North-East Pacific - Antigua Convention | | | | | | | | | | | |
| Red Sea/Gulf of Aden -Jeddah Convention | | 1985 | NYIF | | | 1985 | | | NYIF | | |
| ROPME Sea Area - Kuwait Convention | | 1979 | 1993 | | | 1979 | 1990 | | | NYIF | |
| South Asian Seas - No convention | | | | | | | | | | | |
| South-East Pacific - Lima Convention | | 1986 | 1986 | | | 1987 | | | 1984 | 1995 | |
| Pacific - Noumea Convention | | 1990 | | | | 1990 | | 1990 | | | |
| Arctic - No convention | Independent | | | | | | | | | | |
| Antarctic - The Antarctic Treaty | | 1961 | | | | | | | | | 1998 |
| Baltic Sea - Helsinki Convention | | 1980<br>2000 | *2000* | *2000* | | *2000* | *2000* | *2000* | | | |
| North-East Atlantic - OSPAR Convention | | 1972<br>1998 | *1998* | | | | *1998* | *1998* | *1998* | | |

[21] Amended Convention Not Yet In Force (NYIF)
[22] Currently being amended – NYIF

Climate change, the fourth issue to be addressed, is in some ways qualitatively different from the other three. Its effects will be experienced in all regions and ecosystems of the planet. Thus far, discussions about mitigation have taken place in global level arenas and do not seem to have a regional implementation component with an ocean focus. Adaptation on the other hand will need to be implemented at regional, national and local levels. Only three regional arrangements could be found that made reference to addressing climate change adaptation or vulnerability in ABNJ - the Antarctic Treaty System, the Arctic Council, and the Pacific Islands Forum - of which the latter two are coordinating arrangements. It is not clear from the arrangements examined how climate change will be dealt with at the regional level. It is likely that it will be dealt with largely as a crosscutting issue in sectoral agreements.

With regard to pollution, it should be noted that there are global level arrangements that cannot be considered as part of the IMO cluster. The Vienna Convention/Montréal Protocol, and the Stockholm Convention function independently[23]. Likewise, for biodiversity, CITES (trade in endangered species) is independent of the CBD.

Global-to-regional issue-based networks play an important role in facilitating lateral linkages among regional organisations and connecting them with the global level arrangements. **However, they are largely sector or issue specific, leaving the question as to how integration across issues and sectors is structured for ocean governance at the global level.** It can be argued that there is a need for integration at both global and regional levels.

### 4.1.2 Coordination/integration of the global-to-regional issue-based networks

The need to integrate across marine related issue areas within the UN system was highlighted in 1992 at UNCED. In 1993, the UN agencies dealing with ocean and coastal issues formed the Sub-committee on Oceans and Coastal Areas of the UN Administrative Committee on Coordination (ACC SOCA) to coordinate activities relating to Chapter 17 of Agenda 21. In 2003, it was decided to establish a separate Oceans and Coastal Areas Network (subsequently renamed UN-Oceans) to provide effective, transparent and regular inter-agency coordination on ocean and coastal issues within the United Nations system. UNESCO-IOC hosted the first meeting of UN-Oceans in 2005. Altogether, there are 15 bodies with membership in UN-Oceans (Departments of the UN Secretariat, UN Programmes and Funds, UN Specialized Agencies, related organisations and conventions).

Thus far, UN-Oceans has had no dedicated staff. The Coordinator and Deputy Coordinator were elected from one of the member bodies for a period of two years. The Secretariat also rotated and was at the coordinator's organisation. An evaluation of UN-Oceans concluded that due to its ad hoc structure and lack of dedicated human and financial resources, it was ineffective, and unlikely to be able to achieve its objectives (Zahran and Inomata. 2012). The review recommended that UN-Oceans be provided with a Secretariat and that it be institutionalised with clear procedures for program development and decision-making. The review also recommended that countries should have oceans focal points with which UN-Oceans would interact directly.

New Terms of Reference for UN-Oceans were approved by the UNGA in 2013 (UNGA resolution 68/70) and will be further reviewed in 2014. These ToRs indicate that the UN Division for Ocean Affairs and Law of the Sea (UN-DOALOS) will be the permanent focal point for UN-Oceans. They also outline procedures for meetings, development of a work programme and reporting. What is not clear is the extent to which the mechanism will be provided with the resources needed to be effective. The increased prominence of oceans at Rio +20 suggested that coordination of UN activities in relation to oceans would be likely to receive increased attention from the UN in the coming years (UN Secretary General 2012). But the poor reception of the Oceans Compact has raised questions about this optimistic assessment.

---

[23] The arrangements for the newly created Minamata Convention on Mercury remain to be determined.

There is a substantial literature on inter-relations (or as it is referred to in the governance literature, interplay) among international institutions upon which a strengthened UN-Oceans could draw (e.g. Stokke 2001, Young 2002, Oberthur and Gehring 2006, Oberthur 2009, Stokke, et al. 2011). Oberthur (2009) presents a typology of interplay among international institutions and discusses approaches to managing interplay. One of the key areas of emphasis for enhancement is systematic promotion of inter-institutional learning. This can be pursued by explicitly recognising the importance of institutional process and memory both within and between arrangements, such that process promotes learning, and knowledge and experience are retained in a form that is shareable. Attention to policy cycles and in particular science policy interfaces that are documented is critical for building learning institutions, and learning-enabled networks. But questions about limited mandates, rigid hierarchies and varying priorities (a lack of a common purpose and shared set of principles) leave the future of constructive interplay unsure absent a strong call for enabling mechanisms for cooperation from the UNGA or via a new international agreement.

## 4.2 Regional clusters for EBM

At the regional level, there appear to be several regions in the world where arrangements pertaining to ABNJ issues (and others pertaining to ocean issues in general) overlap and interact. These 'regional intersectoral clusters/networks' of arrangements may provide arenas for regional or 'place-based'[24] implementation of global arrangements together with independent regional arrangements. The governance literature recognises the occurrence of such clusters of arrangements and, when the clusters exhibit certain characteristics, refers to them as regime complexes (Orsini et al. 2013). According to Orsini et al. (2013), to be considered a regime complex, there should be three or more arrangements, they should not be interrelated in a hierarchical way and they should be interacting based on a common purpose and set of principles.

Among the arrangements in the database, 16 regional clusters have been identified based on visual inspection of spatial overlaps (Figure 9). In this section, these clusters are examined to determine if they do indeed form entities for which the whole is greater than the sum of the parts. If so, these could provide an entry point for assessment of governance architecture at the regional level. **The existence of these regional clusters also raises the question as to whether global ocean governance can be enhanced by strengthening them and promoting integration among them.** This would be done in parallel with strengthening the global-to-regional issue-based networks discussed in the previous section, which together with the regional clusters can be seen as forming a single global ocean governance architecture.

A full examination of the connectivity among arrangements within the regional clusters would require considerable information on their interplay. **Interplay may comprise several aspects, ranging from data sharing to full collaboration in decision-making and implementation. Information at this level of detail is not available directly from the documentation for the regional clusters identified and would require more intensive enquiry.** Therefore, this study can only undertake a preliminary evaluation of regional clusters for ocean governance, and the interrelations of the arrangements that comprise them based on statements regarding formal interactions found in the documentation for the organisations. Undoubtedly, there are many interactions that are not explicitly stated in the material reviewed for the arrangements. For example, organizational representatives may attend meetings of other organizations in the cluster even when there is no formal interaction between the arrangements.

The 16 regional clusters shown in Figure 9 are described in the following sections. For each, the description begins with a diagram showing the types of arrangements and the issues that

[24] The term 'place-based' is used broadly here in the sense of Young et al. (2007) to encompass scales from regional down to much smaller specific areas which may be identified as in need of management.

they cover. The diagram also shows the documented interactions among the arrangements in the cluster. Some of the diagrams include key regional arrangements that are not in the arrangements database because they do not pertain to ABNJ. The shapes for these are shaded. They are included to show that the regional clusters are much richer than just the arrangements pertaining to ABNJ. These regional arrangements may represent a potential for the regional cluster to be expanded to include responsibility for ABNJ in that area.

Each diagram is followed by a table showing the spatial overlaps of the main arrangements in the regional cluster. These are based on the GIS shape-files for the arrangements. The overlaps shown are asymmetrical, for example ICCAT overlaps the entire Mediterranean, but the Mediterranean only overlaps a small part of the area covered by ICCAT. Finally, there is a tabular overview of the regional cluster that covers (i) the spatial extent of the regional cluster, (ii) the extent to which there appears to be overarching integration, (iii-vi) what is in place for each of the four issues (fisheries, pollution, biodiversity, climate change), and (vii) the relevance of the regional cluster to ABNJ.

It should be noted that the areas covered by the regional clusters are loosely defined and flexible. They are identified primarily as regions where there are several overlapping arrangements aimed at various aspects of ocean governance. As consideration of these clusters continues, it is to be expected that they may be subdivided, combined, and or networked if the interplay required for integrated EBM is to be achieved.

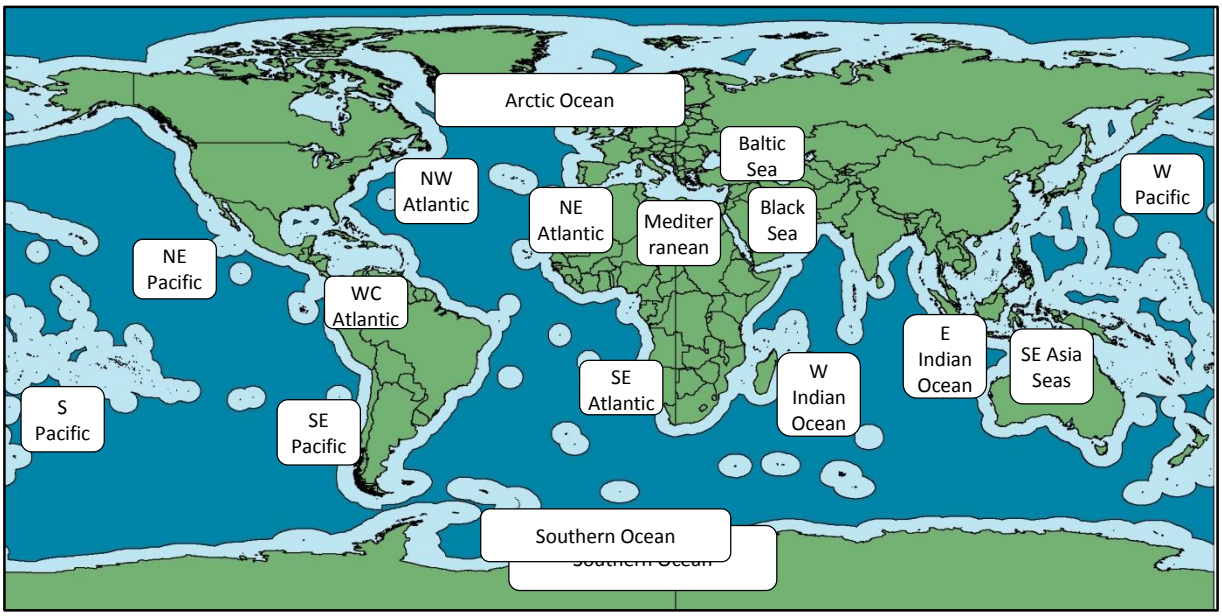



**Figure 9.** The 16 regional clusters identified.

### 4.2.1 Northeast Atlantic

The arrangements comprising the Northeast Atlantic regional cluster are depicted in Figure 10. The spatial overlaps among the key arrangements are shown in Table 8, and the regional cluster is summarized in Table 9.

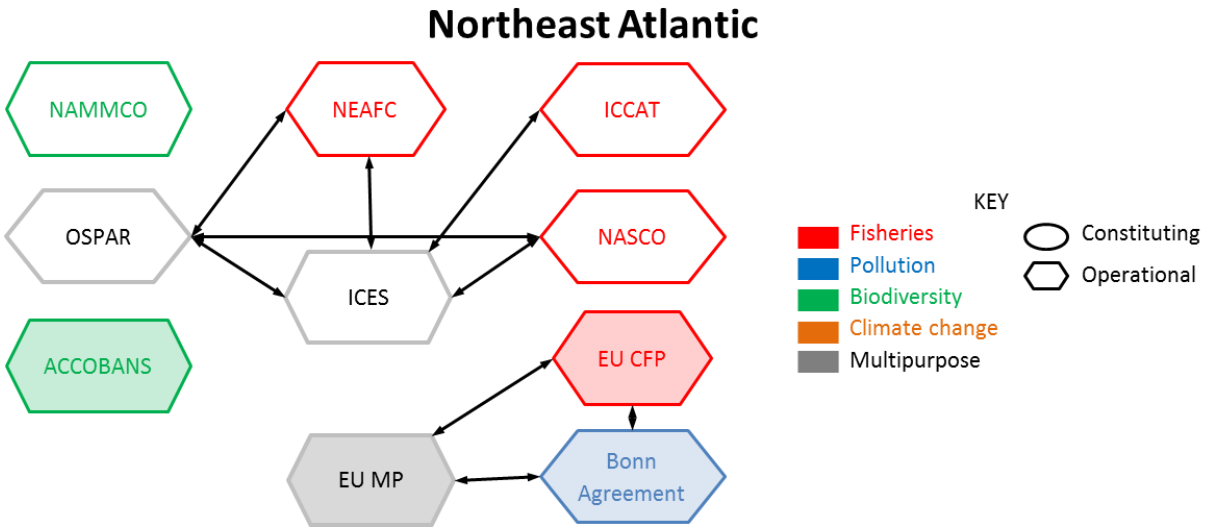



**Figure 10.** The arrangements comprising the Northeast Atlantic regional cluster

**Table 8.** Areas (million km$^2$) covered by the key arrangements in the Northeast Atlantic regional cluster and the percentage overlap of the arrangements

| | ICCAT | ICES | NAMMCO | NASCO | NEAFC | OSPAR |
|---|---|---|---|---|---|---|
| Area | 97.4 | 14.5 | 20.8 | 20.2 | 13.6 | 13.8 |
| ICCAT | | 100 | 100 | 100 | 100 | 100 |
| ICES | 15 | | 70 | 72 | 100 | 99 |
| NAMMCO | 21 | 100 | | 100 | 100 | 99 |
| NASCO | 21 | 100 | 97 | | 100 | 99 |
| NEAFC | 14 | 94 | 65 | 67 | | 98 |
| OSPAR | 14 | 94 | 66 | 68 | 100 | |

**Table 9.** Characteristics of the Northeast Atlantic regional cluster

| | |
|---|---|
| Spatial extent | The arrangements comprising this regional cluster have a high degree of spatial coherence with NEAFC, OSPAR and ICES corresponding closely in space, NAMMCO and NASCO extending across to the Northwest Atlantic. In contrast ICCAT covers the entire Atlantic Ocean and adjacent seas. |
| Integration | In this region there appears to be minimal integration between the implementing organizations. MOUs exist between OSPAR and both NEAFC and NASCO, however, aside from that, the main link between all of the organizations (with the exception of NAMMCO) is that they are all advised by ICES. |
| Fisheries | Fisheries management is the prime regulatory focus of this regional cluster. Every arrangement involved in the Northeast Atlantic region other than OSPAR has at least a portion of its mandate dedicated to fisheries, and in most cases that is the sole focus of the agreement. Even NAMMCO, which is in theory related to biodiversity, makes a point of mentioning fisheries (hunting of marine mammals) as a priority. |

| | |
|---|---|
| Pollution | OSPAR is the main body in this region for the monitoring and management of marine pollution. |
| Biodiversity | OSPAR is the most far reaching agreement in this regional cluster in relation to biodiversity. It is a pioneering body at the global level with regard to the establishment of high seas marine protected areas but has no regulatory authority over sectoral activities such as fishing, shipping or seabed mining that can impact biodiversity |
| Climate change | Both OSPAR and ICES have bodies that conduct research on climate change. While ICES is an advisory body, it provides advice to various contracting parties through the ICES-PICES Strategic Initiative on Climate Change Impacts on Marine Ecosystems (SICCME). OSPAR also states that it considers the impacts of climate change within the development of its strategies. |
| Relevance to ABNJ | This regional cluster has strong connections to ABNJ through fisheries arrangements that are largely focused on HMS, straddling and discrete FS and through the establishment of high seas marine protected areas under the auspices of OSPAR. However, the major impact on these areas, fisheries, is not subject to OSPAR's control, or managed in a coordinated way. |

### 4.2.2 Northwest Atlantic

The arrangements comprising the Northwest Atlantic regional cluster are depicted in Figure 11. The spatial overlaps among the key arrangements are shown in Table 10, and the regional cluster is summarized in Table 11.

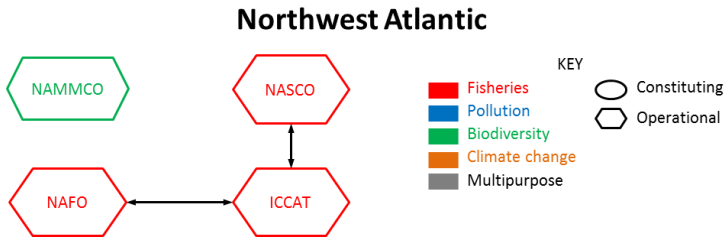



**Figure 11.** The arrangements comprising the Northwest Atlantic regional cluster

**Table 10.** Areas (million km$^2$) covered by the key arrangements in the Northwest Atlantic regional cluster and the percentage overlap of the arrangements

| | ICCAT | NAFO | NAMMCO | NASCO |
|---|---|---|---|---|
| Area | 97.4 | 6.3 | 20.8 | 20.2 |
| ICCAT | | 100 | 100 | 100 |
| NAFO | 6 | | 30 | 28 |
| NAMMCO | 21 | 100 | | 100 |
| NASCO | 21 | 90 | 97 | |

**Table 11.** Characteristics of the Northwest Atlantic regional cluster

| | |
|---|---|
| Spatial extent | Three of the arrangements comprising this regional cluster extend beyond in the Northwest Atlantic (NAMMCO, NASCO and ICCAT). Only NAFO is truly focused on the Northwest Atlantic. |
| Integration | In this region, integration is minimal among the operational organizations and there is no institution that has responsibility for overarching coordination for the area. |
| Fisheries | Fisheries management in this area is the dominant issue. ICCAT has an Atlantic ocean-wide mandate for tuna and tuna-like fisheries, while NAFO, NASCO specific mandates for the management of fisheries in the area. |
| Pollution | There is no regional seas programme for this maritime area. Pollution issues are therefore covered by global arrangements or at the national level or not at all. |
| Biodiversity | NAMMCO manages hunting for marine mammals but some specific ecosystem-focused biodiversity issues. Further, NAFO's management includes provisions that minimize the harmful impact of deep sea fishing activities on "vulnerable marine ecosystems", and requirements to preserve marine biodiversity. |
| Climate Change | Climate change is addressed only within the context of the arrangements for the above three issues. |
| Relevance to ABNJ | This regional cluster has some connections to ABNJ through arrangements that are largely focused on fisheries management. |

### 4.2.3 Baltic Sea

The arrangements comprising the Baltic Sea cluster are depicted in Figure 12. The spatial overlaps among the key arrangements are shown in Table 12, and the regional cluster is summarized in Table 13.

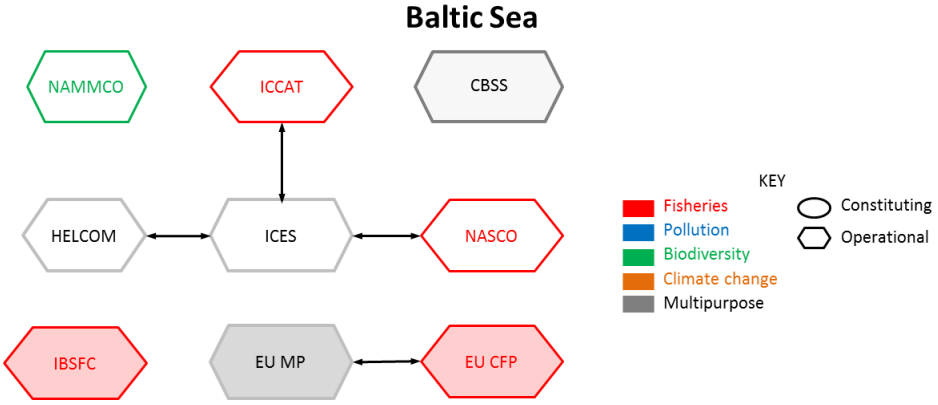



**Figure 12.** The arrangements comprising the Baltic Sea regional cluster

**Table 12.** Areas (million km$^2$) covered by the key arrangements in the Baltic Sea regional cluster and the percentage overlap of the arrangements

| | ICCAT | ICES | NAMMCO | NASCO | NEAFC | Helsinki |
|---|---|---|---|---|---|---|
| Area | 97.4 | 14.5 | 20.8 | 20.2 | 13.6 | 0.4 |
| ICCAT | | 100 | 100 | 100 | 100 | 100 |
| ICES | 15 | | 70 | 72 | 100 | 100 |
| NAMMCO | 21 | 100 | | 100 | 100 | 100 |
| NASCO | 21 | 100 | 97 | | 100 | 100 |
| NEAFC | 14 | 94 | 65 | 67 | | - |
| Helsinki | <1 | 3 | 2 | 2 | - | |

**Table 13.** Characteristics of the Baltic Sea regional cluster

| | |
|---|---|
| Spatial extent | The arrangements comprising this regional cluster range in spatial coverage from the Baltic Sea specifically and internal waters of member states (HELCOM), through of those covering of the north-east Atlantic (NEAFC, ICES), and the entire North Atlantic (NAMMCO), to the entire Atlantic Ocean (ICCAT). |
| Integration | Aside from the fact that all of the arrangements in this area are advised by ICES (with the exception of NAMMCO) there is no significant formalized integration between operational arrangements in this region. |
| Fisheries | Most arrangements involved in the Baltic region have at least a portion of their mandate dedicated to fisheries (other than HELCOM), and in most cases that is the sole focus of the agreement. NAMMCO is focused largely on hunting of marine mammals from an ecosystem-based perspective, ICES serves as the advisory institution for all of the operational arrangements in this cluster. |
| Pollution | The Helsinki convention is the primary arrangement for pollution regulation in the Baltic area, it is advised by ICES. |
| Biodiversity | The Helsinki convention is the most far reaching arrangement in this cluster in relation to biodiversity |
| Climate change | Both the Helsinki Convention and ICES have bodies that conduct research on climate change. ICES is an advisory body that provides advice to various contracting parties through the ICES-PICES Strategic Initiative on Climate Change Impacts on Marine Ecosystems (SICCME). While HELCOM does not specifically mention climate change in its mandate it has conducted climate change assessments. |
| Relevance to ABNJ | This regional cluster is not connected to ABNJ; the only tangential connection being in regard to LBS of pollution but there is very little exchange between the Baltic Sea and Atlantic waters. All the region itself is within EEZs, so more emphasis is placed on near shore and internal waters. |

### 4.2.4 Mediterranean Sea

The arrangements comprising the Mediterranean Sea cluster are depicted in Figure 13. The spatial overlaps among the key arrangements are shown in Table 14, and the regional cluster is summarized in Table 15.

