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Strengthening global governance of Large Marine Ecosystems by incorporating coastal management and Marine Protected Areas

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ABSTRACT

After 20 years of programming GEF International Waters (IW) LME projects, it is time to assemble experiences and promote learning and capacity building among the projects in the LME portfolio. This review is focused on strengthening the multi-scale approach to LME governance by reviewing existing approaches and advocating the incorporation of Integrated Coastal Management (ICM) and Marine Protected Areas (MPAs) at local scales into all GEF-funded LME projects.

1. Introduction

In its 1995 GEF Operational Strategy, the Council of the Global Environment Facility (GEF), an international financial institution supporting developing countries engaged in improving degraded environments, approved the use of Large Marine Ecosystems (LMEs) as a unit for ecosystem-based approaches to management of the coastal oceans in the International Waters (IW) focal area. The 66 LMEs that make up the coastal oceans of our planet are the most highly productive areas of the oceans, the most threatened, and are critical for the global economy. While they are estimated to provide direct services approaching $US 3 trillion annually with a non-market value estimated at $$US 22 trillion each year (Hudson and Glemarec, 2012), LMEs continue to become further depleted and degraded.

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After 20 years of programming GEF International Waters (IW) LME projects, it was time to assemble experiences and promote learning and capacity building among the projects in the LME portfolio. This review is focused on strengthening the multi-scale approach to LME governance. It does so by reviewing existing approaches and advocating the incorporation of Integrated Coastal Management (ICM) and Marine Protected Areas (MPAs) at local scales into all GEF-funded LME projects.

Development of the Global Governance (GG) practice in LMEs was encouraged by the GEF Secretariat for several reasons. The GEF IW portfolio has matured over 20 years of programming LME projects. In fact, as of December 15, 2013, the GEF Council had approved initial, strategic LME IW projects covering 22 LMEs globally involving 112 countries. Good practices from these strategic projects that produced initial strategic action programs need to be shared and their use scaled up for greater governance impact in the portfolio (Carlisle, 2014). A second consideration is that separate Integrated Coastal Management (ICM) and Marine Protected Areas (MPA) projects have been requested by countries and subsequently were approved. They address concerns at a different scale than the LMEs. Therefore,use of these tools is essential to incorporate into LME work and need to be included under the larger LME umbrella to address transboundary concerns at the local level. Third, coastal and marine systems continue to be degraded and depleted globally, in rich countries as well as GEF recipient countries despite 40 years since the original regional seas programs were established and 30 years since the U.N. Convention on the Law of the Seas (UNCLOS) was adopted. If these ecologically, economically, and socially important LMEs are to be sustained, transformative changes in how coasts and oceans are managed need to be implemented before it is too late.

This paper represents an historical perspective and review of the role of the GEF in fostering ecosystem-based approaches to management of LMEs. It begins with a background section on the GEF IW Operational Strategy as it relates to LMEs and the issue of global governance for LMEs and their coasts. Several GEF IW projects related to ICM and MPAs are part of the review as are several non-GEF projects. A discussion of different types of global governance structures for LMEs is included. The review concludes with a section on recommendations for LME project outcomes that pertains mostly to in-house GEF agency practices and GEF policies. An earlier version of this paper contributed to the preparation of the GEF project entitled: “Strengthening Global Governance of Large Marine Ecosystems and their Coasts through Enhanced Sharing and Application of Large Marine Ecosystems/Integrated Coastal Management/Marine Protected Areas Knowledge and Information Tools”.

2. Background on GEF IW strategy and LMEs

This section includes an introduction to the GEF IW Strategy pertaining to LMEs, the key processes recommended for use by GEF to begin addressing transboundary concerns of LMEs and their coasts, and an explanation of the 5-module Assessment and Management approach. When the GEF Council approved the GEF Operational Strategy in 1995, it recognized the sensitive international political dimensions of assisting states in collective management of transboundary water systems in its IW focal area. The Council noted that global environmental benefits would accrue if countries worked together on priority concerns of these transboundary systems, which are actually the dominant waters on Earth. The GEF Council included the concept of LMEs in its 1995 Operational Strategy (GEF, 1995) as a vehicle to foster ecosystem-based, multi-country management of coastal and marine resources in the IW focal area. Eighty percent of the global marine fisheries catch comes from the 66 LMEs that parallel the continental coasts and represent multi-country, ecosystem-based management units. The recent GEF 6 Replenishment continues to utilize LMEs as the key organizing approach to address transboundary coastal and marine concerns and opportunities.