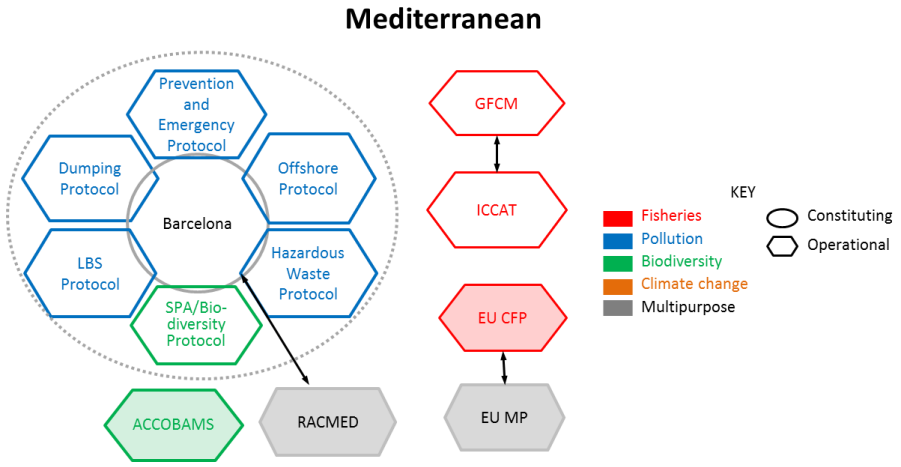



**Figure 13.** The arrangements comprising the Mediterranean Sea regional cluster

**Table 14.** Areas (million km$^2$) covered by the key arrangements in the Mediterranean Sea regional cluster and the percentage overlap of the arrangements

| | GFCM | ICCAT | Barcelona |
|---|---|---|---|
| Area | 3.0 | 97.4 | 2.5 |
| GFCM | | 3 | 100 |
| ICCAT | 100 | | 100 |
| Barcelona | 84 | 3 | |

**Table 15.** Characteristics of the Mediterranean regional cluster

| | |
|---|---|
| Spatial extent | The three arrangements comprising this regional cluster cover the entire Mediterranean Sea, from the Straits of Gibraltar to Straits of the Dardanelles. One, the GFCM also extends to the Black Sea, and another, ICCAT, to the entire Atlantic. |
| Integration | In this region, linkages between the two major issues – pollution and fisheries – appear weak or absent. The linkage of fisheries with biodiversity also appears weak but there are some efforts to improve this. |
| Fisheries | The GFCM is instrumental in managing fisheries in this region, based on its authority to adopt binding recommendations for fisheries conservation and management. ICCAT is responsible for HMS in these areas. |
| Pollution | In this maritime area, the Barcelona Convention, as the constituting arrangement, (along with its five protocols) is the arrangement responsible for protection of the marine environment against pollution. |
| Biodiversity | The SPA and Biodiversity Protocol explicitly deals with ABNJ issues. ACCOBAMS also deals specifically with marine mammals in ABNJ as well as EEZs |

| | |
|---|---|
| Climate Change | There are no agreements in this regional cluster that deal with climate change at the regional level. |
| Relevance to ABNJ | This regional cluster's connection to ABNJ is evident through arrangements dealing with fisheries management, pollution and biodiversity; however fisheries and biodiversity are not well integrated. Currently, the area is largely high seas as most Mediterranean coastal states either have not declared a 200 nm EEZ, or they do not enforce them. Hence, the high seas extends seaward of the territorial waters (12 nm, except Greece and Turkey with 6 nm) (UNEP-MAP-RAC/SPA 2011). |

### 4.2.5 Black Sea

The arrangements comprising the Black Sea cluster are depicted in Figure 14. The spatial overlaps among the key arrangements are shown in Table 16, and the regional cluster is summarized in Table 17.

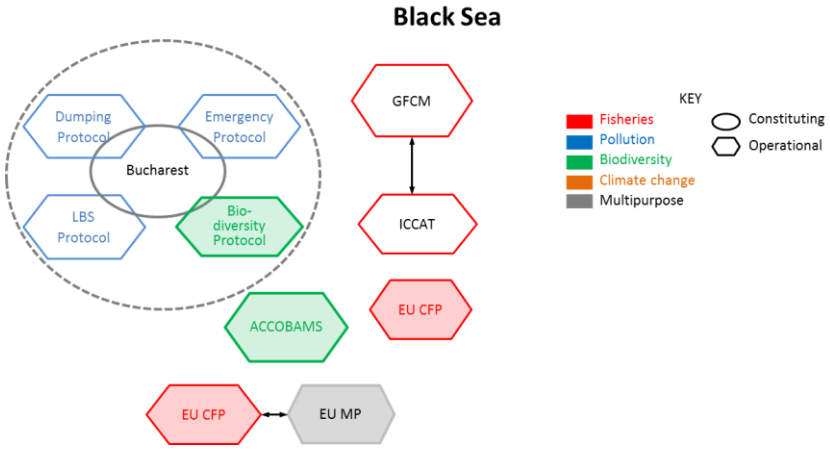



**Figure 14.** The arrangements comprising the Black Sea regional cluster

**Table 16.** Areas (million km$^2$) covered by the key arrangements in the Black Sea regional cluster and the percentage overlap of the arrangements

| | GFCM | ICCAT | Bucharest |
|---|---|---|---|
| Area | 3.0 | 97.4 | 0.5 |
| GFCM | | 3 | 100 |
| ICCAT | 100 | | 100 |
| Bucharest | 16 | <1 | |

**Table 17.** Characteristics of the Black Sea regional cluster

| | |
|---|---|
| Spatial extent | The arrangements within this region cover the jurisdictional waters of the states around the Black Sea, as well as the Mediterranean. |
| Integration | On a regional scale, there is no formal integration amongst the two relevant arrangements. While they have participated in workshops together such as the Joint GFCM BSC Workshop on IUU Fishing in the Black Sea (Feb. 2013), currently no MoUs exist between the two |
| Fisheries | The responsibility for fisheries management falls primarily to the GFCM. It is their responsibility to promote to promote the effective conservation, management and development of the living marine resources. |
| Pollution | Pollution is governed through the Bucharest Convention and its associated protocols. The protocols address pollution from LBS, dumping, and emergency offload of hazardous substances. |
| Biodiversity | Biodiversity is addressed on a regional level by a protocol of Bucharest Convention. |
| Climate change | Climate change is not addressed on a regional level for in this area. |
| Relevance to ABNJ | The main relevance of the agreements in place in the Black Sea is in regard to pollution that could affect ABNJ ecosystems via outflow into the Mediterranean and on into the Atlantic. |

### 4.2.6 Western Central Atlantic

The arrangements comprising the Western Central Atlantic cluster are depicted in Figure 15. The spatial overlaps among the key arrangements are shown in Table 18, and the regional cluster is summarized in Table 19.

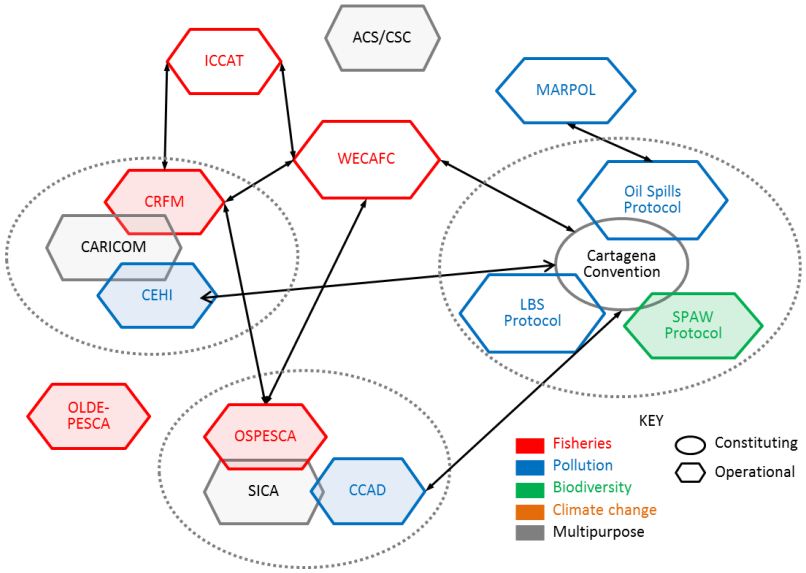



**Figure 15.** The arrangements comprising the Western Central Atlantic regional cluster

**Table 18**. Areas (million km$^2$) covered by the key arrangements in the Western Central Atlantic regional cluster and the percentage overlap of the arrangements

| | CRFM | ICCAT | OLDEPESCA | OSPESCA | WECAFC | Cartagena |
|---|---|---|---|---|---|---|
| Area | 2.0 | 97.4 | 6.9 | 2.1 | 18.2 | 6.6 |
| CRFM | | 2 | 9 | 3 | 11 | 30 |
| ICCAT | 100 | | 42 | 37 | 100 | 100 |
| OLDEPESCA | 32 | 3 | | 59 | 16 | 43 |
| OSPESCA | 3 | 1 | 18 | | 4 | 12 |
| WECAFC | 100 | 19 | 42 | 37 | | 100 |
| Cartagena | 99 | 7 | 42 | 37 | 36 | |

**Table 19.** Characteristics of the Western Central Atlantic regional cluster

| | |
|---|---|
| Spatial extent | The arrangements comprising this regional cluster are largely focused on the actual area of the Western Central Atlantic, with the exception being ICCAT which has Atlantic Ocean-wide mandate |
| Integration | While there are several linkages among arrangements, there is no body with an overarching mandate for coordination. |
| Fisheries | There are several bodies with responsibility for fisheries in this region. The FAO RFB (WECAFC) covers the entire region, while others such as CRFM and OSPESCA are part of subregional integration organizations. OSPESCA and OLDEPESCA also have mandates outside the region, in the Pacific, but have no mandate for ABNJ. |
| Pollution | The Cartagena Convention's Oil Spills and LBS Protocols are the main arrangements for pollution |
| Biodiversity | The Cartagena Convention's Specially Protected Areas and Wildlife (SPAW) Protocol addresses biodiversity only within EEZs in the region and is not included in the database. |
| Climate Change | There are no climate change arrangements within the region that specifically address ABNJ. |
| Relevance to ABNJ | As with the other semi enclosed seas, the relevance of the Western Central Atlantic Region is larger with regard to possible impacts of regional level pollution on ABNJ. However, in this region linkages with fisheries for HMS are perhaps more important than for most of the semi enclosed sea. |

### 4.2.7 Eastern Central and South Atlantic

The arrangements comprising the Eastern Central and South Atlantic cluster are depicted in Figure 16. The spatial overlaps among the key arrangements are shown in Table 20, and the regional cluster is summarized in Table 21.

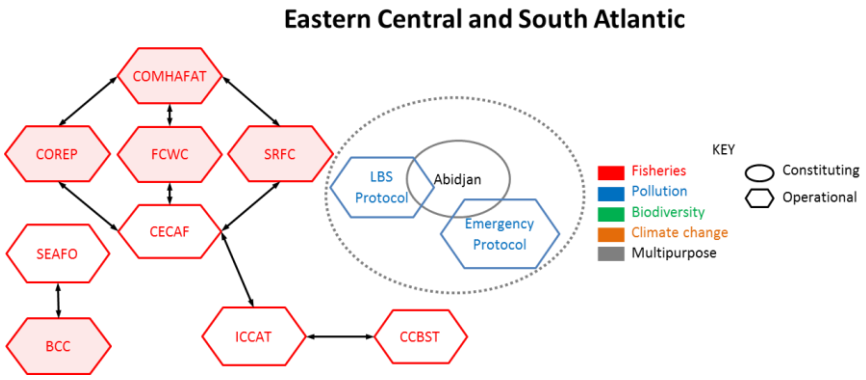



**Figure 16.** The arrangements comprising the Eastern Central and South Atlantic regional cluster

**Table 20.** Areas (million km$^2$) covered by the key arrangements in the Eastern Central and South Atlantic regional cluster and the percentage overlap of the arrangements

| | CCSBT | CECAF | COMHAFAT | COREP | ICCAT | SEAFO | SRFC | Abidjan |
|---|---|---|---|---|---|---|---|---|
| Area | 77.0 | 14.1 | 23.3 | 0.4 | 97.4 | 16.3 | 1.5 | 4.6 |
| CCSBT | | - | 16 | - | 24 | 71 | - | 21 |
| CECAF | - | | 61 | 97 | 14 | 4 | 100 | 63 |
| COMHAFAT | 5 | 100 | | 100 | 24 | 49 | 100 | 92 |
| COREP | - | 3 | 2 | | <1 | - | - | 8 |
| ICCAT | 30 | 100 | 100 | 100 | | 93 | 100 | 100 |
| SEAFO | 15 | 5 | 34 | - | 16 | | - | 6 |
| SRFC | - | 11 | 7 | - | 2 | - | | 31 |
| Abidjan | 1 | 21 | 18 | 100 | 5 | 2 | 93 | |

**Table 21.** Characteristics of the Eastern Central and South Atlantic regional cluster

| | |
|---|---|
| Spatial extent | The arrangements comprising this regional cluster cover the Eastern Atlantic from the Straits of Gibraltar South to the Antarctic. It should perhaps be treated as two regions, but there are linkages within the area which indicate that it should be treated as a single region. |
| Integration | Integration is seen among the fisheries mechanisms largely under the aegis of FAO. It may be noted that COMHAFAT at the policy level and the SRFC, FCWC and COREP, at the management level, aim to promote cooperation among states. However, the two bodies for HMS (CCSBT and ICCAT) are not well integrated.<br><br>The Abidjan Convention also seeks to integrate pollution and biodiversity issues within the region, but does not appear well integrated with fisheries. |
| Fisheries | CECAF and SEAFO are the FAO bodies responsible for the proper management and development of the fisheries and fishing operations. They are complemented by the indigenous COMHAFAT, SRFC, FCWC and COREP to the north, and the newly established Benguela Current Commission |

| | |
|---|---|
| | (BCC) to the south. ICCAT and the CCBST overlap the area in their responsibility for HMS. |
| Pollution | The Abidjan Convention and its two protocols are geared towards protecting the area against pollution, more specifically combatting pollution in cases of emergency and LBS and activities on their territories or emanating from other LBS including atmosphere. |
| Biodiversity | There are no specific arrangements in this regional cluster that deal with biodiversity at the regional level. |
| Climate Change | There are no agreements in this regional cluster that deal with climate change. |
| Relevance to ABNJ | This regional cluster has connections to ABNJ through arrangements that are focused on pollution and management of HMS. |

### 4.2.8 Northeast Pacific

The arrangements comprising the Northeast Pacific cluster are depicted in Figure 17. The spatial overlaps among the key arrangements are shown in Table 22, and the regional cluster is summarised in Table 23.

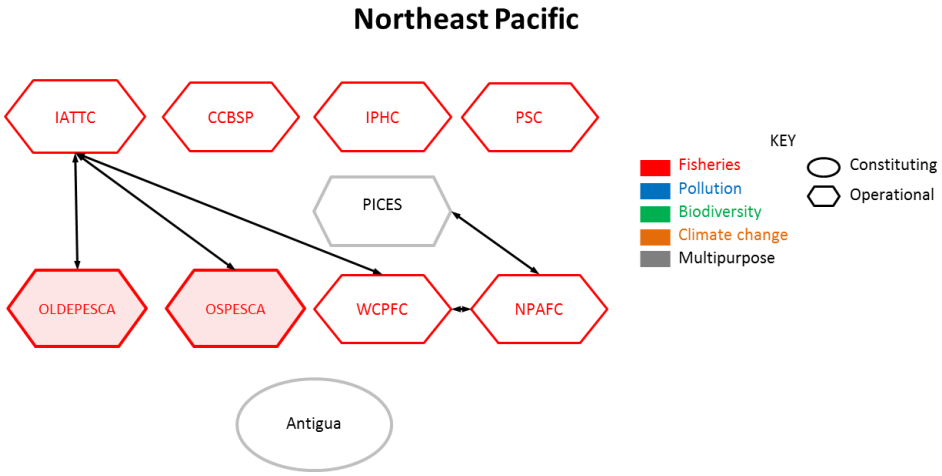



**Figure 17.** The arrangements comprising the Northeast Pacific regional cluster

**Table 22.** Areas (million km$^2$) covered by the key arrangements in the Northeast Pacific regional cluster and the percentage overlap of the arrangements

| | CCBSP | IATTC | IPHC | NPAFC | OLDEPESCA | OSPESCA | PICES | PSC | WCPFC | Antigua |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | 0.1 | 67.4 | 7.7 | 13.4 | 6.9 | 2.1 | 26.8 | 0.8 | 106.2 | 2.8 |
| CCBSP | | - | - | 1 | - | - | <1 | - | - | - |
| IATTC | - | | 30 | 26 | 58 | 63 | 20 | 35 | 10 | 100 |
| IPHC | - | 3 | | 34 | - | - | 29 | 100 | 3 | - |
| NPAFC | 100 | 5 | 60 | | - | - | 50 | 1 | 9 | - |
| OLDEPESCA | - | 6 | - | - | | 59 | 1 | - | - | 76 |
| OSPESCA | - | 2 | - | - | 18 | | - | - | - | 14 |
| PICES | 100 | 8 | 100 | 100 | 2 | - | | 100 | 17 | 7 |
| PSC | - | <1 | 11 | <1 | - | - | 3 | | - | - |
| WCPFC | - | 16 | 41 | 70 | - | - | 66 | - | | - |
| Antigua | - | 4 | - | - | 30 | 18 | 1 | - | - | |

**Table 23.** Characteristics of the Northeast Pacific regional cluster

| | |
|---|---|
| Spatial extent | This area extends from Central America (Panama) north to the Arctic Circle. Some arrangements extend further south (OLDEPESCA, IATTC). |
| Integration | Integration is relatively weak in this area, aside from the WCPFC which has connections to both the IATTC and the NPAFC. There does appear to be extensive unofficial collaboration. For example, staff of NPAFC are members of PICES, however, no official MOU exists. Similarly, OLDEPESCA attends the COPs of numerous organizations in the region despite a lack of formal partnerships |
| Fisheries | Fisheries management is the prime regulatory focus of this regional cluster. Every arrangement involved in the Northeast Pacific has at least a portion of its mandate dedicated to fisheries, and in most cases that is the sole focus of the agreement. |
| Pollution | Aside from the global agreements, only the Antigua Convention has any real focus on pollution, and it is not yet in force. Other agreements in the regional cluster only look at pollution as it relates to their specific fishery. PICES does some research on the effects of pollution, but it has little connection with most of the other arrangements in this regional cluster. |
| Biodiversity | Aside from the global agreements only the Antigua Convention has any real focus on biodiversity, and it is not yet in force. Other agreements in the regional cluster only look at biodiversity as it relates to their specific fishery. PICES does research on biodiversity, but it has limited connection with most of the other arrangements in this cluster. |
| Climate change | PICES conducts climate change research although only in an advisory capacity. In this region, the emphasis tends to be on dealing with the effects of climate change rather than the causes. |
| Relevance to ABNJ | This regional cluster has connections to ABNJ through fisheries arrangements that are largely focused on HMS and the high seas. |

### 4.2.9 Northwest Pacific

The arrangements comprising the Northwest Pacific cluster are depicted in Figure 18. The spatial overlaps among the key arrangements are shown in Table 24, and the regional cluster is summarized in Table 25.

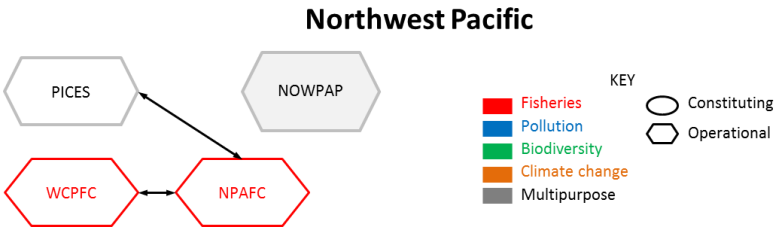



**Figure 18.** The arrangements comprising the Northwest Pacific regional cluster

**Table 24.** Areas (million km$^2$) covered by the key arrangements in the Northwest Pacific regional cluster and the percentage overlap of the arrangements

| | NPAFC | PICES | WCPFC |
|---|---|---|---|
| Area | 13.4 | 26.8 | 106.2 |
| NPAFC | | 50 | 9 |
| PICES | 100 | | 17 |
| WCPFC | 70 | 66 | |

**Table 25.** Characteristics of the Northwest Pacific regional cluster

| | |
|---|---|
| Spatial extent | This area extends from Southeast Asia north to the Arctic Circle. |
| Integration | Integration is relatively weak in this area, aside from the WCPFC which has connections the NPAFC. There does appear to be extensive unofficial collaboration. For example, staff of NPAFC are members of PICES, however, no official MOU exists. NOWPAP and its activity centers appear to be a source of integration for pollution and biodiversity issues albeit with limited scope. |
| Fisheries | Fisheries management is the prime regulatory focus of this regional cluster. Every arrangement involved in the Northwest Pacific has at least a portion of its mandate dedicated to fisheries, and in most cases that is the sole focus of the agreement. |
| Pollution | Aside from the global agreements, only the Regional Seas Northwest Pacific Action Plan (NOWPAP) has any real focus on pollution, and is not a convention. PICES does some research on the effects of pollution in collaboration with NOWPAP. |
| Biodiversity | NOWPAP has some focus on biodiversity and PICES does some research on biodiversity. |

| | |
|---|---|
| Climate change | PICES conducts climate change research although only in an advisory capacity. |
| Relevance to ABNJ | This regional cluster has connections to ABNJ through fisheries arrangements that are largely focused on HMS and the high seas. |

### 4.2.10 Southeast Pacific

The arrangements comprising the Southeast Pacific cluster are depicted in Figure 19. The spatial overlaps among the key arrangements are shown in Table 26, and the regional cluster is summarized in Table 27.

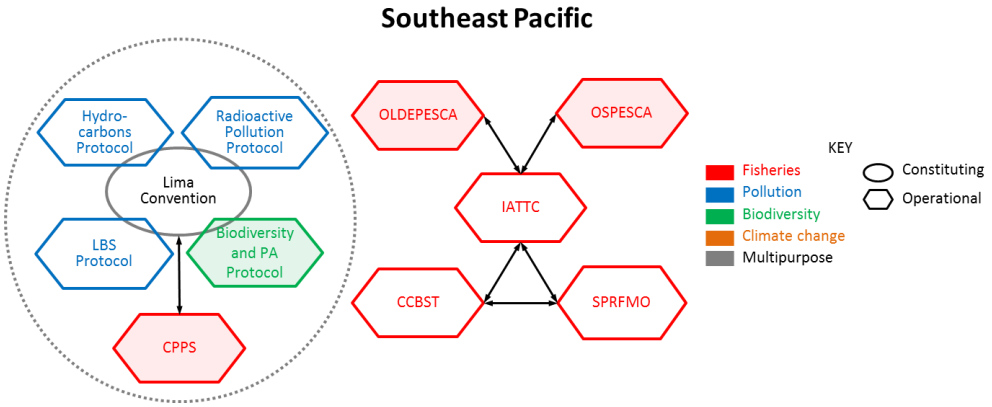



**Figure 19.** The arrangements comprising the Southeast Pacific regional cluster

**Table 26.** Areas (million km$^2$) covered by the key arrangements in the Southeast Pacific regional cluster and the percentage overlap of the arrangements.

| | CCSBT | CPPS | IATTC | OLDEPESCA | OSPESCA | SPRFMO | Lima |
|---|---|---|---|---|---|---|---|
| Area | 77.0 | 9.2 | 67.4 | 6.9 | 2.1 | 59.0 | 6.6 |
| CCSBT | | 3 | - | - | - | 14 | 1 |
| CPPS | <1 | | 12 | 23 | 24 | 4 | 84 |
| IATTC | - | 90 | | 58 | 63 | 58 | 94 |
| OLDEPESCA | - | 17 | 6 | | 59 | - | 28 |
| OSPESCA | - | 6 | 2 | 18 | | <1 | 12 |
| SPRFMO | 11 | 29 | 51 | - | <1 | | 18 |
| Lima | <1 | 60 | 9 | 27 | 37 | 2 | |

**Table 27.** Characteristics of the Southeast Pacific regional cluster

| | |
|---|---|
| Spatial extent | This area covers the Pacific Ocean off the west coast of South America, from Colombia South to the Antarctic. |
| Integration | There is a framework for inter-agency cooperation among the Permanent Commission for the South Pacific (CPPS), UNEP (Lima Convention and its protocols) and some two dozen agencies, programmes and Convention Secretariats. |
| Fisheries | The CPPS, SPRFMO, IATTC and CCSBT have responsibility for conservation and sustainable use of fishery resources. These RFBs are further supplemented by the indigenous bodies Central American Fisheries and Aquaculture Organization (OSPESCA) and the Latin American Organization for Fisheries Development (OLDEPESCA). |
| Pollution | The Lima Convention and its protocols are focused on protecting the marine environment and coastal zones of the South-East Pacific from hydrocarbon and other harmful substances including those from land-based and radio-active sources. The area of influence of the Lima Convention is stated as extending as far into ABNJ as pollution might reach. |
| Biodiversity | The Protocol for the Conservation and Management of Protected Marine and Coastal Areas of the South-East Pacific deals with biodiversity, but its focus is within EEZs. |
| Climate Change | There are no arrangements in this regional cluster that deal with climate change at the regional level. |
| Relevance to ABNJ | This regional cluster has connection to ABNJ through arrangements that are largely focused on the conservation and sustainable use of fishery resources; and to a lesser extent, also includes measures to protect the marine environment and coastal zones of the South-East Pacific. |

### 4.2.11 Pacific Islands Region

The arrangements comprising the Pacific Islands Region cluster are depicted in Figure 20. The spatial overlaps among the key arrangements are shown in Table 28, and the regional cluster is summarized in Table 29.

**Table 28.** Areas (million km$^2$) covered by the key arrangements in the Pacific Islands Region regional cluster and the percentage overlap of the arrangements

| | PIF | FFA | SPC | WCPFC | SPRFMO | Noumea |
|---|---|---|---|---|---|---|
| Area | 26.1 | 63.7 | 31.7 | 590.2 | 1,097.0 | 42.2 |
| PIF | | 34 | 68 | 25 | <1 | 63 |
| FFA | 80 | | 63 | 38 | 56 | 71 |
| SPC | 69 | 32 | | 5 | 29 | 68 |
| WCPFC | 100 | 35 | 10 | | 23 | 6 |
| SPRFMO | <1 | 96 | 100 | 43 | | 98 |
| Noumea | 99 | 47 | 90 | 4 | 38 | |

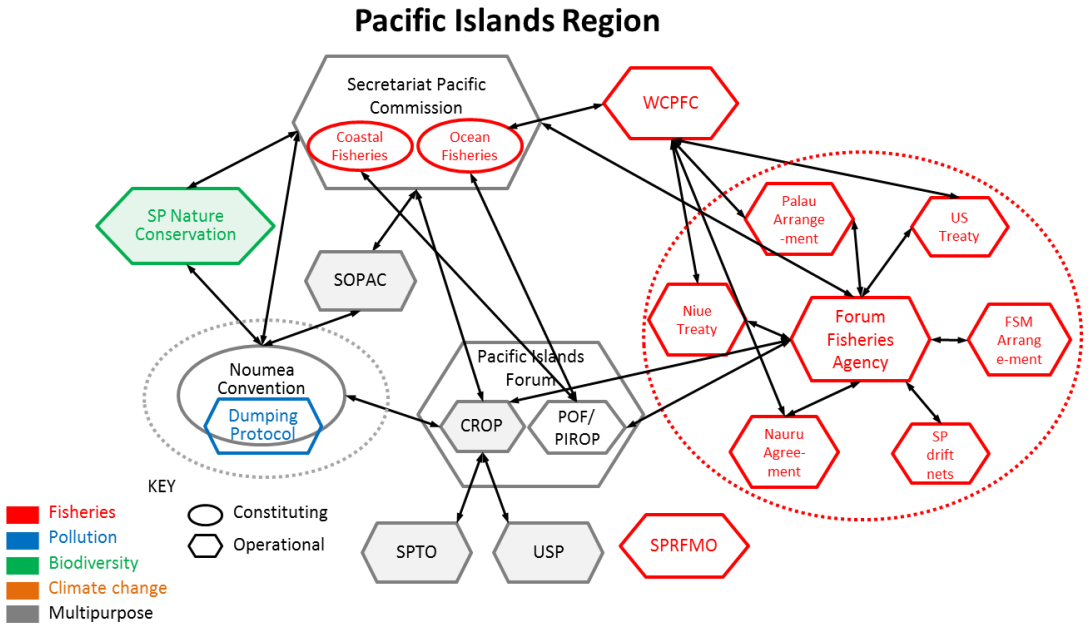



**Figure 20.** The arrangements comprising the Pacific Islands Region regional cluster

**Table 29.** Characteristics of the Pacific Islands Region regional cluster

| | |
|---|---|
| Spatial extent | The arrangements comprising this regional cluster range in spatial extent from the entire Pacific Island Region in the case of the fisheries arrangement for highly migratory tunas (WCPFC) to the EEZs of a subset of Pacific Island Region countries in the case of The Pacific Islands Forum (PIF). |
| Integration | In this region significant emphasis has been placed on institutional arrangements for regional cooperation. The Pacific Islands Forum (PIF), with 16 member countries provides overarching policy formulation for oceans in the form of the Pacific Oceanscape Framework (POF), successor to the Pacific Islands Regional Oceans Policy (PIROP). The PIF Council of Regional Organizations of the Pacific (CROP) was established to facilitate intersectoral integration in the region (Wright et al. 2006). |
| Fisheries | Implementation of ABNJ fisheries aspect of Pacific Ocean Policy is primarily the responsibility of the Forum Fisheries Agency which oversees a suite of operational agreements. The Ocean Fisheries Programme (OFP) of the Secretariat of the Pacific Commission (SPC) is a primary source of technical input to both the Western Central Pacific Fisheries Commission and the Forum Fisheries Agency. It is not yet clear how the new (2012) South Pacific Regional Fisheries Management Organization (SPRFMO), which spans the entire South Pacific, from South America to Asia, will relate to these other fisheries agencies. |
| Pollution | Pollution is addressed primarily by the Secretariat of the Noumea Convention (SPREP). |
| Biodiversity | The Noumea Convention is one of the few Regional Seas conventions which indicate the intention to address biodiversity in ABNJ. However, this intention refers only to the ABNJ lacunae within the entire set of Pacific Island Region EEZs. This leaves a considerable area of Pacific Island Region ABNJ without an organization responsible for biodiversity. |

| | |
|---|---|
| Climate change | The POF addresses climate change as a crosscutting issue. |
| Relevance to ABNJ | This regional cluster has strong connections to ABNJ through fisheries arrangements that are largely focused on Highly Migratory Fish Stocks and the newly established SPRFMO for straddling and discrete high seas fish stocks. Promotion of the EAF in these arrangements may increase the attention to biodiversity and ecosystem issues in ABNJ. Despite the stated intention of the Noumea Convention to address ABNJ biodiversity, this regional cluster remains focused on coastal biodiversity in this area particularly with regard to demersal biodiversity. |

### 4.2.12 Southeast Asia

The arrangements comprising the Southeast Asia cluster are depicted in Figure 21. The spatial overlaps among the key arrangements are shown in Table 30, and the regional cluster is summarized in Table 31.

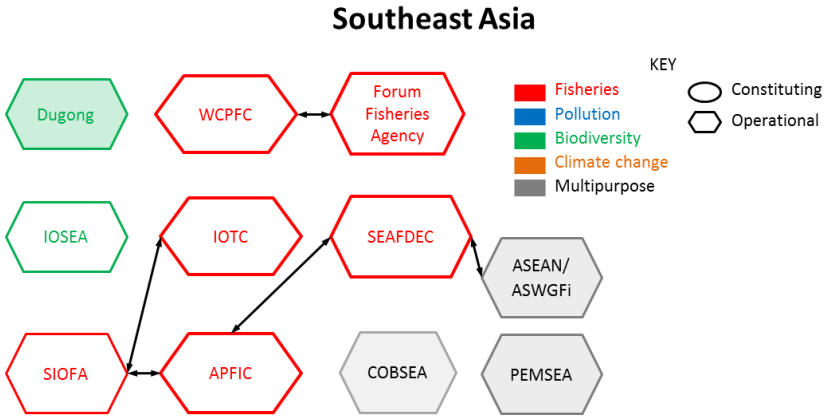



**Figure 21.** The arrangements comprising the Southeast Asia regional cluster

**Table 30.** Areas (million km$^2$) covered by the key arrangements in the Southeast Asia regional cluster and the percentage overlap of the arrangements.

| | APFIC | CCSBT | IOTC | SEAFDEC | SIOFA |
|---|---|---|---|---|---|
| Area | 13.5 | 77.0 | 61.6 | 20.6 | 27.2 |
| APFIC | | <1 | 6 | 50 | - |
| CCSBT | 3 | | 56 | 15 | 79 |
| IOTC | 27 | 45 | | 56 | 99 |
| SEAFDEC | 77 | 4 | 19 | | 6 |
| SIOFA | - | 28 | 44 | 7 | |

**Table 31.** Characteristics of the Southeast Asia regional cluster

| | |
|---|---|
| Spatial extent | This regional cluster comprises mainly the EEZs of countries in Southeast Asia. |
| Integration | There appear to be few formal linkages in this region, and no overarching integration body can be identified for ocean issues. Most integration appears to be at the level of coastal ecosystems which predominate in the region. Purely regional organisations mainly the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) seek to play an integrative role at this level. |
| Fisheries | APFIC is the primary fisheries body for this region, supported by SEAFDEC. HMS are covered by IOTC, FFA, WCPFC and CCSBT which intersect in this region, but have only minor overlap with SE Asian countries. Similarly SIOFA has a minor overlap with SEAFDEC in the south. Even though SEAFDEC has a coordinating role, it is purely advisory and is not tied to any particular governance process. |
| Pollution | There is no Regional Seas convention that deals with pollution at the regional level. However, there is a Regional Seas Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the East Asian Seas Region (East Asian Seas Action Plan) of the Coordinating Body on the Seas of East Asia (COBSEA) which together with PEMSEA addresses coastal pollution in the region. |
| Biodiversity | As for pollution, biodiversity is addressed at a regional level by COBSEA and PEMSEA with sea turtles being covered by the Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA), but this is largely focuses on coastal waters. |
| Climate Change | There are no agreements in this regional cluster that deal with climate change. |
| Relevance to ABNJ | This regional cluster has limited connection to ABNJ other than through pollution, HMS fisheries arrangements centered on other regions and IOSEA for sea turtles. |

### 4.2.13 Eastern Indian Ocean

The arrangements comprising the Eastern Indian Ocean cluster are depicted in Figure 22. The spatial overlaps among the key arrangements are shown in Table 32, and the regional cluster is summarized in Table 33.

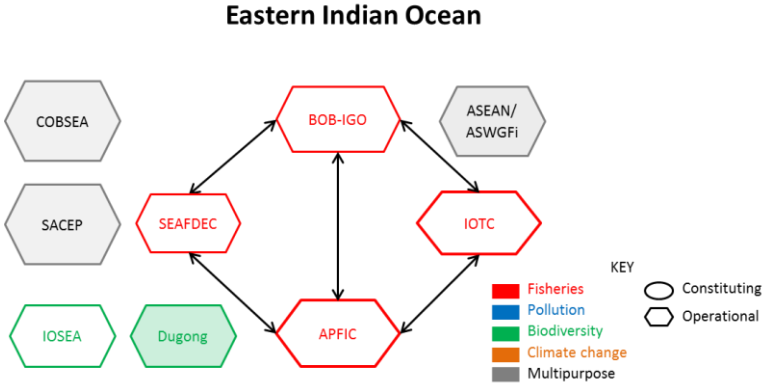



**Figure 22.** The arrangements comprising the Eastern Indian Ocean regional cluster

**Table 32.** Areas (million km$^2$) covered by the key arrangements in the Eastern Indian Ocean regional cluster and the percentage overlap of the arrangements

| | APFIC | BOBP-IGO | IOTC | SEAFDEC |
|---|---|---|---|---|
| Area | 13.5 | 2.3 | 61.6 | 20.6 |
| APFIC | | 100 | 6 | 50 |
| BOBP-IGO | 17 | | 4 | 7 |
| IOTC | 27 | 100 | | 56 |
| SEAFDEC | 77 | 61 | 19 | |

**Table 33.** Characteristics of the Eastern Indian Ocean regional cluster

| | |
|---|---|
| Spatial extent | This area is the entire Indian Ocean east of a line from the southern tip of India passing west of the Maldives and continuing south to the Antarctic circle. |
| Integration | There is some cooperation among bodies responsible for fisheries in this region, but there does not appear to be an overarching integration mechanism for ocean issues. |
| Fisheries | Fisheries is the prime focus of this regional cluster with the BOB-IGO, APFIC, IOTC, SEAFDEC and APFIC being fisheries arrangements. |
| Pollution | There is no Regional Seas Convention for this region. The South Asia Co-operative Environment Programme (SACEP) is a related initiative that has an action plan, The South Asian Seas Action Plan (SASAP), similar to that of a Regional Seas Convention, that deals with pollution. |
| Biodiversity | The SASAP also addresses biodiversity within the SACEP region. Sea turtles are covered by the MOU on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA), but this is largely focuses on coastal waters, as does the dugong MOU. |
| Climate change | There are no agreements in this regional cluster that deal with climate change. |
| Relevance to ABNJ | This regional cluster has connections to ABNJ through fisheries arrangements that are largely focused on HMS, but also other High Seas resources. |

### 4.2.14 Western Indian Ocean

The arrangements comprising the Western Indian Ocean cluster are depicted in Figure 23. The spatial overlaps among the key arrangements are shown in Table 34, and the regional cluster is summarized in Table 35.

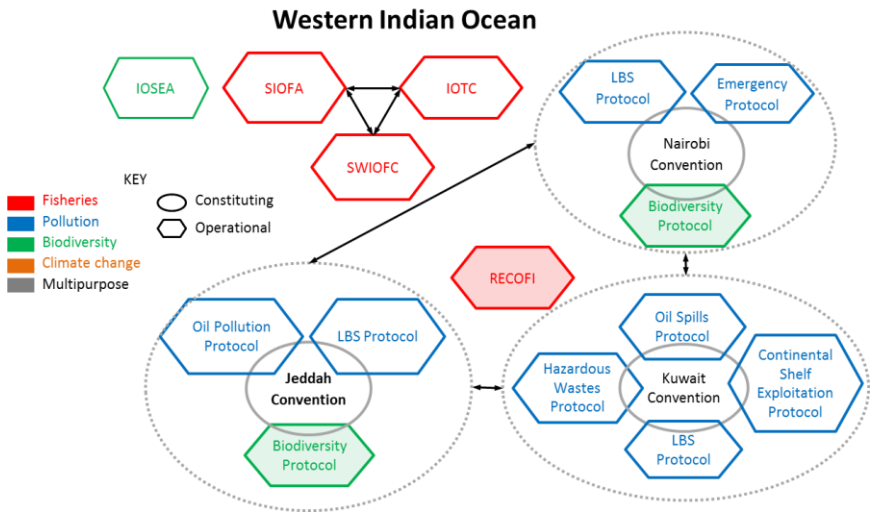



**Figure 23.** The arrangements comprising the Western Indian Ocean regional cluster

**Table 34.** Areas (million km$^2$) covered by the key arrangements in the Western Indian Ocean regional cluster and the percentage overlap of the arrangements

| | IOTC | SIOFA | SWIOFC | Jeddah | Kuwait | Nairobi |
|---|---|---|---|---|---|---|
| Area | 61.6 | 27.2 | 8.5 | 1.1 | 0.7 | 6.3 |
| IOTC | | 99 | 100 | 100 | 100 | 100 |
| SIOFA | 44 | | - | - | - | 2 |
| SWIOFC | 14 | - | | - | - | 92 |
| Jeddah | 2 | - | - | | <1 | <1 |
| Kuwait | 1 | - | - | <1 | | - |
| Nairobi | 10 | <1 | 68 | <1 | - | |

**Table 35:** Characteristics of the Western Indian Ocean regional cluster

| | |
|---|---|
| Spatial extent | This area is the entire Indian Ocean west of a line from the southern tip of India passing west of the Maldives and continuing south to the Antarctic circle. |
| Integration | In this region there is minimal integration among the operational organizations, and no apparent mechanism for overarching coordination. It could be argued that the Jeddah and Kuwait convention areas are sufficiently separate that they should not be included in this regional cluster. The emerging African Centre for Capacity-Building in Ocean Governance (AfriCOG) and Western Indian Ocean Sustainable Ecosystem Alliance (WIOSEA) (Vousden and Stapley, 2013) could be mechanisms for coordination. |
| Fisheries | Fisheries management is the mandate of the IOTC, SIOFA and the SWIOFC with responsibility for HMS, other fisheries in ABNJ and fisheries in EEZs respectively. RECOFI is responsible for fisheries within EEZs in the Persian Gulf |
| Pollution | There are three Regional Seas Conventions in this region. The Nairobi, Jeddah and Kuwait Conventions and their protocols are focused on pollution issues. |

| | |
|---|---|
| Biodiversity | A protocol of the Jeddah Convention (NYIF) also focuses on marine biodiversity, but only in coastal areas. SIOFA includes provisions for protecting marine biodiversity but is not yet functional in this area. Sea turtles are covered by the MOU on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA), but this is largely focuses on coastal waters. |
| Climate Change | There are no agreements in this regional cluster that deal with climate change. |
| Relevance to ABNJ | This regional cluster has strong connection to ABNJ though its mechanisms dealing with pollution and fisheries for HMS and in ABNJ. |

### 4.2.15 Arctic

The arrangements comprising the Arctic Ocean cluster are depicted in Figure 24. The spatial overlaps among the key arrangements are shown in Table 36, and the regional cluster is summarized in Table 37.