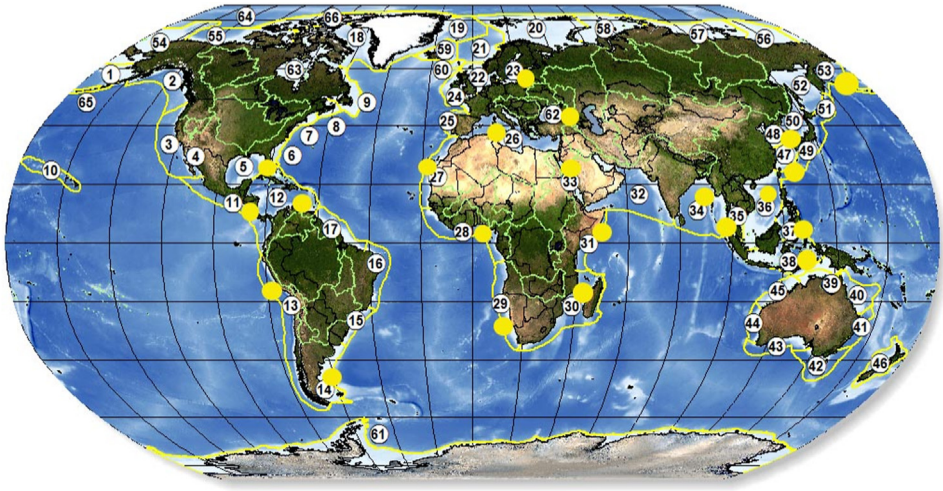
This geographic LME approach, including coasts and adjacent river basins, represents a pragmatic way to operationalize the “ecosystem based management (EBM) approach” with an area sufficiently large to include GEF transboundary considerations, especially living resources. LMEs are place-based, ecologically defined areas for which stakeholder support for integrating essential national and multi-country reforms and international agency programs can be mobilized into a cost-effective, collective

response to an array of conventions and programs. Their spatial domains are based on four linked ecological criteria: bathymetry, hydrography, productivity, and trophic relationships (Sherman, 1994, 2005; Sherman et al., 2005).

As of December 2014, 112 different GEF recipient countries and 21 non-recipient countries have collaborated on initial strategic GEF projects for 22 LMEs in order to catalyze joint commitments to action and finance. The locations of LMEs with GEF support since 1994 are depicted in Fig. 1. The LME approach involves a paradigm shift from single species or single-sector management to ecosystem-based management of the entire coastal and marine ecosystem and linked river basins as an integrated whole. As such, emphasis shifts from: (i) individual species to ecosystems; (ii) small spatial scale to multiple scales; (iii) short-term perspective to long-term perspective; (iv) humans as independent of ecosystems to humans an integral part of ecosystems; (v) management divorced from research to adaptive management driven by best-available science; and (vi) managing commodities to sustaining production potential for goods and services (Duda and Sherman, 2002);(Sherman et al., 2005).

The connectivity of LMEs to terrestrial landscapes, which often extend far inland, is also instrumental to this ecosystem-based approach and has been encouraged by GEF through programming of projects for river basins and downstream LMEs.

In order to have an impact on these complex LME and linked coastal issues, GEF interventions have been made at six site-specific, spatially varying management scales: (1) global, (2) regional groupings of LMEs, (3) LMEs, (4) geographic sub-sets of an LME, (5) national sector, and (6) local cities, communities and site-specific ecosystems. By using a multi-scaled approach and progressive funding tied to progressive commitments to joint action through GEF supported processes, the achievement of a succession of milestones underpins GEF's IW Strategy. The goal is to catalyze joint commitments to