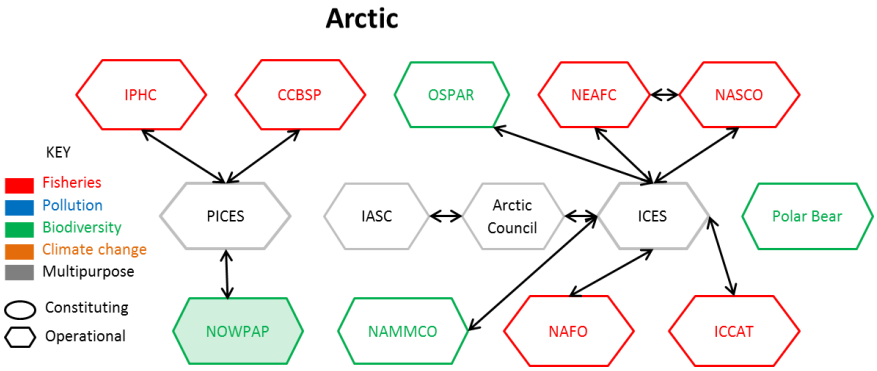



**Figure 24.** The arrangements comprising the Arctic Ocean regional cluster

**Table 36.** Areas (million km$^2$) covered by the key arrangements in the Arctic Ocean regional cluster and the percentage overlap of the arrangements.

| | CCBSP | ICCAT | ICES | IPHC | NAFO | NAMMCO | NASCO | NEAFC | PICES | Arctic Council | NOWPAP | OSPAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | 0.1 | 97.4 | 14.5 | 7.7 | 6.3 | 20.8 | 20.2 | 13.6 | 26.8 | 18.4 | 8.9 | 13.5 |
| CCBSP | | - | - | - | - | - | - | - | <1 | 1 | <1 | - |
| ICCAT | - | | 100 | - | 100 | 100 | 100 | 100 | - | 35 | - | 100 |
| ICES | - | 15 | | - | <1 | 70 | 72 | 100 | - | 26 | - | 100 |
| IPHC | - | - | - | | - | - | - | - | 29 | 7 | <1 | - |
| NAFO | - | 6 | <1 | - | | 30 | 28 | <1 | - | 9 | - | <1 |
| NAMMCO | - | 21 | 100 | - | 100 | | 100 | 100 | - | 35 | - | 100 |
| NASCO | - | 21 | 100 | - | 90 | 97 | | 100 | - | 35 | - | 100 |
| NEAFC | - | 14 | 94 | - | <1 | 65 | 67 | | - | 24 | - | 100 |
| PICES | 100 | - | - | 100 | - | - | - | - | | 14 | 66 | - |
| Arctic Council | 100 | 7 | 33 | 16 | 25 | 31 | 32 | 32 | 10 | | 7 | 32 |
| NOWPAP | 3 | - | - | <1 | - | - | - | - | 22 | 4 | | - |
| OSPAR | - | 14 | 93 | - | <1 | 65 | 67 | 99 | - | 23 | - | |

**Table 37.** Characteristics of the Arctic regional cluster

| | |
|---|---|
| Spatial extent | Strictly, the Arctic is the area north of the Arctic Circle. However, the Arctic Council has not defined a particular geographic area for its activities. In this study we use the area defined by the Working Group on Conservation of Arctic Flora and Fauna (CAFF). This overlaps with several arrangements that are primarily focused on areas to the south, in the north Atlantic and Pacific Oceans, or in the case of ICCAT the entire Atlantic Ocean. |
| Integration | Integration within the Arctic regional cluster is pursued through the Arctic Council which has working groups addressing several of the issue areas[25]. While they may not be directly connected with each other (NASCO and NEAFC being the exception), through ICES as well as the coordinating bodies of the Arctic Council and NAMMCO most of the arrangements have at least some level of coordination between them. Connectivity among Atlantic Ocean arrangements and of those with the Arctic appears to be higher, as would be expected. |
| Fisheries | The most prominent fisheries arrangements are NEAFC, NASCO, NAFO, CCBSP and ICCAT. NAMMCO is a mechanism for cooperation in managing the conservation and hunting of marine mammals. |
| Pollution | Pollution measures are researched by ICES and coordinated through the Arctic Council. |
| Biodiversity | Biodiversity measures are researched by ICES and coordinated through NAMMCO and the Polar Bear Convention. The Arctic Council Working Group on Conservation of Arctic Flora and Fauna (CAFF) is active in circumpolar marine biodiversity assessment and monitoring that includes ABNJ. |
| Climate change | Climate change is addressed primarily by the Arctic Council and ICES |
| Relevance to ABNJ | This regional cluster has connections to ABNJ through fisheries arrangements and coordinating bodies that are largely focused on HMS, as well as agreements that are specifically focused on the high seas. |

### 4.2.16 Southern Ocean

The arrangements comprising the Southern Ocean regional cluster are depicted in Figure 25. The spatial overlaps among the key arrangements are shown in Table 38, and the regional cluster is summarized in Table 39.

[25] Arctic Contaminants Action Program (ACAP), Arctic Monitoring and Assessment Programme (AMAP), Conservation of Arctic Flora and Fauna (CAFF), Emergency Prevention, Preparedness and Response (EPPR), Protection of the Arctic Marine Environment (PAME), Sustainable Development Working Group (SDWG).

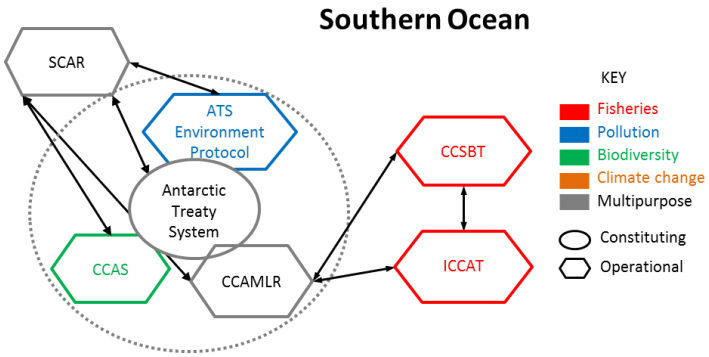



**Figure 25.** The arrangements comprising the Southern Ocean regional cluster

**Table 38.** Areas (million km$^2$) covered by the key arrangements in the Southern Ocean regional cluster and the percentage overlap of the arrangements.

| | CCAMLR | CCSBT | ICCAT | WCPFC | CCAS | ATS |
|---|---|---|---|---|---|---|
| Area | 34.1 | 77.0 | 97.4 | 106.2 | 20.2 | 20.2 |
| CCAMLR | | 18 | 11 | 1 | 100 | 100 |
| CCSBT | 40 | | 24 | 11 | - | - |
| ICCAT | 31 | 30 | | - | 27 | 27 |
| WCPFC | 2 | 15 | - | | 3 | 3 |
| CCAS | 59 | - | 6 | 1 | | 100 |
| ATS | 59 | - | 6 | 1 | 100 | |

**Table 39:** Characteristics of the Southern Ocean regional cluster

| | |
|---|---|
| Spatial extent | This region includes the entire area south of 60°S as well as the area north of 60°S that is part of CCAMLR. |
| Integration | There is a significant integration of the arrangements in this region through the Antarctic Treaty System (ATS). CCAMLR, the major ocean related component of the ATS, embraces the 'ecosystem approach', which considers the whole Southern Ocean to be a suite of interlinked systems. The Scientific Committee for Antarctic Research (SCAR) has a cross-cutting role in providing technical advice. |
| Fisheries | CCAMLR has a mandate for fisheries (for non-mammal species) in this area. Its primary mission is conservation of Antarctic marine living resources, including birds, unlike other RFMOs whose focus is managing fisheries. |
| Pollution | An ATS Protocol focuses on issues related to environmental protection. It sets forth environmental principles to govern Antarctic activities, designates Antarctica as a natural reserve and prohibits all activities related to mineral resources other than scientific research. |
| Biodiversity | The ATS Protocol also has provisions for biodiversity conservation including in the marine environment. As developed in practice, the Parties to the ATS Protocol have agreed to not designate marine areas without the consent of CCAMLR. CCAMLR focuses on the conservation of Antarctic marine living resources and has a mandate to conserve the ecosystem. CCAS also promotes |

| | |
|---|---|
| | the protection, scientific study, and rational use of Antarctic seals, and to maintain a satisfactory balance within the ecological system of Antarctica. The Agreement on the Conservation of Albatrosses and Petrels (ACAP), while global, is particularly relevant in this region. Annexes to an ATS Protocol directly address biodiversity conservation. |
| Climate Change | Climate change issues are also addressed under the ATS. |
| Relevance to ABNJ | This regional cluster has strong connections to ABNJ through fisheries arrangements that are not just focused on the regulation of fishing, but also has a mandate to conserve the ecosystem. |

### 4.2.17 Characteristics and potential role of regional clusters

The 16 regional clusters for ocean governance reflect a diversity of regional level approaches to pursuing (or not) intersectoral integration and ecosystem-based management for the ocean. The governance literature has recognised the existence of regime complexes in which several arrangements address a single issue (e.g. Raustiala and Victor 2004, Keohane and Victor 2011, Oberthür and Stokke 2011). However, the regional clusters appear to be different from regime complexes, being primarily spatially defined and with a broad focus (or potential focus) on marine EBM. Within the clusters identified, interaction appears highest among fisheries management arrangements. In many instances Regional Seas conventions and action plans are also active in integrating pollution and biodiversity aspects, although few include ABNJ.

Few of the clusters were found to have clearly identifiable overarching mechanisms for integrated policy development and coordination. The Pacific Islands Forum (PIF) and its Council of Regional Organisations of the Pacific (CROP) is the most prominent example of such a mechanism. Two other mechanisms developed with the express purpose of coordination are the Antarctic Treaty System and the Arctic Council. In the Mediterranean, coordination for sustainable development is approached through the establishment of the Mediterranean Commission on Sustainable Development (MCSD) in 1996, in association with the Barcelona Convention whose Secretariat supports the activities of the MCSD. In the southeast Pacific, the interaction between the FAO and CPPS, which also serves as the Secretariat for the Lima Convention, has the potential to promote EBM. In Southeast Asia, PEMSEA, a home-grown coordination body emerged as a bottom-up response to a perceived lack of regional policy/coordination capability. In other regions, an ocean specific mechanism for overarching policy development and coordination is either absent or is partially taken up by the Secretariat of the Regional Seas Conventions (or its counterpart). However, this may mean that linkages between the major issues of Regional Seas Conventions, such as pollution and environment/biodiversity, with other sectors, notably fisheries, shipping and tourism, remain weak or absent.

**The observation that some clusters appear to be progressing towards becoming a structured system capable of promoting integrated ocean governance raises the question of the extent to regional clusters should be perceived as building blocks for global ocean governance system and should be the focus of initiatives to build and strengthen them.** It would appear that despite their current deficiencies these clusters could have a potentially important role in implementation of EBM in their respective regions. In most clusters the FAO EAF and the UNFSA mandate to protect marine biodiversity would be an obvious starting point and would require linkages with Regional Seas and other non-fisheries arrangements in the cluster. One can envisage the strengthening of clusters to the level where the full range of ocean governance interests is engaged and integrated. To determine this, further work needs to be done on assessing their role. The following preliminary observations on the structuring characteristics of the clusters suggest possible areas for attention in terms of strengthening.

The extent to which the clusters form discrete spatial entities is also highly variable. The regional arrangements addressing the issues of concern were usually developed without reference to other regional arrangements operating in the same area and were designed to cover the specific issue of concern. Some arrangements, notably the RFMOs for HMS cover large ocean areas and appear in several clusters. ICCAT, for example, is included in each of the five Atlantic Ocean clusters. Ultimately, if regional clusters are to become a focus of ocean governance reform and strengthening, there will be the need for attention to their spatial scope.

In most clusters, provisions for technical advice appear to be largely by mechanisms that are internal to the individual arrangements that comprise them (see section 4.3). A few of the regional clusters appear to also have crosscutting arrangements for the provision of technical advice involving separate bodies, namely PICES in the North Pacific, ICES in the North Atlantic, the SCAR in the Antarctic and the IASC in the Arctic. Each of these technical advisory arrangements has a different history and relationship with the other arrangements in their cluster. They may provide some degree of integration across issues, but solely at the technical level. These crosscutting providers of technical advice may be a useful component of improved integration, particularly if they are mandated to take more proactive role in identifying interactions among issues that should be considered in policy making. This topic will be taken up further in the section below pertaining to science-policy interfaces.

Another facet of the regional clusters is the extent to which the arrangements are integrated with the broader regional political economies undertaken by bodies such as ASEAN, SADC, SAARC, MERCOSUR and CARICOM. Söderbaum and Granit (2014) argue that this connectivity is important if transboundary water issues are to achieve the desired prominence at the regional level and be mainstreamed into regional programmes. This is likely to become increasingly important in the future, if the trend of the past few decades towards regionalism continues (Kluvánková-Oravaská and Chobotová 2012). The information collected in this study is insufficient for a comprehensive assessment of the extent to which these linkages occur or the opportunities for developing them. However, some preliminary observations are possible.

Only the coordinating mechanisms for the Pacific Island Region and the Mediterranean Sea appear to have strong linkages with regional multipurpose political organisations. Some connectivity is evident in the Western Central Atlantic where agencies associated with the two major regional integration organisations, the Caribbean Community and Common Market (CARICOM) and the Central American Economic Integration System (SICA) are part of the cluster despite the absence of an overall coordinating mechanism (Mahon et al. 2013). In the Bay of Bengal area in the Western Indian Ocean, there appears to be some connectivity between fisheries and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC). In the South African Development Region (SADC) there is a Fisheries Protocol that provides some connectivity between fisheries arrangements and SADC. In the Pacific, the Asia-Pacific Economic Cooperation body (APEC) has an Oceans and Fisheries Working Group (OFWG) that links the work of fisheries bodies with this multipurpose organisation. As indicated above, these are preliminary observations and will require further investigation.

The relationships among these regional clusters and their linkages to the global level (Figure 8) is another aspect of the overall structure for ocean governance to consider if the strengthening of regional clusters is identified as a valuable goal. The extent to which global arrangements are reflected in regional clusters should be investigated to determine gaps. Some global arrangements may have mechanisms for placed-based application without being part of a regional cluster, for example, implementation by the International Seabed Authority. While the granting of licences for deep sea mining may have implications for ABNJ biodiversity, pollution and fisheries, this assessment found little explicit connection between the process identified for the granting of licences and the arrangements in place for the other sectoral issues.

The proposed perspective of regional clusters as governance units becomes critical if spatial nesting of arrangements is considered to be important for effective ocean governance. Nesting facilitates application of the principle of subsidiarity (Young 2013, p 107) while providing for higher level integration among nested arrangements. Ostrom (2010) points out advantages of pursuing governance through multiple units at diverse scales that cumulatively make a difference. There is also an ongoing discourse about how lessons learned from research on governing 'the commons' at smaller scales might inform approaches at regional and global levels (Dietz et al. 2003). Polycentric approaches such as regional clusters facilitate achieving benefits at multiple scales as well as experimentation and learning from experience with diverse policies.

If the regional clusters are seen as governance units that should be explicitly targeted for strengthening, there are several facets to strengthening their structure and functionality. Broadly, these are: the extent to which the arrangements that comprise them are geographically coherent (spatial overlap and fit); the extent to which the individual arrangements within the cluster reflect good governance structure (as per the assessments in this study) and practice; the extent to which there are functional linkages (interplay) among the arrangements comprising the cluster; and the extent to which they share a common purpose and set of principles and can deal with one another as equals.

### 4.3 Science-policy interfaces

The UNEP Foresight Process on Emerging Environmental Issues for the 21st century, concluded that the cross-cutting issue "Broken Bridges: Reconnecting Science and Policy" is the fourth most pressing one regarding efforts to achieve sustainable development (UNEP 2012). The panel noted that critical scientific knowledge is not being communicated effectively to audiences ranging from decision-makers to the general public. Many of the arrangements assessed state 'best use of scientific information available' as a foundational principle. To give effect to this principle, it is essential that there be clearly identifiable mechanisms for the transformation of available science into policy and management advice that can be used by decision-makers. These mechanisms are referred to here as science-policy interfaces.

Diverse factors can be identified as affecting the functionality of science-policy interfaces, ranging from a lack of confidence in the scientific information provided, through lack of mechanisms for access to scientific information, to failure on the part of scientists and advisors to formulate scientific advice in a manner that is understandable (Mitchell et al 2006, Holmes and Clark 2008). The GEF has recognised these and other shortcomings regarding the development of effective science-policy interfaces in its international waters projects and has identified approaches to addressing them (Mee and Adeel 2012).

The importance of the science-policy interface is a main reason for the policy cycle based approach in this assessment and more explicitly the inclusion of the policy cycle stages relating to development and provision of policy and management advice. While these fields provide insight into the science-policy mechanisms in place in arrangements, there are other important factors that determine their functionality. These include the extent to which quality information is available, and the extent to which there is a demand from the decision-makers for scientific information. Both of these factors are also reflected in the policy cycle, as the data and information and decision-making stages.

It is also important to look beyond the mechanisms within individual arrangements to determine if there are identifiable overarching science-policy interfaces within the global and regional networks. Therefore, in the remainder of this section we will look in turn at science-policy interfaces in: (1) the individual arrangements; (2) the regional clusters; and (3) the global regional issue-based networks.

### 4.3.1 Individual arrangements

A review of the arrangements in the database indicates that there are three distinct forms of science-policy interfaces: (i) scientific advice as an integral part of the arrangement; (ii) scientific advice coming from outside the arrangement; and, (iii) scientific advice coming from both inside and outside the arrangement. Based on the assessment of policy cycles associated with arrangements, the first of these appears to be by far the most common, as most arrangements seek to have their advisory needs built-in at the time of developing the arrangement.

The overall picture for individual arrangements is that policy advisory mechanisms are weak. Only 35% of constituting arrangements have science-policy interfaces that are clearly specified in the agreement (Table 41). For operational arrangements, the percentage is higher (61%), yet still the remaining 39% appears to be a high number of arrangements for which the science-policy interface is less than 'clearly specified' (Table 41). We recognise that there may be mechanisms in place that may be functioning and known to individual stakeholders that are not evident from the documented sources used in developing the database. Nonetheless, in a functional arrangement, one would expect the mechanism for formulation of advice to decision-makers to be laid out clearly in order to promote transparency and facilitate engagement of stakeholders who may have information to contribute.

Viewed from the perspective of the issues, fisheries arrangements have the highest percentage of instances where the science-policy interface is clearly specified (69%), biodiversity arrangements are next (50%) followed by pollution arrangements (45%) (Table 41). The strength of the fisheries arrangements in this regard is expected, given that fishery resources are dynamic and require regular review for effective management. It is consistent with the relatively high percentage of binding decision-making mechanisms for fisheries, which is 50% as compared to 33% for biodiversity and 19% for pollution. The relatively low percentage of binding decision-making for biodiversity seems inconsistent with the somewhat higher percentage of policy advisory mechanisms that are either identifiable or clearly specified (50%). This has implications for the uptake of scientific information related to biodiversity conservation, such as the CBD reports on areas of ecological or biological significance.

**Table 41.** The strength of the science-policy interface as indicated by the scores for provision of advice and decision-making and the criteria for assigning the score (CN = constituting, OP = operational, F = fisheries, P = pollution, B = biodiversity).

| Strength of policy cycle stage | | Percent of arrangements | | | | |
|---|---|---|---|---|---|---|
| | | Type | | Issue | | |
| Provision of policy advice | | CN | OP | F | P | B |
| 0 | No transboundary science-policy mechanism, e.g. COP self-advises | 6 | 4 | 4 | 5 | |
| 1 | Science-policy interface mechanism unclear - irregular, unsupported by formal documentation | 29 | 16 | 12 | 31 | |
| 2 | Science-policy interface not specified in the agreement, but identifiable as a regular process | 29 | 20 | 15 | 19 | 50 |
| 3 | Science-policy interface clearly specified in the agreement | 35 | 61 | 69 | 45 | 50 |
| Policy decision-making | | | | | | |
| 0 | No decision-making mechanism | 0 | 8 | 8 | 2 | 33 |
| 1 | Decisions are recommendations to countries | 88 | 54 | 42 | 76 | 33 |
| 2 | Decisions are binding with the possibility for countries to opt out of complying | 6 | 0 | 0 | 2 | 0 |
| 3 | Decisions are binding | 6 | 38 | 50 | 19 | 33 |

Clearly, unravelling the interactions among the policy cycle stages will require further detailed analysis of the arrangements. At this stage, what can be said is that there is significant room for improvement in the majority of arrangements regarding the clear specification of advisory mechanisms. While this is best done in the agreement itself, it can be achieved through rules of procedure. There is also room for improvement regarding demand for information from the decision-makers, which is likely to accompany a mandate to make binding decisions that would require more substantive changes to the arrangements.

### 4.3.2 Regional clusters

Assessing the extent to which there are clear science-policy mechanisms within the regional clusters is a more difficult challenge than assessing individual arrangements comprising the cluster. Although each arrangement within the cluster may not have an internal means of access to scientific advice, if some of the arrangements do have access to science providers in other arrangements and there is interaction among them, there may be flows of information and advice between arrangements that compensate for deficiencies at the level of the weaker arrangements. The extent to which such regional level mechanisms are be present may be largely related to the extent to which there are independent institutions in the region with the capacity for generation of information needed for advice, and for contributing to the formulation of the advice.

What is notable is that in some regions, specific science-policy mechanisms have been established with the scientific analysis and advice being provided by different organisations than the one in which decision-making takes place. For example, in the North East Atlantic, ICES plays a central role in generating scientific information and advice for several decision-making bodies (OSPAR, NEAFC, HELCOM). In playing this role, ICES interacts with a diversity of experts from universities, NGOs and government research institutes. A similar role is played by PICES in the North East Pacific, SCAR in the Southern Ocean, IASC in the Arctic, and the SPC in the Pacific Island Region. These organisations all have quite different geneses and relationships with the decision-making mechanism. Some are explicitly identified in the arrangement, and provide advice on a regular basis, while others are called upon as needed.

The regional science-policy arrangements above provide examples of where structured organisational interplay within a regional cluster could contribute to a complete policy process. One advantage of using a separate technical advisory body that provides advice to several decision-making processes is that it could, if so tasked, contribute to the intersectoral integration that is required for EBM. Science-policy interfaces that are isolated within individual arrangements may not have the broad purview required to see and consider interrelationships and trade-offs.

In terms of strengthening regional clusters, there may be regional organisations, or networks of organisations that can be called upon to make structured input to decision-making processes. This may require targeted investigation of the science-policy needs and processes within a region, such as was carried out in the Western Central Atlantic (McConney et al. 2012). It may further require proactive coordination of existing science providers and the establishment of an entity such as the Western Indian Ocean Sustainable Ecosystem Alliance (WIOSEA) (Vousden and Stapley 2013).

### 4.3.3 Global-to-regional issue-based networks

The science-policy interfaces within the global-to-regional issue-based networks might be expected to focus largely on policy which is then implemented at the regional level. However, this is not always the case, notably for biodiversity where regional level operational arrangements relevant to ABNJ are few. Indeed, there is a considerable diversity of arrangements within global regional issue-based networks.

For fisheries, where there are many regional operational arrangements, the major global level interface deals largely with policy. This is the case with FAO's Committee on Fisheries (COFI)

which meets annually to review fisheries and determine future directions for FAO, and by implication, the Regional Fisheries Bodies. As previously noted, the 'RFB Secretariats' Network' is one source of policy advice to COFI. It should be noted though that not all fisheries bodies are constituted under the FAO and those that are not are less obligated to pursue policies agreed-upon at COFI.

At the global level, the IMO provides an integrated system for pollution, with a well-defined science-policy interface. IMO's Marine Environmental Protection Committee (MEPC) is served by a variety of technical committees associated with various pollution agreements. The IMO also receives technical input from GESAMP, which is an independent body of experts that advises United Nations agencies on the scientific aspects of marine pollution and marine environmental protection (GESAMP 2005). GESAMP was established primarily to address the international policy requirement for a cross-sectoral, interdisciplinary, and science-based approach to marine environmental affairs. It is also intended to facilitate, technical coordination and cooperation among UN agencies for marine affairs. While GESAMP is supported by eight UN agencies (IM0, FA0, UNESC0-I0C, IM0, WH0, IAEA, UNHQ and UNEP), its activities are largely oriented towards pollution and the IMO.

Regarding biodiversity, there is an emerging global initiative to develop a science-policy interface for the CBD similar to that for climate change. The Intergovernmental Panel for Biodiversity and Ecosystem Services (IPBES) was established by a UN General Assembly resolution in 2011 and first met in 2013 (IISD 2013a). Its establishment was the culmination of a process originating in the Millennium Ecosystem Assessment in 2005. However, given its recent formation, it is not possible to assess the functioning of IPBES at this time or its ability to address marine biodiversity in AWNJ or ABNJ.

Despite progress with the IPBES, there is major concern that there are no global level arrangements for science or policy advice or decision-making with regard to the protection of biodiversity in ABNJ, whether through the declaration of protected areas, or the implementation of environmental impact assessment procedures for the High Seas (Warner 2012). These matters are being addressed through the UN Working Group on Marine Biodiversity beyond Areas of National Jurisdiction (BBNJ) (IISD 2013b). This Working Group is to make recommendations to the General Assembly in 2015 on whether to commence negotiations for an international instrument under UNCLOS on marine biodiversity conservation and sustainable use and is currently discussing the scope, parameters and feasibility of such an instrument (IISD 2014, Gjerde, et al. 2008a, Gjerde et al. 2008b, Hart 2008). If this is successful, it may lead to the development of a global level agreement that could encompass the entire policy cycle. A Conference of Parties to such an agreement could set up its own scientific and technical advisory body or utilise the services of an existing body such as the CBD or IPBES. From a policy perspective, this may be the most effective approach to achieving effective integration and coordination for ABNJ through the establishment of a common purpose and set of principles under which all organizations operate. This arrangement could complement efforts to expand the mandates of Regional Seas conventions to include biodiversity in adjacent ABNJ, as proposed by Ban et al. (2013). Even if the global level process is established, as noted above, regional bodies as components of regional clusters would likely have a significant potential role in achieving improved governance for biodiversity in ABNJ as also argued by Druel et al. (2012) and Rochette et al. (2014).

Climate change provides an example of a global science policy interface that has access to one of the most comprehensive and thorough sources of scientific and technical information - the Intergovernmental Panel on Climate Change (IPCC). The IPCC is a scientific body under the auspices of the United Nations (UN). Established in 1988 jointly by UNEP and the WMO and endorsed that same year by the UN, it reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. It does not conduct any research nor does it monitor climate related data or parameters.

To date, the IPCC has generated five reports on the current state of knowledge regarding global climate change. The scientific evidence brought up by the first IPCC Assessment Report of 1990 underlined the importance of climate change as a challenge requiring international cooperation to tackle its consequences. It therefore played a decisive role in leading to the creation of the United Nations Framework Convention on Climate Change (UNFCCC), the key international treaty to reduce global warming and cope with the consequences of climate change. The IPPC has also responded to the need for information on scientific and technical matters from the UNFCCC and has provided methodologies and guidelines to help Parties to the UNFCCC prepare their national greenhouse gas inventories.

The IPCC Second Assessment Report of 1995 provided important material drawn on by negotiators in the run-up to adoption of the Kyoto Protocol in 1997. The Third Assessment Report came out in 2001 and the Fourth came out in 2007. The Fourth Assessment Report paid greater attention to the integration of climate change with sustainable development policies and relationships between mitigation and adaptation. The Fifth Report was released in March 2014 underscoring the severity of the climate change situation and focusing on adaptation through the lens of vulnerability and risk. The IPCC has organised its work to provide the 'best available scientific information' on climate change matters. In strict terms, the UNFCC Subsidiary Body for Scientific and Technological Advice (SBSTA) is responsible for provision of timely information and advice on scientific and technological matters. It plays the role of linking the advisory outputs of the IPCC with the policy input needs of the UNFCC COP.

The UN Regular Process[26] for the marine environment is a global initiative to develop a review and advisory process for oceans as a whole that will provide its inputs to the UN General Assembly. It was first conceived at the 2002 UN World Summit on Sustainable Development and taken up by the UNGA in 2003 with the aim of establishing the process by 2004 (UNGA 2003). The initial assessment, based on a survey of existing assessments[27] was completed in 2007 (UNEP 2007). In 2009, the UNGA (UNGA 2010) endorsed the following overall objective:

> "The regular process under the United Nations would be recognized as the global mechanism for reviewing the state of the marine environment, including socioeconomic aspects, on a continual and systematic basis by providing regular assessments at the global and supraregional levels and an integrated view of environmental, economic and social aspects.
>
> Such assessments would support informed decision-making and thus contribute to managing in sustainable manner human activities that affect the oceans and seas, in accordance with international law, including the United Nations Convention on the Law of the Sea and other applicable international instruments and initiatives.
>
> The regular process would facilitate the identification of trends and enable appropriate responses by States and competent regional and international organizations.
>
> The regular process would promote and facilitate the full participation of developing countries in all of its activities. Ecosystem approaches would be recognized as a useful framework for conducting fully integrated assessments."

The first cycle of the Regular Process is from 2010 to 2014 and will produce the first World Ocean Assessment (WOA). It is being overseen by an Ad Hoc Working Group of the Whole and carried out a Group of Experts with the assistance of a much larger pool of experts. The Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations, has been designated by the General Assembly to act as the secretariat of the Regular Process.

---

[26] A Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-economic Aspects.

[27] Commonly referred to as the Assessment of Assessments.

The assessment takes a systems approach based on the DPSIR (drivers-pressures-state-impact-response) based on ecosystem services consistent with the approach of the Millennium Ecosystem Assessment (MEA). Whereas, this is clearly an important step towards sustainable use of the oceans it remains to be seen what the quality of the WOA will be, and its impact on decision-making absent a common purpose and set of operating principles shared by the relevant organizations and States

### 4.3.4 Overall observations on science-policy interfaces

This study can only illustrate the extent to which the suite of science-policy interfaces required for 'use of best available scientific information' in ocean governance exists or not, and the many forms it takes. Science-policy interfaces are required at the level of individual arrangements for effective adaptation of the arrangements to changing circumstances, as well as for management decision-making aimed at bringing about changes in behaviours and practices leading to ecosystems stresses. They are also required at the level of regional clusters, where it may be possible to take advantage of economies of scale, and add integration value, by developing advisory mechanisms that serve multiple decision-making mechanisms. Finally, they are required at the level of global-to-regional, issue-based networks within which sectoral policy is made.

The categorisation of science-policy interfaces for ocean governance, the extent to which they are functioning effectively and the factors that affect their functioning, will require targeted analysis. This should be aimed at the development and sharing of best practices (Holmes and Lock 2010, Runhaar and van Nieuwaal, 2010). There is a substantial body of literature and expertise in the area of science-policy interfaces, both in environmental arrangements and in other subject areas that could be brought to bear on this subject (e.g. van den Hove 2007, 2014, Carden 2009, Bauer and Stringer 2009, Kropp and Wagner 2010).

The findings suggest that some of the issues requiring further investigation could include:

- The extent to which the advisory mechanism is independent of the decision-making and implementation mechanisms;
- The extent to which policy advice tends to come from the same body that is providing technical/management advice;
- The extent to which science-policy interface processes are adaptable with regard to being able to change the questions that are being put to advice providers.

## 4.4 Linkages between ABNJ and regional architecture

As indicated in the introduction, UNCLOS notes that 'the problems of ocean space are closely interrelated and need to be considered as a whole'. The questions to be addressed in this section are (1) whether the emerging governance architecture for marine areas under national jurisdiction and ABNJ indicates that there are two separate identifiable structures, and (2) whether such a dichotomy is thought to be desirable. Regarding the first question, the set of arrangements in the database reveals clearly that there is a substantial overlap between arrangements for AWNJ and those for ABNJ. This is the case also for the regional clusters, of which most include a variety of arrangements, some having mandates for AWNJ, others for ABNJ, and others with mandates for both. Considering, the large spatial scale of marine ecosystems and the openness of ecosystem boundaries in the sea, there does not appear to be a dichotomy. Notably, Large Marine Ecosystems (LMEs), which are considered to be large scale biophysically defined spatial units for marine EBM often include significant areas of ABNJ (Fanning et al. in press). Therefore, regional level management that takes LMEs into account must be able to deal with both areas within national jurisdiction and ABNJ.

With regard to the second question, given the connectivity and linkages among ocean issues, it could be most appropriate to perceive ocean governance arrangements globally as comprising a single set of nested multi-level arrangements structured as described in section 4 on 'The emerging global structure of ABNJ governance'. This structure comprises a set of

global-to-regional issue-based networks complemented by regional clusters to facilitate regional level implementation needed to achieve EBM and to facilitate engagement with the regional political economies (Figure 8). This structure could reflect what is needed to address governance in both AWNJ and ABNJ. The key point to be made regarding the structure is that it is more advanced for areas within national jurisdiction, and weak for areas beyond national jurisdiction, particularly with regard to biodiversity.

From this perspective, the emphasis should then be on strengthening the existing set of global/regional arrangements to address deficiencies and fill gaps. This includes:

- Strengthening regional clusters (both mandate and capacity) to address issues in adjacent ABNJ.
- Strengthening the global level constituting and operational arrangements for biodiversity.
- Paying attention to structure that will facilitate processes needed to improve adaptive capacity.
- Exploring ways of strengthening lateral linkages among regional clusters.
- Subscribing to a general emerging set of principles, in particular conservation in addition to sustainable use, as well as the ecosystem and precautionary approaches, that cuts across AWNJ and ABNJ.

## 5 Discussion

This study has focused on the governance arrangements and architecture for ABNJ. It has taken a structural approach looking at the many arrangements that relate to governance of ABNJ and the way that they appear to be interrelated, globally and regionally. It has looked at the individual arrangements from the perspective of whether they appear to be established in such a way as to be able to carry out the full policy process thought to be needed for good governance. The study has also looked for any emerging organisational structure among arrangements at global and regional levels that may relate to governance functioning and that may also make it easier to understand and interact with global ocean governance. In this regard, particular attention was paid to science-policy interfaces, and the extent to which there appeared to be separate sets of governance arrangements for AWNJ and ABNJ. Finally, attention will be focused on the extent to which the perceived structure provides an opportunity for monitoring global ocean governance architecture.

### 5.1 Architecture and ‘good’ governance versus effectiveness

One of the key challenges in this study was to deal with governance arrangements and architecture, without venturing into the area of assessing governance effectiveness. This limitation was necessary because assessing governance effectiveness would require evaluation of outcomes and impacts that require substantial amount of physical, ecological, social and economic information in the indicator categories shown in Figure 2, over appropriate periods of time. Given the time and resources available for this study, this was not feasible. In this study, architecture is considered to provide the arena that facilitates the processes that are needed to achieve outcomes and impacts. There is also thought to be sufficient experience with architecture and process to support ideas of what characteristics they should reflect in order to facilitate ‘good governance’. Several of these characteristics are based on values and principles reflected in many multilateral agreements, including principles such as transparency, accountability, and inclusivity.

Much of what was assessed in the policy cycle scoring process can be considered as determining whether provisions for ‘good governance’ practices are in place. For example, having clearly specified processes and mechanisms across the seven policy cycle stages is seen as likely to improve transparency, accountability, and ease with which stakeholders can engage with the process. It is also likely to increase the potential for uptake of science in decision-making by providing the arena for iterative science-policy process. Ultimately, these characteristics may produce better governance results, and are often cited as being desirable

characteristics of governance processes, of value in their own right (Lemos and Agrawal 2006, Lockwood et al. 2010). However, the state of governance research is such that it is not possible to conclude clearly that these characteristics are necessary for governance to be effective. The degree to which good governance characteristics are correlated with effective governance remains an emerging area of research in the field of international governance.

It is likely that governance arrangements will be sufficiently context specific that it would be unwise to propose a definite link between 'good governance' and effectiveness (UNDP 2014). Therefore, monitoring the policy cycle stage scores, and overall completeness for the arrangements pertaining to ABNJ should be perceived only as monitoring the extent to which practices considered to reflect 'good governance' are in place. Indeed, the scores considered desirable for policy cycle stages may differ among individual arrangements such that each needs to set its own target level for monitoring. Over time, as variables relating to outcomes of governance are monitored, the extent to which 'good governance' and effectiveness are related will become better understood. Empirical studies to explore the connection between architecture, good governance, and effectiveness are much needed.

## 5.2 The global architecture for ocean governance

This study takes a holistic perspective in defining global architecture for ocean governance as comprising the entire set of arrangements and their interrelations. Laying out what is perceived as the structure is just a start in this regard. The global architecture to which we refer comprises complementary sets of global-to-regional, issue-based networks and regional clusters described previously. This structure may be seen as emerging but far from complete and with much dysfunctionality. It is essentially operating largely on one pillar of sustainable development, economic use, and missing much of the other pillars of environmental sustainability (with respect to biodiversity conservation) and social sustainability (at both intra- and intergenerational scales).

The perspective on global ocean governance architecture in this paper may have value for several groups of stakeholders. For those practitioners actively engaged in ocean governance at the global level, this architecture may already appear evident. However, articulating it in a form where it can be referred to, discussed, revised and further elaborated seems to have substantial potential to contribute to the discourse on ocean governance. For many practitioners operating within parts of the system there may not be the time or resources to avail themselves of the entire global picture. The perspective developed in this paper is expected to help build a global view on ocean governance by allowing practitioners in all parts of the system to see where their part fits in, how it compares to other parts, and where they may seek to build linkages that will strengthen their part and the whole system.

The third group that may benefit from the perspective in this paper, is those outside the system, or at its margins. These may be people from organisations with global perspectives on related issues such as finance and trade, who do not have the time to make sense of what may, from the outside, appear to be a very complex, disordered and fragmented set of arrangements for the ocean (Freestone 2010, Rothwell and Stephens 2010, Töpfer et al. 2014). They may also be donors or stakeholders seeking to engage with ocean governance but lacking a full understanding of its complexity.

It is hoped that the perspective provided here can move the global-regional ocean governance community towards a better understanding of what has been achieved over the past several decades, where the major gaps are, and what the critical next steps may be to address these gaps and strengthen the entire system. The ideas relating to networks, nesting of arrangements, the importance of scale and interplay among arrangements that inform this assessment are prominent in conceptual discourse on governance (Young 2002, Kooiman et al. 2005, Sorensen and Torfing 2007). These ideas are not totally abstract or academic, and many of the concepts underlying the perspective developed in this paper have been derived from scholars' analyses of global and regional regimes and regime clusters (Miles et al. 2002, Biermann et al. 2009, Biermann and Pattberg 2012). However, much of this thinking has failed

to gain traction in the world of practitioners and institution builders for global environmental governance. It is hoped that this study can make a contribution towards bringing those working at the conceptual level together with those responsible for making regimes work in practice.

The perspective of regional clusters is central to the overall structure as developed in this study. Their importance has also been highlighted recently by Gjerde et al. (2013) and Rochette et al. (2014). They are given special attention here, because the global-to-regional, issue-based networks have been the primary focus of global ocean governance thus far. The findings from this assessment on ocean governance architecture strongly suggest that there is the need to focus additional attention on the regional clusters in order for them to develop the functionality for good governance. Our findings suggest that these clusters may be essential, if scale appropriate EBM is to be achieved for the oceans. The regional clusters can be viewed as arenas for the interactions required for EBM. They could be seen as governance units that should be promoted and assessed as units. There are many facets to the structure and functionality of regional clusters. These include: the extent to which the arrangements that comprise them are geographically coherent (spatial overlap and fit); the functionality of the individual arrangements within the cluster (as per the assessments in the database); and linkages (interplay) among the arrangements comprising the cluster (including shared principles, etc.) These all need to become the focus of increased attention that seeks to build regional clusters within which there are shared values and principles, such as conservation of biodiversity, accountability, transparency, efficiency thought to be essential for “good governance”.

### 5.3 Assessment of current status – gaps and overlaps

The set of arrangements for ABNJ, the evaluation of the strengths of the policy processes, and the overall global structure elaborated in this report constitute an assessment of what is currently in place. This could be considered to be a baseline assessment of ocean governance architecture. There are, however, other aspects of governance architecture that could be pursued in order to develop a more comprehensive baseline. These include:

- Analysis of the spatial fit of arrangements and regional clusters to the spatial issues, for example the extent to which the multiple spatial aspects of biodiversity are covered at the global and regional levels in ABNJ;
- The extent to which there is spatial coherence among arrangements within a regional cluster.
- The extent of engagement of countries in arrangements, regional clusters and global networks as indicated by at least the signing of the arrangements, but additionally, by their engagement in processes;
- The extent to which there is progress within arrangements in moving towards EBM such as the adoption of EBM as a principle and/or establishment of EBM Working Groups.
- The extent to which there is a mechanism specified for integrating policy and management across issues within regional clusters and at the global level.
- The linkages among arrangements, or clusters of arrangements;

A spatial analysis of the fit of arrangements and clusters to the issues requires additional information on the distribution of ecosystems, resources, and sources of negative impacts. For fisheries, the distribution of fishery resources is well known, at least for ABNJ fisheries since these are largely commercial. Mapping these against the arrangements developed for their governance should be a relatively straightforward task. Spatial coverage of fisheries in ABNJ has been discussed by Molenaar (2005), Freestone (2012) and others. Coverage for HMS is essentially complete, provided by five well-established RFMOs (ICCAT, IATTC, IOTC, WCPFC, CCSBT). In contrast coverage for demersal fishery resources is much less complete, with the majority of the South Atlantic and North Pacific having no coverage, as well as smaller but significant areas in other oceans. Furthermore, RFMOs with responsibility for demersal resources in ABNJ are relatively recent.

The situation for ecosystems and biodiversity in ABNJ is much more complex and less advanced (Druel et al. 2012). Information on the distribution of marine ecosystems and the development of classification systems for them, and is at a relatively early stage in development. It was only in 2007 that classification of coastal and shelf regions into marine eco-regions appeared (Spalding, et al. 2007). Equivalents for ABNJ have only recently been developed (UNESCO 2009, Harris and Whiteway 2009, Rice et al. 2011, Spalding et al. 2012, Watling et al. 2013). The alternative to a comprehensive, zoning, approach to ecosystems and biodiversity in ABNJ, has been to encourage competent international organizations to apply the information available on EBSAs to design management measures capable of avoiding significant adverse impacts, but this approach has not gained traction as there is as yet no mechanism to encourage cooperation on biodiversity. For this reason, many governments, scientists and NGOs are proposing a new agreement under UNCLOS which would provide for a global level coordinating mechanism, establish common objectives and principles including ecosystem-based management, systems of marine protected areas, and procedures for environmental impact assessment, as well as to provide funding to incentivize cooperation and enhance the capacity of developing countries (Hart 2008, Druel and Gjerde 2014).

A spatial perspective on coverage of biodiversity in ABNJ, and indeed the ocean overall would provide a biased picture. While there are several global and regional arrangements with wide geographical coverage, they may be narrow in terms of the coverage of species or ecosystems, for example, the Agreement on the Conservation of Albatrosses and Petrels (ACAP), which is global but applies only to these species, the two sea turtle agreements for the Americas and Indian Ocean/Southeast Asia region or the polar bear agreement. The Ballast Water Convention is also global but provides coverage for a very specific issue; introduction of alien invasive species by ballast water discharge.

Gaps in pollution coverage of LBS and MBS at the regional level can be related to the extent to which Regional Seas conventions and their pollution related protocols are in place to address pollution within areas under national jurisdiction that can in most cases ultimately be transported into ABNJ. As can be seen from Table 7 and Figure 26 there are numerous significant gaps in coverage, many of them in areas of high coastal population and extensive marine activity.

The input of chemical pollutants to the ocean via atmospheric transport is a major area of concern (GESAMP 2012). The 1979 Convention on Long-range Transboundary Air Pollution which entered into force in 1983 addresses this issue for a limited number of countries globally, mainly those of Europe. This convention was not included in the analysis as it is much broader in scope than oceans. It still has only 51 parties, and several large countries with significant emissions have yet to join. The numbers of parties to the seven[28] protocols giving further effect to this convention range from 25 to 35. Engagement with and implementation of this convention and its protocols is a gap area for ocean pollution.

[28] The eighth protocol pertains to financing monitoring and has 46 parties.

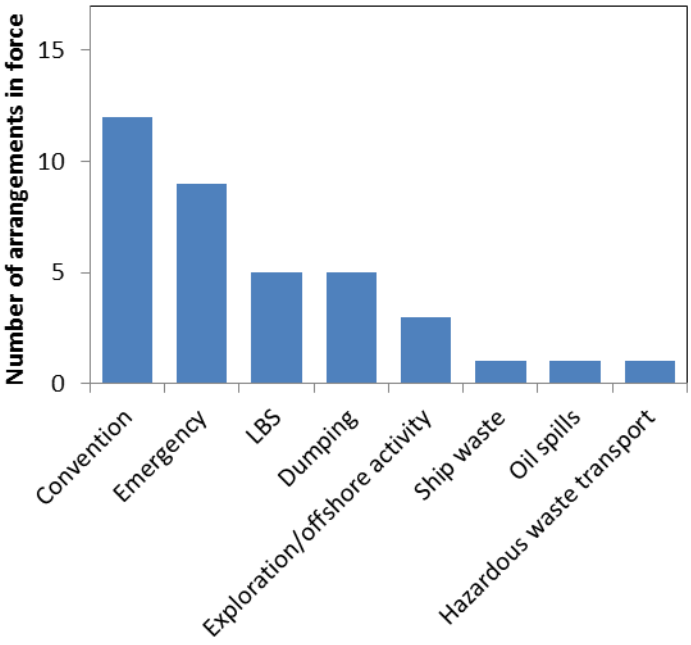



**Figure 26.** The numbers of Regional Seas Conventions and associated protocols for pollution in place for the 17 Regional Seas regions globally.

A comprehensive baseline for ocean governance architecture will also require considerably more detail on the structural aspects of the global framework for ocean governance described in this report. For example, the extent and nature of vertical and lateral interplay among arrangements is an important aspect of architecture that could not be adequately explored in this assessment. While the identification of networks and regional clusters is based on inferred linkages, a baseline that would provide a basis for monitoring change should include information on actual linkages. This requires a substantial investigation using approaches such as social network analysis.