1. East Bering Sea
2. Gulf of Alaska
3. California Current
4. Gulf of California
5. Gulf of Mexico
6. Southeast U.S. Continental Shelf
7. Northeast U.S. Continental Shelf
8. Scotian Shelf
9. Newfoundland-Labrador Shelf
10. Insular Pacific-Hawaiian
11. Pacific Central-American
12. Caribbean Sea
13. Humboldt Current
14. Patagonian Shelf
15. South Brazil Shelf
16. East Brazil Shelf
17. North Brazil Shelf
18. Canadian Eastern Arctic - West Greenland
19. Greenland Sea
20. Barents Sea
21. Norwegian Sea
22. North Sea
23. Baltic Sea
24. Celtic-Biscay Shelf
25. Iberian Coastal
26. Mediterranean
27. Canary Current
28. Guinea Current
29. Benguela Current
30. Agulhas Current
31. Somali Coastal Current
32. Arabian Sea
33. Red Sea
34. Bay of Bengal
35. Gulf of Thailand
36. South China Sea
37. Sulu-Celebes Sea
38. Indonesian Sea
39. North Australian Shelf
40. Northeast Australian Shelf
41. East-Central Australian Shelf
42. Southeast Australian Shelf
43. Southwest Australian Shelf
44. West-Central Australian Shelf
45. Northwest Australian Shelf
46. New Zealand Shelf
47. East China Sea
48. Yellow Sea
49. Kuroshio Current
50. Sea of Japan/East Sea
51. Oyashio Current
52. Sea of Okhotsk
53. West Bering Sea
54. Northern Bering-Chukchi Seas
55. Beaufort Sea
56. East Siberian Sea
57. Laptev Sea
58. Kara Sea
59. Iceland Shelf and Sea
60. Faroe Plateau
61. Antarctic
62. Black Sea
63. Hudson Bay Complex
64. Central Arctic Ocean
65. Aleutian Islands
66. Canadian High Arctic-North Greenland

Fig. 1. Since 1994, projects in 22 LMEs, denoted by yellow dots, have received GEF, World Bank and donor country financing for supporting ecosystem-based management (EBM) of LME goods and services. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Table 1
Example of GEF IW projects at different scales for Vietnam in South China Sea LME.

1	GEF/UNDP GLOBALLAST Global Ship Ballast Water Project
2	GEF/UNDP PEMSEA regional project for ICM in 7 LMEs
3	GEF/UNEP South China Sea and Gulf of Thailand LMEs project
4	GEF/World Bank Mekong river Basin water utilization project
5	GEF/World Bank Vietnam coastal cities environment and sanitation project
6	GEF/UNEP/Vietnam sustainable management of corals in Ninh Hai district

regional institutional reforms as well as national/local reforms and investments in each collaborating state. This can help to achieve development assistance coherence with coordinated programs working together to address priorities states have outlined. In this way transboundary concerns/opportunities can be addressed with root causes of degradation from the watershed to the river deltas, coasts, and ultimately downstream into marine ecosystems. Table 1 illustrates an example using the country of Vietnam to show how GEF IW interventions at multiple scales can be supported in the same coastal ocean by GEF to help sustain LMEs and their coasts.

2.1. Key GEF processes at the LME scale—TDA and SAP

There are many barriers to states working together on their shared coastal and marine ecosystems. Disputes over borders, oil/gas, exclusive economic zones, fisheries, continental shelves, and maritime transport often cloud discussions. In order to overcome disputes, potential jealousies, uncertainties, and assumptions about the intentions of neighboring states, GEF developed a series of processes to help countries learn to work together and build trust. The original GEF Operational Strategy (GEF, 1995) includes formulation of a Transboundary Diagnostic Analysis (TDA) and a Strategic Action Program (SAP) to help countries begin to work together on their shared transboundary concerns starting at the multi-country LME scale. At that time in the evolution of GEF, enabling activities under the conventions were being developed for GEF funding. In the IW area, the TDA/SAP process and active use of national inter-ministry committees in each IW project were adopted as equivalent enabling activities as a first, strategic GEF intervention the way these activities in other GEF focal areas like Biodiversity and Climate Change. The GEF was created to operationalize the concept of incremental cost. For example, a country would conduct activities in an expected or planned baseline and then GEF would add an increment of funding to those activities that help protect the global environment.

The TDA/SAP process was designed to help build trust and confidence among countries choosing to work together in a GEF initial IW transboundary project and determine whether countries can agree on priorities and adopt commitments to action. Sovereignty issues often provide barriers to cooperation and such a first strategic project shows whether countries will move beyond those issues to ensure GEF funding is not wasted. The TDA is a scientific analysis while a SAP is a political document. National inter-ministry committees should represent each state in the process of formulating them and in conducting all IW projects because integrated approaches require cooperation among national sectors. The TDA begins the process as countries and partners jointly compile data and factual information on the particular multi-country water system and its transboundary concerns and opportunities. This analysis should be spatial because only certain parts of LMEs may be experiencing a particular transboundary issue and action may be needed only by certain countries or sectors.