## 5.4 Monitoring system

The two main purposes of the TWAP are to:

(1) Develop a baseline for assessment of conditions in the five IW water categories

(2) Put in place a system for monitoring these conditions at regular intervals.

The analysis presented in this report is considered to provide a minimal baseline against which to monitor the development and strengthening of the global architecture for ocean governance.

Ideally, a monitoring system will track the progress in a desired direction or towards a desired state, if this can be determined. In this case, it is more feasible to identify the desired direction for the various parts of ocean governance architecture, than to define a desired state. Changes that would be thought to reflect improvements in various parts of the overall architecture can be specified. The criteria for scoring the stages of the policy cycle provide indicators for individual arrangements. Desirable characteristics for regional clusters can be developed, as can those for the global-to-regional, issue-based networks. However, although general guidelines for improvement can be developed for these various parts of the architecture, explicit conclusions about the desired state for each part are likely to be context specific. Ideally, these should be developed through collaboration between governance experts and practitioners involved in that particular part of the governance system. Thus, the target

conditions that monitoring should track progress towards may differ widely among arrangements, regional clusters, and issue-based networks.

Whereas monitoring governance architecture can provide valuable information on the evolving context for governance processes, there is also the need to assess governance effectiveness. As already discussed, and illustrated in figure 2, effectiveness can only be evaluated on the basis of achieved outcomes such as reduced stresses, improved ecosystems, socially just solutions to problems, and improved human well-being.

## 6 Key conclusions and recommendations

The key conclusions of the study are:

- Normative characteristics representing 'good governance' can be assessed in ocean governance arrangements as a basis for targeting interventions and monitored improvements, but 'good governance' may be context specific.
- There are significant gaps in coverage of the issues for ABNJ particularly for biodiversity, but also to a lesser extent for pollution and fisheries for straddling and demersal stocks.
- The entire set of governance arrangements for ABNJ and areas within national jurisdiction may be best approached as a single global ocean governance structure.
- The perspective of the single global ocean governance structure as comprising 'global-regional issue-based networks' and 'regional clusters' provides a framework that may help to improve understanding of the very complex, disordered and fragmented set of arrangements for the ocean.

Based on the analysis conducted for this study, recommendations can be made in three areas:

(1) Individual arrangements

(2) Regional clusters

(3) Global-to-regional issue-based networks.

At the level of individual arrangements, there is the need to support monitoring of the extent to which 'good governance' practices are observed and to link them with an understanding of how they relate to governance effectiveness. Monitoring of good governance should be arrangement context specific, but nevertheless based on a common set of criteria. The refinement of 'good governance' criteria at the arrangement level will be an iterative process.

Strengthening regional clusters of agreements, particularly so that they can undertake EBM in offshore waters and ABNJ, is seen as a critical component of strengthening ABNJ governance. This will include promotion of integration mechanisms, improvement of interplay among arrangements within clusters, as well as building new linkages with regional multipurpose organisations to increase political understanding of and support for ocean governance. Clearly this will also strengthen governance in AWNJ.

A focus on vertical interplay between regional and global processes and the capacity to integrate at the global policy level is also required. However, the proposal for an UNCLOS Implementing Agreement, if it sets forth the conditions necessary for effective interplay, i.e. non-hierarchical organizations operating in sync based on a common purpose and set of principles, could improve vertical as well as regional horizontal interplay for the key issue of biodiversity (Druel and Gjerde 2014).

Three key recommendations from 'A blueprint for ocean and coastal sustainability' (UNESCO-IOC, IMO, FAO, UNDP, 2011) are:

- Create and implement an institutional and legal framework to protect, conserve and sustainably manage ecosystems and biodiversity beyond national jurisdiction
- Reform Regional Fisheries Management Organisations

- Enhance coordination, coherence and effectiveness of the UN System on oceans issues

The findings and conclusions of this report are consistent with these recommendations but this report goes further in identifying a global ocean governance framework within which these recommendations can be pursued to achieve all three pillars of sustainable development.

## 7 References

Baldwin, K. and R. Mahon. 2014. Spatial analysis of ocean governance at the global level: Spatial data availability, accuracy, coordinate systems and considerations for practice. Centre for Resource Management and Environmental Studies, The University of the West Indies, Cave Hill Campus, Barbados, CERMES Technical Report No 74: 18pp.

Ban, N. C., N. J. Bax, K. M. Gjerde, R. Devillers, D. C. Dunn, P. K. Dunstan, A. J. Hobday, S. M. Maxwell, D. M. Kaplan, R. L. Pressey, J. A. Ardron, E. T Game and P. N. Halpin. 2014. Systematic conservation planning: A better recipe for managing the high seas for biodiversity conservation and sustainable use. Conservation Letters, 7: 41–54.

Bauer, S. and L. C. Stringer. 2009. The role of science in the global governance of desertification. The Journal of Environment and Development, 18: 248-267

Biermann, F. 2007. 'Earth system governance' as a crosscutting theme of global change research. Global Environmental Change. 17: 326-337.

Biermann, F. and P. Pattberg [eds]. 2012. Global environmental governance reconsidered. MIT Press, Cambridge.

Biermann, F., O. Davies and N. van der Grijp. 2009. Environmental policy integration and the architecture of global environmental governance. International Environmental Agreements 9: 351–369

Breitmeier, H., O. R. Young and M. Zurn 2006. Analysing international environmental regimes: from case study to database. MIT Press, London, 321 pp.

Carden, F. 2009. Knowledge to policy: making the most of development research. International Development Research Centre, Ottawa, Canada

Ceo, M., S. Fagnani, J. Swan, K. Tamada, and H. Watanabe. 2012. Performance reviews by Regional Fishery Bodies: Introduction, summaries, synthesis and best practices, Volume I: CCAMLR, CCSBT, ICCAT, IOTC, NAFO, NASCO, NEAFC. FAO Fisheries and Aquaculture Circular. No.1072. Rome, FAO. 2012. 92 pp.

Crowder, L. B., G. Osherenko, O. R. Young, S. Airamé, E. A. Norse, N. Baron, J. C. Day, F. Douvere, C. N. Ehler, B. S. Halpern, S. J. Langdon, K. L. McLeod, J. C. Ogden, R. E. Peach, A. A. Rosenberg and J. A. Wilson. 2006. Resolving mismatches in U.S. ocean governance. Science 213: 617-618.

Dietz, T., E. Ostrom, and P. C. Stern. 2003. The Struggle to Govern the Commons, Science, 2003, 302 (5652), 1907-1912.

Druel, E. 2012. Ecologically or Biologically Significant Marine Areas (EBSAs): the identification process under the Convention on Biological Diversity (CBD) and possible ways forward, Working Paper N°17 /12, IDDRI, Paris, France, 24 pp.

Druell, E. and K. Gjerde. 2014. Sustaining marine life beyond boundaries: Options for an implementing agreement for marine biodiversity beyond national jurisdiction under the United Nations Convention on the Law of the Sea. Marine Policy 49: 90–97.

Druel, E., Rochette, J., Billé, R., Chiarolla, C. 2012. A long and winding road. International discussions on the governance of marine biodiversity in areas beyond national jurisdiction, Studies N°07/13, IDDRI, Paris, France, 42 pp.

Duda, A. 2002. Monitoring and Evaluation Indicators for GEF International Waters Projects. Global Environment Facility Monitoring and Evaluation Working Paper 10: 11 pp.

Duda, A. and A. C.Hume. 2013. A new imperative to harness sound science in the GEF International Waters focal area. Environmental Development 7: 102-108.

Fanning, L., R. Mahon, K. Baldwin and S. Douglas. In press. Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean: Vol 1 – Transboundary Large Marine Ecoystems. IOC Technical Series 115.

Fanning, L., R. Mahon, P. McConney, J. Angulo, F. Burrows, B. Chakalall, D. Gil, M. Haughton, S. Heileman, S. Martinez, L. Ostine, A. Oviedo, S. Parsons, T. Phillips, C. Santizo Arroya, B. Simmons, C. Toro. 2007. A large marine ecosystem governance framework. Marine Policy 31: 434–443.

FAO. 1999. Report of the meeting of FAO and non-FAO regional fishery bodies or arrangements. Rome, 11-12 February 1999. FAO Fisheries Report. No.597. Rome, FAO. 1999. 53pp.

FAO. 2007. Report of the First Meeting of Regional Fishery Body Secretariats Network. Rome, 12–13 March 2007. FAO Fisheries Report. No. 837. Rome, FAO. 2007. 38pp.

FAO. 2013. What is COFI? See http://www.fao.org/fishery/about/cofi/en. Accessed December 15, 2013.

Freestone, D. 2010. Problems of High Seas governance. Pp 99-124, In: The world ocean in globalisation. D. Vidas and P. J. Schei [Eds]. Martinus Nijhoff,

Freestone, D. 2011. Fisheries commissions and organisations. Max Planck Encyclopedia of Public International Law [MPEPIL]

Garibaldi, L. and L. Limongelli. 2003. Trends in oceanic captures and clustering of large marine ecosystems: two studies based on the FAO capture database. Fisheries Technical paper 435, Rome, Italy, 2003.

GESAMP. 2001. The state of the marine environment. Group of experts on the scientific aspects of marine pollution. Regional Seas Reports and Studies, Nairobi, UNEP.

GESAMP. 2005. The new GESAMP: Science for Sustainable 0ceans: A strategic vision for the IM0/FA0/UNESC0-I0C/WM0/WH0/IAEA/UN/ UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection. London, IM0. 21pp.

GESAMP. 2012. The Atmospheric Input of Chemicals to the Ocean. Rep. Stud. GESAMP No. 84/GAW Report No. 203. 69 pp.

Gjerde K. M, D. Currie, K. Wowk, K. Sack. 2013. Ocean in peril: Reforming the management of global ocean living resources in areas beyond national jurisdiction. Marine Pollution Bulletin 74: 540–551.

Gjerde K. M., H. Dotinga, S. Hart, E. J. Molenaar, R. Rayfuse and R. Warner. 2008a. Regulatory and governance gaps in the international regime for the conservation and sustainable use of marine biodiversity in Areas beyond National Jurisdiction. IUCN, Gland, Switzerland. x + 70.

Gjerde K. M., H. Dotinga, S. Hart, E. J. Molenaar, R. Rayfuse and R. Warner. 2008b. Options for addressing regulatory and governance gaps in the international regime for the conservation and sustainable use of marine biodiversity in Areas Beyond National Jurisdiction. IUCN, Gland, Switzerland. x + 20.

Global Ocean Commission. 2013. Modernising ocean governance. Policy Options Paper # 10, 10 pp.

Harris, P. T. and T. Whiteway. 2009. High seas marine protected areas: Benthic environmental conservation priorities from a GIS analysis of global ocean biophysical data. Ocean & Coastal Management 52 (2009) 22–38.

Hart, S. 2008. Elements of a possible implementation agreement to UNCLOS for the conservation and sustainable use of marine biodiversity in Areas beyond National Jurisdiction. IUCN, Gland, Switzerland. x + 21

Holmes, J., and R. Clark. 2008. Enhancing the use of science in environmental policy-making and regulation. Environmental Science and Policy 11:702–711.

Holmes J. and J. Lock. 2010. Generating the evidence for marine fisheries policy and management. Marine Policy 34:29-35.

IISD 2013a. Summary of the sixth meeting of the Working Group on Marine Biodiversity beyond Areas of National Jurisdiction: 19-23 august 2013. IISD Briefing Note on the WG on Marine Biodiversity. International Institute for Sustainable Development , New York, New York. 4 pp.

IISD. 2013b. Summary of the first plenary meeting of the Intergovernmental Platform on Biodiversity and Ecosystem Services: 21-26 January 2013. Earth Negotiations Bulletin, 31 (6): 1-14.

IPCC. 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Draft Report.

Jeftic, L., P. Glennie, L. Talaue-McManus and J. A. Thornton (Eds.). Volume 1. Methodology and Arrangements for the GEF Transboundary Waters Assessment Programme, United Nations Environment Programme, Nairobi, 61 pp.

Kluvánková-Oravaská, T. and V. Chobotová. 2012. Regional governance arrangements. Pp 219-235. In: F.Biermann and P. Pattberg. [eds]. Global environmental governance reconsidered. MIT press, Cambridge

Koehler, H. 2013. Promoting Compliance in Tuna RFMOS: A Comprehensive Baseline Survey of the Current Mechanics of Reviewing, Assessing and Addressing Compliance with RFMO Obligations and Measures. ISSF Technical Report 2013-02. International Seafood Sustainability Foundation, McLean, Virginia, USA. 53 pp.

Kropp, C. and J. Wagner. 2010. Knowledge on stage: scientific policy advice. Science, Technology, & Human Values 35(6) 812-838.

Lemos, M. C., and A. Agrawal. 2006. Environmental governance. Annual Review of Environment and Resources 31:297–325.

Levy, M. A. O R. Young and M. Zürn. 1995. The study of international regimes. European Journal of International Relations 1: 267-330.

Lockwood, M., J. Davidson, A. Curtis, E. Stratford and R. Griffith. 2010. Governance principles for natural resource management. Society and Natural Resources, 23:1–16

Mahon, R, L. Fanning and P. McConney. 2011a. Observations on governance in the Global Environment Facility (GEF) International Waters (IW) Programme. CERMES Technical Report No. 45, 36 p. (www.cavehill.uwi.edu\cermes)

Mahon, R., L. Fanning, and P. McConney. 2011b. TWAP common governance assessment. Pp. 55-61. In: L. Jeftic, P. Glennie, L. Talaue-McManus, and J. A. Thornton (Eds.). Volume 1. Methodology and Arrangements for the GEF Transboundary Waters Assessment Programme, United Nations Environment Programme, Nairobi, 61 pp.

Mahon, R., A. Cooke, L. Fanning and P. McConney. 2013. Governance arrangements for marine ecosystems of the Wider Caribbean Region. Centre for Resource Management and Environmental Studies, University of the West Indies, Cave Hill Campus, Barbados. CERMES Technical Report No 60. 99pp.

McConney, P., L. Fanning, R. Mahon and B. Simmons. 2012. Survey of the regional science-policy interface for ocean governance in the Wider Caribbean Region. Centre for Resource Management and Environmental Studies, University of the West Indies, Cave Hill Campus, Barbados, CERMES Technical Report No 51. 46pp.

Mee, L. and Z. Adeel. 2012. Science-policy bridges over troubled waters – making science deliver greater impacts in shared water systems. United Nations University Institute for water, Environment and Health, Hamilton, Canada. 48 pp.

Miles, E. L., A. Undrdal, S. Andresen, J. Wettestad, J. B. Skjaerseth and E. M. Carlin. 2002. Environmental regime effectiveness: confronting theory with evidence. MIT Press, Cambridge.

Mitchell, R. B., W. C. Clark, D. W. Cash and N. M. Dickson [Eds]. 2006. Global Environmental Assessments: Information and Influence. MIT Press, Cambridge, 352 pp.

Molenaar, E. J. 2005. Addressing regulatory gaps in high seas fisheries. The International Journal of Marine and Coastal Law, 20, (3–4): 533-570.

Murillas-Maza, A., J. Virto, M. C. Gallastegui, P. González, J. Fernández-Macho. 2011. The value of open ocean ecosystems: A case study for the Spanish exclusive economic zone. Natural Resources Forum, 35: 122–133.

Oberthur, S. 2009. Interplay management: enhancing environmental policy integration among international institutions. International Environmental Agreements 9:371–391

Oberthur, S. and T. Gehring. [Eds] 2006. Institutional interaction in global environmental governance. MIT Press, Cambridge, 405 pp.

Orsini, A., J.-F. Morin and O. Young. 2013. Regime complexes: a buzz, a boom, or a boost for global governance? Global Governance 19: 27–39.

Ostrom, E. 2010. Polycentric systems for coping with collective action and global environmental change. Global Environmental Change 20 (2010) 550–557.

Rice, J., K. M. Gjerde, J. Ardron, S. Aricod, I. Cresswell, E. Escobar, S. Grant and M. Vierro. 2011. Policy relevance of biogeographic classification for conservation and management of marine biodiversity beyond national jurisdiction, and the GOODS biogeographic classification. Ocean & Coastal Management 54 (2011) 110-122.

Rochette J., S. Unger, D. Herr, D. Johnson, T. Nakamura, T. Packeiser, A. Proelss, M. Visbeck, A. Wright and D. Cebrian. 2014. The regional approach to the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. Marine Policy 49: 109–117.

Rothwell, D. R. and T. Stephens. 2010. The international law of the sea. Hart Publishing, Oxford, 499 pp.

Runhaar, H. and K. van Nieuwaal. 2010. Understanding the use of science in decision-making on cockle fisheries and gas mining in the Dutch Wadden Sea: Putting the science–policy interface in a wider perspective. Environmental Science and policy 13: 239–248

Sherman, K. and A.M. Duda. 1999. An ecosystem approach to global assessment and management of coastal waters. Marine Ecology Progress Series 190: 271–87.

Söderbaum, F. and J. Granit. 2014. The political economy of regionalism: The relevance for International Waters and the Global Environment Facility: A STAP Issues Paper. Global Environment Facility, Washington, D.C.

Sorenesen, E. and J. Torfing. 2007. Theories of democratic network governance. Palgrave Macmillan, New York, 356 pp.

Spalding, M. D. et al. 2007. Marine Ecoregions of the World: A Bioregionalization of Coastal and Shelf Areas. BioScience 57 (7): 573-583.

Spalding, M. D., V. N. Agostini, J. Rice, S. M. Grant. 2012. Pelagic provinces of the world: A biogeographic classification of the world's surface pelagic waters. Ocean & Coastal Management, 60: 19-30.

Stokke, O. S. [Ed]. 2001. Governing high seas fisheries: The interplay of global and regional regimes. Oxford: Oxford University Press.

Stokke, S., O. Schram and S. Oberthur. [Eds]. 2011. Managing institutional complexity: Regime interplay and global environmental change. MIT Press, Cambridge, 405 pp.

Swan, J. 2004. Decision-making in regional fishery bodies or arrangements: the evolving role of RFBs and international agreement on decision-making processes. FAO Fisheries Circular. No. 995. Rome, FAO. 82pp.

Töpfer, K., L. Tubiana, S. Unger and J. Rochette. 2014. Charting pragmatic courses for global ocean governance. Marine Policy 49 (2014) 85–86.

UN Secretary General. 2012. The Oceans Compact: Healthy oceans for prosperity. United Nations, New York, 8 pp.

UNDP, 2014. Governance for Sustainable Development: Integrating Governance in the Post-2015 Development Framework. United Nations Development Programme, New York, 14pp.

UNEP. 2012. 21 Issues for the 21st Century: Result of the UNEP Foresight Process on Emerging Environmental Issues. United Nations Environment Programme (UNEP), Nairobi, Kenya, 56pp.

UNEP. 2010. Modalities for advancing cross-sectoral cooperation in managing marine areas beyond national jurisdiction. Discussion paper, 12th Global Meeting of the Regional Seas Conventions and Action Plans, Bergen, Norway, 20th – 22nd September 2010. UNEP (DEPI)/RS.12 /8, 27 pp.

UNEP. 2007. Global Marine Assessments: A survey of global and regional assessments and related activities of the marine environment. UNEP/UNESCO-IOC/UNEP-WCMC.

UNEP. 2006. Marine and coastal ecosystems and human wellbeing: A synthesis report based on the findings of the Millennium Ecosystem Assessment. UNEP. 76 pp.

UNEP/GPA. 2006. Implementation of the GPA at regional level: The role of regional seas conventions and their protocols. UNEP/GPA, The Hague: 31 pp.

UNEP-MAP-RAC/SPA. 2011. Note on the establishment of marine protected areas beyond national jurisdiction or in areas where the limits of national sovereignty or jurisdiction have not yet been defined in the Mediterranean Sea. RAC/SPA, Tunis: 54pp.

UNESCO. 2009. Global Open Oceans and Deep Seabed (goods) – biogeographic classification, Paris, UNESCO-IOC. (IOC Technical Series, 84.) Vierros, M., Cresswell. I., Escobar Briones, E., Rice, J., Ardron, J. (Eds). Submitted to 25th Session of the IOC Assembly, June 2009, 96 pp.

UNESCO-IOC, 2011a. Methodology for the GEF Transboundary Waters Assessment Programme. Volume 5. Methodology for the Assessment of Large Marine Ecosystems, United Nations Environment Programme, Nairobi, viii + 115 pp.

UNESCO-IOC, 2011b. Methodology for the GEF Transboundary Waters Assessment Programme. Volume 6. Methodology for the Assessment of the Open Ocean, United Nations Environment Programme, Nairobi, vi + 71 pp.

UNESCO-IOC, IMO, FAO, UNDP. 2011. A blueprint for ocean and coastal sustainability. UNESCO-IOC, Paris, 42 pp.

UNGA. 2010. Resolution 64/71 - Oceans and the law of the sea. United Nations General Assembly RES 64/71: 53 pp.

UNGA. 2003. Resolution 57/141 - Oceans and the law of the sea. United Nations General Assembly RES/57/141: 13 pp.

United Nations. 2012. The Future We Want: Outcome document adopted at Rio+20. 49 pp.

UNDP. 2014. Governance for Sustainable Development: Integrating Governance in the Post-2015 Development Framework. United Nations Development Programme, New York, 14pp.

van den Hove, S. 2007. A rationale for science–policy interfaces. Futures 39: 807–826

Vidas, D. and M. Markovcic Kostelac. 2011. Ballast water and alien species: regulating global transfers and regional consequences. Pp 373392. In: The world ocean in globalisation. D. Vidas and P. J. Schei [Eds]. Martinus Nijhoff,

Vousden, D. and J. Stapley. 2013. Evolving new governance approaches for the Agulhas and Somali Current Large Marine Ecosystems through dynamic management strategies and partnerships. Environmental Development 7: 32–45.

Warner, R. 2012. Oceans beyond Boundaries: Environmental Assessment Frameworks. The International Journal of Marine and Coastal Law 27: 481–499.

Watling, L., J. Guinotte, M. R. Clark, C. R. Smith. 2013. A proposed biogeography of the deep ocean floor. Progress in Oceanography 111: 91–112.

World Bank. 2014. Global Oceans Action Summit for Food Security and Blue Growth: Chair's Summary. The World bank, Washington DC. 51 pp.

Wright, A., N. Stacey and P. Holland. 2006. The cooperative framework for ocean and coastal management in the Pacific Islands: Effectiveness, constraints and future direction. Ocean & Coastal Management 49*,* 739-763.

Young, O. R. 2013. Effectiveness of international environmental regimes: Existing knowledge, cutting-edge themes, and research strategies. Proceedings of the National Academy of Sciences.

Young, O. R. 2002. The institutional dimensions of environmental change: fit interplay and scale. MIT Press, Cambridge, MA, 221 pp.

Young O. R. [Ed]. 1999. The effectiveness of international environmental regimes: causal connections and behavioural mechanisms. MIT Press, Cambridge, MA.

Young, O. R., G. Osherenko, J. Ekstrom, L. B. Crowder, J. Ogden, J. A. Wilson, J. C. Day, F. Douvere, C. N. Ehler, K. L. McLeod, B. S. Halpern and R. Peach. 2007. Solving the crisis in ocean governance: place-based management of marine ecosystems. Environment, 49 (4): 20–32.

Zahran, M. M., and T. Inomata. 2012. Evaluation of UN-Oceans. Joint Inspection Unit, United Nations, Geneva, JIU/REP/2012/3: 34 pp.

## Appendix 1. List of arrangements included in the database

(CN = constituting, OP = operational, P = pollution, F = Fisheries, B = biodiversity, C = climate change.

| Acronym/Short name | Full name | Type | Issues |
|---|---|---|---|
| Abidjan Convention | Abidjan Convention for Co-operation in the protection and Development of the Marine and Coastal Environment of the West and Central African Region | CN | P |
| Abidjan Convention - Emergency Protocol | Protocol on Cooperation in Combating Pollution in Cases of Emergency and the associated Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the West and Central African Region | OP | P |
| Abidjan Convention - LBS Protocol | Protocol concerning Cooperation in the Protection annd Development of the Marine and Coastal Environment from land-Based Sources and the Activities | OP | P |
| ACAP | Agreement on the Conservation of Albatrosses and Petrels | OP | B |
| Anti-fouling convention | The International Convention on the Control of Harmful Anti-fouling Systems on Ships | OP | P |
| Antigua Convention | Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific | CN | FPB |
| APFIC | Asia Pacific Fisheries Commission | OP | F |
| Arctic Council | Arctic Council | OP | FPBC |
| ATS | Antarctic Treaty System | CN | FP |
| ATS Environment Protocol | Protocol on Environmental Protection to The Antarctic Treaty | OP | P |
| Barcelona Convention | Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean | CN | P |
| Barcelona Convention - Dumping Protocol | Protocol for the Prevention of Pollution in the Mediterranean Sea by Dumping from Ships and Aircraft | OP | P |
| Barcelona Convention - Hazardous Wastes Protocol | Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal | OP | P |
| Barcelona Convention - LBS Protocol | Protocol on the Protection of the Mediterranean Sea against Pollution from Land-Based Sources | OP | P |
| Barcelona Convention - Offshore Protocol | Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil | OP | P |

| Acronym/Short name | Full name | Type | Issues |
|---|---|---|---|
| Barcelona Convention - Prevention and Emergency Protocol | Protocol Concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea | OP | P |
| Barcelona Convention - SPA and Biodiversity Protocol | Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean | OP | B |
| BOBP-IGO Agreement | Agreement on the Institutionalisation of the Bay of Bengal Programme as an Inter-Governmental Organisation | OP | F |
| Bucharest Convention | Convention on the Protection of the Black Sea against Pollution | CN | P |
| Bucharest Convention - Dumping protocol | Protocol on dumping of waste | OP | P |
| Bucharest Convention - Emergency Protocol | Protocol on joint action in the case of accidents (such as oil spills) | OP | P |
| Bucharest Convention - LBS Protocol | Protocol on the control of land-based sources of pollution | OP | P |
| BWMC | International Convention for the Control and Management of Ships' Ballast Water and Sediments (Ballast Water Management Convention) | OP | P |
| Cartagena Convention | Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) | CN | P |
| Cartagena Convention - LBS Protocol | Cartagena Convention Protocol Concerning Pollution from Land-Based Sources and Activities | OP | P |
| Cartagena Convention – Oil Spills Protocol | Cartagena Convention Protocol Concerning Co-operation in Combating Oil Spills | OP | P |
| CBD | Convention on Biological Diversity | CN | B |
| CCAMLR | Convention for the Conservation of Antarctic Marine Living Resources | OP | FB |
| CCAS | Convention for the Conservation of Antarctic Seals | OP | B |
| CCBSP | Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea | OP | F |
| CCSBT | Convention for the Conservation of the Southern Bluefin Tuna | OP | F |
| CECAF | Fishery Committee for the Eastern Central Atlantic | OP | F |
| CITES | Convention on International Trade in Endangered Species | OP | FB |
| CMS | Convention on Migratory Species | CN | FB |

| Acronym/Short name | Full name | Type | Issues |
|---|---|---|---|
| COMHAFAT | Ministerial Conference on Fisheries Cooperation among African States Bordering the Atlantic (COMHAFAT or ATLAFCO) | OP | F |
| FAO Compliance Convention | The Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas - 1993 | OP | F |
| FFAC | Pacific Islands Forum Fisheries Agency/South Pacific Forum Fisheries Agency Convention | OP | F |
| GFCM Agreement | Agreement for the establishment of the General Fisheries Commission for the Mediterranean | OP | F |
| GPA | Global Programme of Action for the Protection of the Marine Environment from Land-based Activities | CN | P |
| HELCON | Convention on the Protection of the Marine Environment of the Baltic Sea Area - Helsinki Convention | OP | PB |
| Hong Kong Convention | Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships | OP | P |
| HSDN | United Nations Resolution on High Seas Drift Netting | OP | F |
| IAC | Inter-American Convention for the Protection and Conservation of Sea Turtles | OP | B |
| IATTC | Convention for the Strengthening of the Inter-American Tropical Tuna Commission | OP | F |
| ICCAT | International Convention for the Conservation of Atlantic Tunas | OP | F |
| ICES | International Council for the Exploration of the Sea | OP | FPBC |
| IOTC | Agreement for the establishment of the Indian Ocean Tuna Commission | OP | F |
| IPHC | International Pacific Halibut Commission (IPHC)/Convention for the Preservation of the Halibut Fishery | OP | F |
| IWC | International Convention for the Regulation of Whaling | OP | F |
| Jeddah Convention | Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment | CN | P |
| Jeddah LBS Protocol | Protocol Concerning the Protection of the Marine Environment from Land-Based Activities in the Red Sea and Gulf of Aden | OP | P |
| Jeddah Oil Pollution Protocol | Protocol concerning Regional Cooperation in Combating Pollution by Oil and Other Harmful Substances in cases of Emergency | OP | P |
| Kuwait - Continental Shelf Exploitation Protocol | Protocol Concerning Marine Pollution Resulting from Exploration and Exploitation of the Continental Shelf | OP | P |
| Kuwait Convention | Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution – Kuwait Convention | CN | P |

| Acronym/Short name | Full name | Type | Issues |
|---|---|---|---|
| Kuwait Convention - Hazardous Wastes Protocol | Protocol on the Control of Marine transboundary movements and disposal of hazardous wastes and other wastes, 1998 | OP | P |
| Kuwait Convention - LBS Protocol | Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution – Kuwait Convention | OP | P |
| Kuwait Convention - Oil Spills Protocol | Protocol concerning regional cooperation in combating pollution by oil and other harmful substances in cases of emergency, 1978 | OP | P |
| Lima Convention | Convention for the Protection of the Marine Environment and Coastal Areas of the South-East Pacific | CN | P |
| Lima Convention - Hydrocarbons Protocol | Lima Agreement on Regional Cooperation in Combating Pollution in the South East Pacific by Hydrocarbons and other Harmful Substances in cases of Emergency | OP | P |
| Lima Convention - LBS Protocol | Lima Protocol for the Protection of the South East Pacific Against Pollution from Land- Based Sources | OP | P |
| Lima Convention - Radioactive Pollution Protocol | Lima Protocol for the Protection of the South East Pacific from Radioactive Pollution | OP | P |
| London Convention | London Convention (1975) | OP | P |
| London Convention - Protocol | London Convention Protocol (2006) | OP | PC |
| MARPOL | International Convention for the Prevention of Pollution from Ships (MARPOL) Annexes I - VI | OP | P |
| Montreal Protocol | The Montreal Protocol on Substances that Deplete the Ozone Layer | OP | P |
| NAFO | Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries | OP | F |
| Nairobi Convention | Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the West Indian Ocean | CN | P |
| Nairobi Convention - Emergency Protocol | Protocol Concerning Co-operation in Combating Marine Pollution in Cases of Emergency in the Eastern African Region | OP | P |
| Nairobi Convention - LBS Protocol | Protocol for the Protection of the Marine and Coastal Environment of the Western Indian Ocean from Land-Based Sources and Activities | OP | P |
| NAMMCO | Agreement on Cooperation in Research, Conservation and Management of Marine Mammals in the North Atlantic | OP | FB |

| Acronym/Short name | Full name | Type | Issues |
|---|---|---|---|
| NASCO | Convention for the Conservation of Salmon in the North Atlantic Ocean | OP | F |
| NEAFC | North-East Atlantic Fisheries Commission | OP | F |
| Niue Treaty/NTSA | Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region and Multilateral NTSA Agreement on Strengthening Implementation of the Niue Treaty | OP | F |
| Noumea Convention | Convention for the Protection of the Natural Resources and Environment of the South Pacific | CN | PBC |
| Noumea Convention - Dumping Protocol | Protocol for the Prevention of Pollution of the South Pacific Region by Dumping | OP | P |
| Noumea Convention - Emergency Protocol | Protocol Concerning Co-operation in Combating Pollution Emergencies in the South Pacific Region | OP | P |
| NPAFC | Convention for the Conservation of Anadromous Stocks in The North Pacific Ocean | OP | F |
| OPRC 90 | International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 | OP | P |
| OSPAR Convention | Convention for the Protection of the Marine Environment of the North-East Atlantic | OP | BP |
| PICES | The North Pacific Marine Science Organization | OP | FPBC |
| PIF/POF/PIROP | Pacific Islands Forum/Pacific Oceanspace Framework/Pacific Islands Regional Oceans Policy | OP | FPBC |
| PNA | Nauru Agreement Concerning Cooperation in the Management of Fisheries of Common Interest | OP | F |
| Polar Bear | Agreement on the Conservation of Polar Bears | OP | B |
| PSC | Treaty Between the Government of the United States of America and the Government of Canada concerning Pacific Salmon | OP | F |
| SCAR | Scientific Committee on Antarctic Research | OP | FPBC |
| SEAFDEC | South East Asian Fisheries Development Center | OP | F |
| SEAFO | The Convention on the Conservation and Management of Fishery Resources in the South East Atlantic Ocean | OP | FB |
| SIOFA | South Indian Ocean Fisheries Agreement | OP | FB |
| SPC | Secretariat of the Pacific Community (initially South Pacific Commission) | OP | F |
| SPRFMO | Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean | OP | F |
| Stockholm Convention | Stockholm Convention on Persistent Organic Pollutants | OP | P |
| UNCLOS | United Nations Convention on the Law of the Sea | CN | FPB |
| UNCLOS – Seabed Agreement | Agreement relating to the implementation of Part XI of the United Nations Convention on the Law of the Sea. | OP | PB |

| Acronym/Short name | Full name | Type | Issues |
|---|---|---|---|
| UNFCC | United Nations Framework Convention on Climate Change | CN | C |
| UNFCC - Kyoto Protocol | Kyoto Protocol to the United Nations Framework Convention on Climate Change | OP | C |
| UNFSA | UN Fish Stocks Agreement | CN | FB |
| Vienna Convention | The Vienna Convention for the Protection of the Ozone Layer | CN | P |
| WCPFC | Convention on the Conservation and Management of High Migratory Fish Stocks in the Western and Central Pacific Ocean | OP | F |
| WECAFC | Western Central Atlantic Fisheries Commission | OP | FB |
| Wellington Convention (SP Drift Nets) | Convention for the Prohibition of Fishing with Long Drift Nets in the South Pacific | OP | F |

## Appendix 2: Acronyms for other organisations and regional agreements

| Acronym/Short name | Full name |
|---|---|
| ASCOBANS | Agreement on the Conservation of Small Cetaceans in the Baltic, North East Atlantic, Irish and North Seas |
| ACCOBAMS | Agreement on the Conservation of Cetaceans in the Black Sea Mediterranean Sea and Contiguous Atlantic Area |
| APEC-OFWG | Asia-Pacific Economic Cooperation (APEC) Oceans and Fisheries Working Group (OFWG) |
| ASEAN | Association of Southeast Asian Nations |
| ASEAN/ASWGFi | Association of Southeast Asian Nations |
| BBNJ | UN Working Group on Marine Biodiversity beyond Areas of National Jurisdiction |
| BCC | Benguela Current Commission |
| BIMSTEC | Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) Working Committee on Fisheries |
| CARICOM | Caribbean Community and Common Market |
| CARPHA | Caribbean Public Health Agency |
| CBSS | Council of the Baltic Sea States |
| CCAD | La Comisión Centroamericana de Ambiente y Desarrollo |
| COBSEA | Coordinating Body on the Seas of East Asia |
| COFI | FAO Committee on Fisheries |
| COREP | Convention Concerning the Regional Development of Fisheries in the Gulf of Guinea and the Regional Fisheries Committee for the Gulf of Guinea (COREP) |
| CPPS | Permanent Commission of the South Pacific |
| CRFM | Caribbean Regional Fisheries Mechanism |
| CRFM | Agreement establishing the Caribbean Regional Fisheries Mechanism (CRFM) |
| CROP | Council of Regional Organisations of the Pacific |
| CROP | Council of Regional Organisations of the Pacific |
| DPSIR | Drivers-pressures-state-impact-response |
| Dugong MOU | Memorandum of Understanding on the Conservation and Management of Dugongs and their Habitats throughout their Range |
| EU Maritime Policy | European Union Integrated Maritime Policy |
| EU-CFP | European Union Common Fisheries Policy |
| FA0 | Food and Agriculture Organisation of the UN |
| FCWC | Convention for the establishment of Fishery Committee of the West Central Gulf of Guinea |
| GESAMP | Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection |
| HELCOM | Baltic Marine Environment Protection Commission |
| IAEA | International Atomic Energy Agency |

| Acronym/Short name | Full name |
|---|---|
| IASC | International Arctic Science Committee |
| IMO | International maritime Organisation |
| IOSEA | The Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia |
| IPBES | Intergovernmental Panel for Biodiversity and Ecosystem Services |
| IPCC | Intergovernmental Panel on Climate Change |
| LME | Large Marine Ecosystems |
| MEA | Millennium Ecosystem Assessment |
| MEPC | IMO Marine Environmental Protection Committee |
| NOWPAP | North West Pacific Action Plan |
| NOWPAP | Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region |
| OECS | Organisation of Eastern Caribbean States |
| OLDEPESCA | Agreement instituting the Latin American Organization for Fisheries Development |
| OSPESCA | Central America Fisheries and Aquaculture Organization |
| PEMSEA | Partnerships in Environmental Management for the Seas of East Asia |
| PIF | Pacific Islands Forum |
| PRCM | Regional Marine and Coastal Conservation Programme for West Africa |
| RACMED | Regional Advisory Council for the Mediterranean |
| RECOFI | Agreement for the establishment of the Regional Commission for Fisheries |
| SAARC | South Asian Association for Regional Cooperation |
| SACEP | South Asian Cooperative Environment Programme |
| SADC | South African Development Community |
| SBSTA | UNFCC Subsidiary Body for Scientific and Technological Advice |
| SICA | Sistema de la Integración Centroamericana |
| SOPAC | Pacific Islands Applied GeoScience Commission |
| SPAW Protocol | Specially Protected Areas and Wildlife Protocol, Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region |
| SPTO | South Pacific Tourism Organisation |
| SRFC | Sub-Regional Fisheries Commission |
| UNEP | United Nations Environment Programme |
| UNESC0-I0C | Intergovernmental Oceanographic Commission of UNESCO |
| USP | University of the South Pacific |
| WH0 | World Health Organisation |
| WIOSEA | Western Indian Ocean Sustainable Ecosystem Alliance |
| WOA | World Ocean Assessment |

## Appendix 3. The distribution of principles in arrangements by issue and through time

| Principles | Overall | | | | | | | | | | | | | | | | Fisheries | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 45-50 | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 | 75-80 | 80-85 | 85-90 | 90-95 | 95-00 | 00-05 | 05-10 | 10-15 | NYIF | Total | 45-50 | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 | 75-80 | 80-85 | 85-90 | 90-95 | 95-00 | 00-05 | 05-10 | 10-15 | NYIF | Total |
| Conservation | 1 | | | | 1 | | 6 | 5 | 2 | 12 | 5 | 6 | 2 | 2 | | 42 | 1 | | | | 1 | | 1 | 3 | 1 | 3 | 3 | 4 | | 1 | | 18 |
| Cooperation | | | 1 | | 1 | 1 | 5 | 1 | 5 | 7 | 5 | 1 | 1 | 3 | | 31 | | | | | 1 | | 1 | 1 | 1 | | | 1 | | | | 5 |
| Sustainability | 2 | 1 | | | 1 | | 1 | 2 | 4 | 4 | 10 | 1 | 2 | 3 | | 31 | 2 | 1 | | | 1 | | | 1 | 1 | 2 | 3 | | | 1 | | 12 |
| Precaution | 1 | | | | | 1 | | 3 | 2 | 1 | 4 | 5 | 4 | 4 | 1 | 26 | 1 | | | | | | | 2 | | 1 | | 2 | | 1 | | 7 |
| Ecosystem approach | | 1 | | | | 1 | | 2 | | 1 | 5 | 1 | | 3 | | 14 | | 1 | | | | | | 1 | | | | | | 1 | | 3 |
| Equity | | | | | | | 1 | | 2 | 2 | 3 | 1 | | | | 9 | | | | | | | | | 1 | | | | | | | 1 |
| Participation | | | | | | | | | 1 | 4 | | | | | | 5 | | | | | | | | | | | | | | | | 0 |
| Prevention of pollution | 1 | | | | | | 1 | 1 | | | 1 | | 1 | | | 5 | 1 | | | | | | | | | | 1 | | | | | 2 |
| Best available scientific evidence | | | | | | | | 1 | | 1 | | 2 | | 1 | | 5 | | | | | | | | | | | | | | 1 | | 1 |
| Coordination | | | | | | | 2 | | | 2 | | | | | | 4 | | | | | | | | | | | | | | | | 0 |
| Polluter pays | | | | | | | | | | | 1 | 1 | 1 | 1 | | 4 | | | | | | | | | | | | | | | | 0 |
| Transparency | | | 1 | | | | | | | | | | | 2 | | 3 | | | | | | | | | | | | | | 1 | | 1 |
| Effective MCS/ Effective Management | | | | | | | | | | 1 | | 1 | | 1 | | 3 | | | | | | | | | | 1 | | 1 | | | | 2 |
| Adaptiveness | | | | | | | | | | 1 | | | 1 | | | 2 | | | | | | | | | | | | | | | | 0 |
| Ecosystem-based management | | | | | | | 1 | | 1 | | | | | | | 2 | | | | | | | 1 | | | | | | | | | 1 |
| Integration | | | | | | | | | | 1 | 1 | | | | | 2 | | | | | | | | | | | | | | | | 0 |
| Optimum utilisation | | | | | | | 1 | | | | | 1 | | | | 2 | | | | | | | 1 | | | | | 1 | | | | 2 |
| Responsibility | | | | | | | | | | | 1 | 1 | | | | 2 | | | | | | | | | | | | | | | | |
| Best practice | | | | | | | | | | | 1 | 1 | | | | 2 | | | | | | | | | | | | | | | | |
| Poverty alleviation | | | | | | | | | 1 | | | | | | | 1 | | | | | | | | | | | | | | | | |
| Attention to small-scale fisheries | | | | | | 1 | | | | | | | | | | 1 | | | | | | | | | | | | | | | | |
| Environmental Impact Assessment | | | | | | | | | | | 1 | | | | | 1 | | | | | | | | | | | | | | | | |
| Principle of commercialisation | | | | | | | | | | | 1 | | | | | 1 | | | | | | | | | | | | | | | | |
| Multi-scale | | | | | | | | | | | 1 | | | | | 1 | | | | | | | | | | | | | | | | |
| Good governance | | | | | | | | | 1 | | | | | | | 1 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Principles | Pollution | | | | | | | | | | | | | | | | Biodiversity | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 45-50 | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 | 75-80 | 80-85 | 85-90 | 90-95 | 95-00 | 00-05 | 05-10 | 10-15 | NYIF | Total | 45-50 | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 | 75-80 | 80-85 | 85-90 | 90-95 | 95-00 | 00-05 | 05-10 | 10-15 | NYIF | Total |
| Conservation | | | | | | | 2 | 1 | 1 | 6 | 1 | | | | | 11 | | | | | | | 2 | | | | | 1 | | | | 3 |
| Cooperation | | | | | | | 2 | | 4 | 4 | 5 | | | 2 | | 17 | | | | | | | 1 | | | | | | | | | 1 |
| Sustainability | | | | | | | | 1 | 3 | | 3 | | 2 | 1 | | 10 | | | | | | | | | | | 1 | | | | | 1 |
| Precaution | | | | | | | | | 2 | | 2 | | 3 | 2 | 1 | 10 | | | | | | | | | | | 1 | 1 | | | | 2 |
| Ecosystem approach | | | | | | | | | | | 3 | | | 1 | | 4 | | | | | | | | | | | 1 | | | | | 1 |
| Equity | | | | | | | | | 1 | | 1 | | | | | 2 | | | | | | | 1 | | | 1 | | | | | | 2 |
| Participation | | | | | | | | | 1 | 4 | | | | | | 5 | | | | | | | | | | | | | | | | 0 |
| Prevention of pollution | | | | | | | 1 | 1 | | | | | | | | 2 | | | | | | | | | | | | | | | | 0 |
| Best available scientific evidence | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | 1 | | | | 1 |
| Coordination | | | | | | | 2 | | | 2 | | | | | | 4 | | | | | | | | | | | | | | | | 0 |
| Polluter pays | | | | | | | | | | | | | | 1 | | 1 | | | | | | | | | | | | | | | | 0 |
| Transparency | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| Effective MCS/ Effective Management | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| Adaptiveness | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| Ecosystem-based management | | | | | | | | | 1 | | | | | | | 1 | | | | | | | | | | | | | | | | 0 |
| Integration | | | | | | | | | | | 1 | | | | | 1 | | | | | | | | | | | | | | | | 0 |
| Optimum utilisation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| Responsibility | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | 1 |
| Best practice | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| Poverty alleviation | | | | | | | | | 1 | | | | | | | 1 | | | | | | | | | | | | | | | | 0 |
| Attention to small-scale fisheries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| Environmental Impact Assessment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| Principles of commercialisation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| Multi-scale | | | | | | | | | | | 1 | | | | | 1 | | | | | | | | | | | | | | | | 0 |
| Good governance | | | | | | | | | 1 | | | | | | | 1 | | | | | | | | | | | | | | | | 0 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Principles | Climate change | Mixed |
|---|---|---|