This process of joint fact-finding is aimed at each state being able to understand the situation its neighbors experience and to fill gaps in information. National inter-ministry committees should contribute national information to the analysis that is assembled on a multi-country basis, often through GIS systems with spatially varying data. This sharing of information builds trust and confidence in working together. It also fills information gaps in joint understanding of how the larger system works and tests willingness of countries to work transparently together. Participation of the science community in the development of a TDA is critical for integrating science into management in

a practical way, and for identifying root causes for the transboundary concerns so that appropriate reforms in governance regimes can be recommended to change human behavior in different sectors. The TDA should be preceded by a full consultation with all stakeholders, and the stakeholders are involved throughout the subsequent process. The TDA approach is not only a proven way of achieving progress, it also acts as a diagnostic tool for measuring the effectiveness of SAP implementation. A good example of the TDA/SAP process can be found elsewhere for the Benguela Current LME (O'Toole, 2009) and for most GEF LME projects on the GEF IW:LEARN website (www.iwlearn.net).

The process of jointly developing a TDA helps countries exchange information and work together. This helps to determine the trans-boundary nature, magnitude, significance, and priority of various issues such as water quality, quantity, biodiversity, fisheries, and habitat degradation. In addition, the root causes of the conflicts or degradation, and relevant social issues, especially governance, are also included in the analysis so that actions to address them may be adopted in the SAP. The TDA process allows complex trans-boundary issues to be broken up into smaller, more manageable components for action as specific sub-areas of degradation or priority "hotspots" are geographically identified (with their specific problem and root cause) within the larger, complex system. Some of these may be deemed high priority; others may not. In the case of LMEs, it is essential to examine linkages among coasts, LMEs, and their contributing freshwater basins as part of the TDA process so that necessary linkages to root causes in upstream basins and spatially varying transboundary concerns can be included in the subsequent SAP.

A shared commitment and vision for action embodied in the SAP has proven essential in GEF projects for developing multi-country partnerships that can sustain commitment to action in the future. Countries need to agree on basic principles and a vision for the future for their shared transboundary water system, including LMEs. A SAP is a negotiated policy document which identifies policy, legal and institutional reforms and investments needed to address the priority transboundary concerns and opportunities. Signed at the ministerial level, it establishes clear priorities for action to resolve the priority transboundary concerns which were identified in the TDA or transboundary opportunities to pursue.

The formulation of a SAP is a cooperative process among the participating countries and different ministries in each through national inter-ministry committees. The TDA identifies the priority concerns or opportunities, the underlying sector causes, the root causes, and possible benefits. The SAP outlines the governance reforms and investments countries agree to jointly undertake to balance competing uses, resolve the priority concerns or pursue shared opportunities. After approval in writing by ministers, technical assistance, capacity-building, and/or investment projects can be developed and funded by GEF to implement sector measures that contribute to resolve the transboundary concern. The SAP sets out specific actions for each country that can be adopted nationally (often through National Action Programs–NAPS) and are to be harmonized among countries.

A five-module indicator approach to assessment and management of LMEs (Sherman, 2005) has proven useful in introducing ecosystem-based approaches to management (Duda and Sherman, 2002). The modules have been adapted to LME conditions through the TDA and SAP process in some GEF LME projects, but not all. These processes are critical for integrating science into management in a practical way, and for establishing appropriate governance to change human behavior in sectors.

Fig. 2 depicts the five LME modules used to support the paradigm shift to EBM practices. Collectively, these modules provide indicators and metrics to assess the changing states of the LME and support preventive and remedial actions for recovery, sustainability, and management of goods and services. This approach is particularly important in adapting to climate change, as it is inherently designed for adaptive management, iteratively informed by best-available science (Sherman, 2005).

3. Introduction to global governance for LMEs and their coasts

Thirty years after adoption of the UN Convention on the Law of the Sea (UNCLOS), governance for coastal and marine systems remains a fragmented patchwork of conventions, agreements, programs, and voluntary codes of conduct. While other agreements, programs, and initiatives have been adopted