| | 45-50 | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 | 75-80 | 80-85 | 85-90 | 90-95 | 95-00 | 00-05 | 05-10 | 10-15 | NYIF | Total | 45-50 | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 | 75-80 | 80-85 | 85-90 | 90-95 | 95-00 | 00-05 | 05-10 | 10-15 | NYIF | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conservation | | | | | | | | | | 1 | | | 1 | | | 2 | | | | | | | 1 | 1 | | 2 | 1 | 1 | 1 | 1 | | 8 |
| Cooperation | | | | | | | | | | 1 | | | 1 | | | 2 | | | 1 | | | 1 | 1 | | | 2 | | | | 1 | | 6 |
| Sustainability | | | | | | | | | | | | | | | | 0 | | | | | | | 1 | | | 2 | 3 | 1 | | 1 | | 8 |
| Precaution | | | | | | | | | | | | | | | | 0 | | | | | | 1 | | 1 | | | 1 | 2 | 1 | 1 | | 7 |
| Ecosystem approach | | | | | | | | | | | | | | | | 0 | | | | | | 1 | | 1 | | 1 | 1 | 1 | | 1 | | 6 |
| Equity | | | | | | | | | | | | | | | | 0 | | | | | | | | | | 1 | 2 | 1 | | | | 4 |
| Participation | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | | | | 0 |
| Prevention of pollution | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | 1 | | | 1 |
| Best available scientific evidence | | | | | | | | | | | | | | | | 0 | | | | | | | | 1 | | 1 | | 1 | | | | 3 |
| Coordination | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | | | | 0 |
| Polluter pays | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | 1 | 1 | 1 | | | 3 |
| Transparency | | | | | | | | | | | | | | | | 0 | | | 1 | | | | | | | | | | | 1 | | 2 |
| Effective MCS/ Effective Management | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | | 1 | | 1 |
| Adaptiveness | | | | | | | | | | 1 | | | 1 | | | 2 | | | | | | | | | | | | | | | | 0 |
| Ecosystem-based management | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | | | | 0 |
| Integration | | | | | | | | | | | | | | | | 0 | | | | | | | | | | 1 | | | | | | 1 |
| Optimum utilisation | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | | | | 0 |
| Responsibility | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | 1 | | | | 1 |
| Best practice | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | 1 | 1 | | | | 2 |
| Poverty alleviation | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | | | | 0 |
| Attention to small-scale fisheries | | | | | | | | | | | | | | | | 0 | | | | | | 1 | | | | | | | | | | 1 |
| Environmental Impact Assessment | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | 1 | | | | | 1 |
| Principles of commercialisation | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | 1 | | | | | 1 |
| Multi-scale | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | | | | 0 |
| Good governance | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | | | | 0 |

**IOC Technical Series**

| No. | Title | Languages |
|---|---|---|
| 1 | Manual on International Oceanographic Data Exchange. 1965 | (out of stock) |
| 2 | Intergovernmental Oceanographic Commission (Five years of work). 1966 | (out of stock) |
| 3 | Radio Communication Requirements of Oceanography. 1967 | (out of stock) |
| 4 | Manual on International Oceanographic Data Exchange - Second revised edition. 1967 | (out of stock) |
| 5 | Legal Problems Associated with Ocean Data Acquisition Systems (ODAS). 1969 | (out of stock) |
| 6 | Perspectives in Oceanography, 1968 | (out of stock) |
| 7 | Comprehensive Outline of the Scope of the Long-term and Expanded Programme of Oceanic Exploration and Research. 1970 | (out of stock) |
| 8 | IGOSS (Integrated Global Ocean Station System) - General Plan Implementation Programme for Phase I. 1971 | (out of stock) |
| 9 | Manual on International Oceanographic Data Exchange - Third Revised Edition. 1973 | (out of stock) |
| 10 | Bruun Memorial Lectures, 1971 | E, F, S, R |
| 11 | Bruun Memorial Lectures, 1973 | (out of stock) |
| 12 | Oceanographic Products and Methods of Analysis and Prediction. 1977 | E only |
| 13 | International Decade of Ocean Exploration (IDOE), 1971-1980. 1974 | (out of stock) |
| 14 | A Comprehensive Plan for the Global Investigation of Pollution in the Marine Environment and Baseline Study Guidelines. 1976 | E, F, S, R |
| 15 | Bruun Memorial Lectures, 1975 - Co-operative Study of the Kuroshio and Adjacent Regions. 1976 | (out of stock) |
| 16 | Integrated Ocean Global Station System (IGOSS) General Plan and Implementation Programme 1977-1982. 1977 | E, F, S, R |
| 17 | Oceanographic Components of the Global Atmospheric Research Programme (GARP) . 1977 | (out of stock) |
| 18 | Global Ocean Pollution: An Overview. 1977 | (out of stock) |
| 19 | Bruun Memorial Lectures - The Importance and Application of Satellite and Remotely Sensed Data to Oceanography. 1977 | (out of stock) |
| 20 | A Focus for Ocean Research: The Intergovernmental Oceanographic Commission - History, Functions, Achievements. 1979 | (out of stock) |
| 21 | Bruun Memorial Lectures, 1979: Marine Environment and Ocean Resources. 1986 | E, F, S, R |
| 22 | Scientific Report of the Interealibration Exercise of the IOC-WMO-UNEP Pilot Project on Monitoring Background Levels of Selected Pollutants in Open Ocean Waters. 1982 | (out of stock) |
| 23 | Operational Sea-Level Stations. 1983 | E, F, S, R |
| 24 | Time-Series of Ocean Measurements. Vol.1. 1983 | E, F, S, R |
| 25 | A Framework for the Implementation of the Comprehensive Plan for the Global Investigation of Pollution in the Marine Environment. 1984 | (out of stock) |
| 26 | The Determination of Polychlorinated Biphenyls in Open-ocean Waters. 1984 | E only |
| 27 | Ocean Observing System Development Programme. 1984 | E, F, S, R |
| 28 | Bruun Memorial Lectures, 1982: Ocean Science for the Year 2000. 1984 | E, F, S, R |
| 29 | Catalogue of Tide Gauges in the Pacific. 1985 | E only |
| 30 | Time-Series of Ocean Measurements. Vol. 2. 1984 | E only |
| 31 | Time-Series of Ocean Measurements. Vol. 3. 1986 | E only |
| 32 | Summary of Radiometric Ages from the Pacific. 1987 | E only |
| 33 | Time-Series of Ocean Measurements. Vol. 4. 1988 | E only |
| 34 | Bruun Memorial Lectures, 1987: Recent Advances in Selected Areas of Ocean Sciences in the Regions of the Caribbean, Indian Ocean and the Western Pacific. 1988 | Composite E, F, S |
| 35 | Global Sea-Level Observing System (GLOSS) Implementation Plan. 1990 | E only |

*(continued)*

| | | |
|---|---|---|
| 36 | Bruun Memorial Lectures 1989: Impact of New Technology on Marine Scientific Research. 1991 | Composite E, F, S |
| 37 | Tsunami Glossary - A Glossary of Terms and Acronyms Used in the Tsunami Literature. 1991 | E only |
| 38 | The Oceans and Climate: A Guide to Present Needs. 1991 | E only |
| 39 | Bruun Memorial Lectures, 1991: Modelling and Prediction in Marine Science. 1992 | E only |
| 40 | Oceanic Interdecadal Climate Variability. 1992 | E only |
| 41 | Marine Debris: Solid Waste Management Action for the Wider Caribbean. 1994 | E only |
| 42 | Calculation of New Depth Equations for Expendable Bathymerographs Using a Temperature-Error-Free Method (Application to Sippican/TSK T-7, T-6 and T-4 XBTS. 1994 | E only |
| 43 | IGOSS Plan and Implementation Programme 1996-2003. 1996 | E, F, S, R |
| 44 | Design and Implementation of some Harmful Algal Monitoring Systems. 1996 | E only |
| 45 | Use of Standards and Reference Materials in the Measurement of Chlorinated Hydrocarbon Residues. 1996 | E only |
| 46 | Equatorial Segment of the Mid-Atlantic Ridge. 1996 | E only |
| 47 | Peace in the Oceans: Ocean Governance and the Agenda for Peace; the Proceedings of *Pacem in Maribus* XXIII, Costa Rica, 1995. 1997 | E only |
| 48 | Neotectonics and fluid flow through seafloor sediments in the Eastern Mediterranean and Black Seas - Parts I and II. 1997 | E only |
| 49 | Global Temperature Salinity Profile Programme: Overview and Future. 1998 | E only |
| 50 | Global Sea-Level Observing System (GLOSS) Implementation Plan-1997. 1997 | E only |
| 51 | L'état actuel de 1'exploitation des pêcheries maritimes au Cameroun et leur gestion intégrée dans la sous-région du Golfe de Guinée *(cancelled)* | F only |
| 52 | Cold water carbonate mounds and sediment transport on the Northeast Atlantic Margin. 1998 | E only |
| 53 | The Baltic Floating University: Training Through Research in the Baltic, Barents and White Seas - 1997. 1998 | E only |
| 54 | Geological Processes on the Northeast Atlantic Margin (8$^{th}$ training-through-research cruise, June-August 1998). 1999 | E only |
| 55 | Bruun Memorial Lectures, 1999: Ocean Predictability. 2000 | E only |
| 56 | Multidisciplinary Study of Geological Processes on the North East Atlantic and Western Mediterranean Margins (9$^{th}$ training-through-research cruise, June-July 1999). 2000 | E only |
| 57 | Ad hoc Benthic Indicator Group - Results of Initial Planning Meeting, Paris, France, 6-9 December 1999. 2000 | E only |
| 58 | Bruun Memorial Lectures, 2001: Operational Oceanography – a perspective from the private sector. 2001 | E only |
| 59 | Monitoring and Management Strategies for Harmful Algal Blooms in Coastal Waters. 2001 | E only |
| 60 | Interdisciplinary Approaches to Geoscience on the North East Atlantic Margin and Mid-Atlantic Ridge (10$^{th}$ training-through-research cruise, July-August 2000). 2001 | E only |
| 61 | Forecasting Ocean Science? Pros and Cons, Potsdam Lecture, 1999. 2002 | E only |
| 62 | Geological Processes in the Mediterranean and Black Seas and North East Atlantic (11$^{th}$ training-through-research cruise, July- September 2001). 2002 | E only |
| 63 | Improved Global Bathymetry – Final Report of SCOR Working Group 107. 2002 | E only |
| 64 | R. Revelle Memorial Lecture, 2006: Global Sea Levels, Past, Present and Future. 2007 | E only |
| 65 | Bruun Memorial Lectures, 2003: Gas Hydrates – a potential source of energy from the oceans. 2003 | E only |
| 66 | Bruun Memorial Lectures, 2003: Energy from the Sea: the potential and realities of Ocean Thermal Energy Conversion (OTEC). 2003 | E only |

| | | |
|---|---|---|
| 67 | Interdisciplinary Geoscience Research on the North East Atlantic Margin, Mediterranean Sea and Mid-Atlantic Ridge (12th training-through-research cruise, June-August 2002). 2003 | E only |
| 68 | Interdisciplinary Studies of North Atlantic and Labrador Sea Margin Architecture and Sedimentary Processes (13th training-through-research cruise, July-September 2003). 2004 | E only |
| 69 | Biodiversity and Distribution of the Megafauna / Biodiversité et distribution de la mégafaune. 2006<br>Vol.1 The polymetallic nodule ecosystem of the Eastern Equatorial Pacific Ocean / Ecosystème de nodules polymétalliques de l'océan Pacifique Est équatorial<br>Vol.2 Annotated photographic Atlas of the echinoderms of the Clarion-Clipperton fracture zone / Atlas photographique annoté des échinodermes de la zone de fractures de Clarion et de Clipperton<br>Vol.3 Options for the management and conservation of the biodiversity — The nodule ecosystem in the Clarion Clipperton fracture zone: scientific, legal and institutional aspects | E F |
| 70 | Interdisciplinary geoscience studies of the Gulf of Cadiz and Western Mediterranean Basin (14th training-through-research cruise, July-September 2004). 2006 | E only |
| 71 | Indian Ocean Tsunami Warning and Mitigation System, IOTWS. Implementation Plan, 7–9 April 2009 (2nd Revision). 2009 | E only |
| 72 | Deep-water Cold Seeps, Sedimentary Environments and Ecosystems of the Black and Tyrrhenian Seas and the Gulf of Cadiz (15th training-through-research cruise, June–August 2005). 2007 | E only |
| 73 | Implementation Plan for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS), 2007–2011. 2007 *(electronic only)* | E only |
| 74 | Bruun Memorial Lectures, 2005: The Ecology and Oceanography of Harmful Algal Blooms – Multidisciplinary approaches to research and management. 2007 | E only |
| 75 | National Ocean Policy. The Basic Texts from: Australia, Brazil, Canada, China, Colombia, Japan, Norway, Portugal, Russian Federation, United States of America. (Also Law of Sea Dossier 1). 2008 | E only |
| 76 | Deep-water Depositional Systems and Cold Seeps of the Western Mediterranean, Gulf of Cadiz and Norwegian Continental margins (16th training-through-research cruise, May–July 2006). 2008 | E only |
| 77 | Indian Ocean Tsunami Warning and Mitigation System (IOTWS) – 12 September 2007 Indian Ocean Tsunami Event. Post-Event Assessment of IOTWS Performance. 2008 | E only |
| 78 | Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE EWS) – Implementation Plan 2013–2017 (Version 2.0). 2013 | E only |
| 79 | Filling Gaps in Large Marine Ecosystem Nitrogen Loadings Forecast for 64 LMEs – GEF/LME global project Promoting Ecosystem-based Approaches to Fisheries Conservation and Large Marine Ecosystems. 2008 | E only |
| 80 | Models of the World's Large Marine Ecosystems. GEF/LME Global Project Promoting Ecosystem-based Approaches to Fisheries Conservation and Large Marine Ecosystems. 2008 | E only |
| 81 | Indian Ocean Tsunami Warning and Mitigation System (IOTWS) – Implementation Plan for Regional Tsunami Watch Providers (RTWP). 2008 | E only |
| 82 | Exercise Pacific Wave 08 – A Pacific-wide Tsunami Warning and Communication Exercise, 28–30 October 2008. 2008 | E only |
| *83.* | *Cancelled* | |
| 84. | Global Open Oceans and Deep Seabed (GOODS) Bio-geographic Classification. 2009 | E only |
| 85. | Tsunami Glossary | E, F, S |
| 86 | Pacific Tsunami Warning System (PTWS) Implementation Plan | *Electronic publication* |

*(continued)*

| | | |
|---|---|---|
| 87. | Operational Users Guide for the Pacific Tsunami Warning and Mitigation System (PTWS) – Second Edition. 2011 | E only |
| 88. | Exercise Indian Ocean Wave 2009 (IOWave09) – An Indian Ocean-wide Tsunami Warning and Communication Exercise – 14 October 2009. 2009 | E only |
| 89. | Ship-based Repeat Hydrography: A Strategy for a Sustained Global Programme. 2009 | E only |
| 90. | 12 January 2010 Haiti Earthquake and Tsunami Event Post-Event Assessment of CARIBE EWS Performance. 2010 | E only |
| 91. | Compendium of Definitions and Terminology on Hazards, Disasters, Vulnerability and Risks in a coastal context | *Under preparation* |
| 92. | 27 February 2010 Chile Earthquake and Tsunami Event – Post-Event Assessment of PTWS Performance (Pacific Tsunami Warning System). 2010 | E only |
| 93. | Exercise CARIBE WAVE 11 / LANTEX 11—A Caribbean Tsunami Warning Exercise, 23 March 2011 | |
| | Vol. 1 Participant Handbook / Exercise CARIBE WAVE 11 —Exercice d'alerte au tsunami dans les Caraïbes, 23 mars 2011. Manuel du participant / Ejercicio Caribe Wave 11. Un ejercicio de alerta de tsunami en el Caribe, 23 de marzo de 2011. Manual del participante. 2010 | E/F/S |
| | Vol. 2 Report. 2011 | E only |
| | Vol. 3 Supplement: Media Reports. 2011 | E/F/S |
| 94. | Cold seeps, coral mounds and deep-water depositional systems of the Alboran Sea, Gulf of Cadiz and Norwegian continental margin (17th training-through-research cruise, June–July 2008) | E only |
| 95. | International Post-Tsunami Survey for the 25 October 2010 Mentawai, Indonesia Tsunami | E only |
| 96. | Pacific Tsunami Warning System (PTWS) 11 March 2011 Off Pacific coast of Tohoku, Japan, Earthquake and Tsunami Event. Post-Event Assessment of PTWS Performance | E only |
| 97. | Exercise PACIFIC WAVE 11: A Pacific-wide Tsunami Warning and Communication Exercise, 9–10 November 2011 | |
| | Vol. 1 Exercise Manual. 2011 | E only |
| | Vol. 2 Report. 2013 | E only |
| 98. | Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and connected seas. First Enlarged Communication Test Exercise (ECTE1). Exercise Manual and Evaluation Report. 2011 | E only |
| 99. | Exercise INDIAN OCEAN WAVE 2011 – An Indian Ocean-wide Tsunami Warning and Communication Exercise, 12 October 2011 | E only |
| | Vol. 1 Exercise Manual. 2011<br>Supplement: Bulletins from the Regional Tsunami Service Providers | |
| | Vol. 2 Exercise Report. 2013 | |
| 100. | Global Sea Level Observing System (GLOSS) Implementation Plan – 2012. 2012 | E only |
| 101. | Exercise Caribe Wave/Lantex 13. A Caribbean Tsunami Warning Exercise, 20 March 2013. Volume 1: Participant Handbook. 2012 | E only |
| 102. | Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas — Second Enlarged Communication Test Exercise (CTE2), 22 May 2012. | E only |
| | Vol. 1 Exercise Manual. 2012 | |
| | Vol. 2 Evaluation Report. 2014 | |
| 103. | Exercise NEAMWAVE 12. A Tsunami Warning and Communication Exercise for the North-eastern Atlantic, the Mediterranean, and Connected Seas Region, 27–28 November 2012. | E only |
| | Vol. 1: Exercise Manual. 2012 | |
| | Vol. 2: Evaluation Report. 2013 | |
| 104. | Seísmo y tsunami del 27 de agosto de 2012 en la costa del Pacífico frente a El Salvador, y seísmo del 5 de septiembre de 2012 en la costa del Pacífico frente a Costa Rica. Evaluación subsiguiente sobre el funcionamiento del Sistema de Alerta contra los Tsunamis y Atenuación de sus Efectos en el Pacífico. 2012 | Español solamente (resumen en inglés y francés) |
| 105. | Users Guide for the Pacific Tsunami Warning Center Enhanced Products for the Pacific Tsunami Warning System, August 2014. Revised Edition. 2014 | E, S |

| | | |
|---|---|---|
| 106. | Exercise Pacific Wave 13. A Pacific-wide Tsunami Warning and Enhanced Products Exercise, 1–14 May 2013.<br>Vol. 1 Exercise Manual. 2013<br>Vol. 2 Summary Report. 2013 | E only |
| 107. | Tsunami Public Awareness and Educations Strategy for the Caribbean and Adjacent Regions. 2013 | E only |
| 108. | Pacific Tsunami Warning and Mitigation System (PTWS) Medium-Term Strategy, 2014−2021. 2013 | E only |
| 109. | Exercise Caribe Wave/Lantex 14. A Caribbean and Northwestern Atlantic Tsunami Warning Exercise, 26 March 2014.<br>Vol. 1 Participant Handbook. 2014 | E/S |
| 110. | Directory of atmospheric, hydrographic and biological datasets for the Canary Current Large Marine Ecosystem. 2014 | E only |
| 111. | Integrated Regional Assessments in support of ICZM in the Mediterranean and Black Sea Basins. 2014 | E only |
| 112. | 11 April 2012 West of North Sumatra Earthquake and Tsunami Event - Post-event Assessment of IOTWS Performance | E only |
| 113. | Exercise Indian Ocean Wave 2014: An Indian Ocean-wide Tsunami Warning and Communication Exercise. | E only |
| 114. | Exercise NEAMWAVE 14. A Tsunami Warning and Communication Exercise for the North-Eastern Atlantic, the Mediterranean, and Connected Seas Region, 28–30 October 2014<br>Vol. 1 Manual<br>Vol. 2 Evaluation Report – Supplement: Evaluation by Message Providers and Civil Protection Authorities | E only |
| 115. | Oceanographic and Biological Features in the Canary Current Large Marine Ecosystem. 2015 | E only |
| 116. | Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas. Third Enlarged Communication Test Exercise (CTE3), 1st October 2013.<br>Vol. 1 Exercise Manual<br>Vol. 2 Evaluation Report | E only |
| 117. | Exercise Pacific Wave 15. A Pacific-wide Tsunami Warning and Enhanced Products Exercise, 2–6 February 2015<br>Vol. 1: Exercise Manual; Vol. 2: Summary Report | E only |
| 118. | Exercise Caribe Wave/Lantex 15. A Caribbean and Northwestern Atlantic Tsunami Warning Exercise, 25 March 2015 (SW Caribbean Scenario)<br>Vol. 1: Participant Handbook | E only |
| 119. | Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean<br>Vol 1: Transboundary Large Marine Ecosystems<br>Vol 2: Areas Beyond National Jurisdiction | E only |
| 120. | Status and Trends in Primary Productivity and Chlorophyll from 1996 to 2014 in Large Marine Ecosystems and the Western Pacific Warm Pool, Based on Data from Satellite Ocean Colour Sensors | *In preparation* |