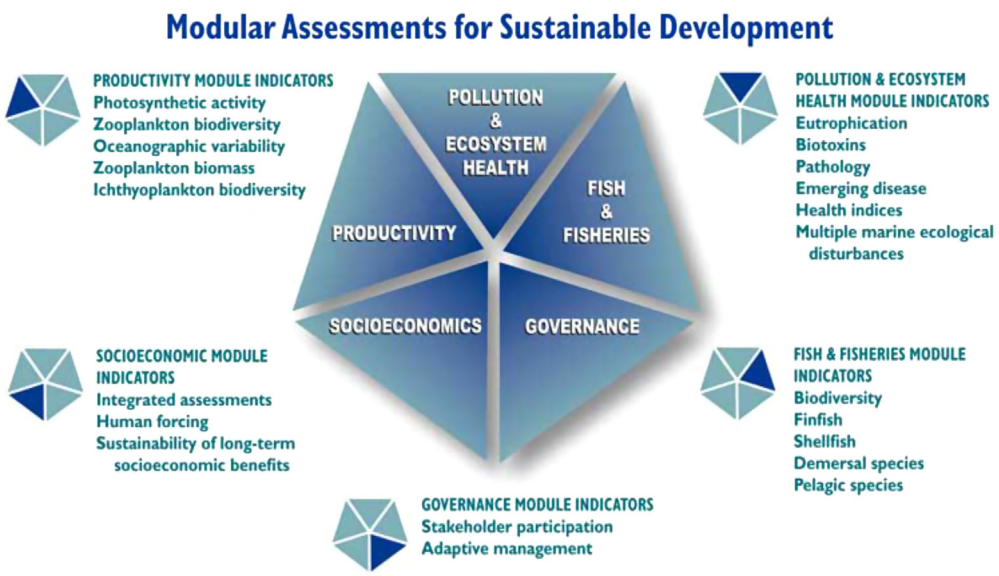


Fig. 2. A5-Module Approach for Indicators Supporting LME Assessment and Management (from Sherman (2005)).

since 1982, international ocean governance is pretty much as described by Kimball (2001). The patchwork has become even more complex with newer global conventions on Biological Diversity, Persistent Organic Pollutants, Ship Ballast Water/Alien Species, Mercury reduction. And with the concept of LMEs being fairly recent, few non-GEF cases exist.

While theorists can argue that governance issues are already covered, the reality is that fragmentation, economic disincentives, lack of government funding and compliance priority, global economic interests, and corruption all interact to stifle progress in reversing the degradation and depletion of the coastal oceans and further loss of biological diversity. In support of this point, the 5th GEF Overall Performance Study, undertaken by the GEF Evaluation Office (EO) in 2013 to support the Sixth GEF Replenishment scheduled for 2014, bemoans the continued loss and further degradation of ecosystems globally. The evaluation underscores to finance ministries that insufficient amounts of funding and political commitment are being devoted globally to reverse the trend—including insufficient funding in GEF Replenishments. Articles in the literature such as Duda and Sherman (2002), Sale et al. (2008), IOC-UNESCO (2011) and IPSO-IUCN Rogers and Laffoley (2013) all underscore the continued, complex degradation and depletion of coastal and marine systems. They express concerns that damage is accelerating, including ocean acidification, and may soon reach a tipping point toward irreversibility. The synergistic impact of all stresses is worse than each in isolation.

If the patchwork of global governance was working for LMEs and their coasts, there would not continue to be further degradation and depletion. This failure in governance was true in 1995, which is why the GEF Council adopted the use of LMEs for a new, integrated and ecosystem-based approach. Now with the situation worsening, including added stress from global warming that adversely affects fish catch composition globally (Cheung et al., 2013), the urgency to correct governance failures is even greater.

Failures in governance are most often used to explain the continued depletion and degradation of coastal oceans. It is not just that the existing framework is fragmented and complex due to political considerations. Natural systems are so complex and variable that it makes it difficult to formulate, adopt, and implement appropriate governance systems. That is why sector fragmentation is so common (addressing thematic concerns one by one through incremental political approaches as support can be garnered for specific problems or opportunities) and why formulating practical

ecosystem-based approaches to managing coastal oceans are few and far between. This is the gap GEF stepped into with LMEs in 1995 to foster a paradigm shift toward more comprehensive, ecosystem-based management (EBM).

So what is really meant by the term governance? For the purpose of this review, governance refers to all the many public and private actions at all different scales (global, regional, national, and local) that can directly and indirectly influence development, use and management of coastal and marine systems, including their associated formal and informal institutions.

Articles by Wang (2004b), (2004a), Juda and Hennessey (2005), Hennessey and Sutinen (2005), Sutinen et al. (2005), Olsen et al. (2006) and Mahon et al. (2011), (2013) are quite helpful to better understand the challenges facing governance of LMEs, their coasts, and linked freshwater basins and aquifers. Governance is not just government but it also includes institutions and organizations that can possibly help to influence human behavior and direct it in certain ways. These can vary from market mechanisms to government action and work of non-governmental organizations, social institutions, and mores of civil society.

Simply put as noted by Juda and Hennessey (2005), governance refers to "the formal and informal arrangements, institutions, and mores which structure: (a) how resources and environment are utilized, (b) how problems and opportunities are evaluated, (c) what behavior is deemed acceptable or forbidden; and (d) what rules and sanctions are applied to affect the pattern of use". Mahon et al. (2011) noted that the term governance reflects a global shift in awareness of increasing larger number of stakeholders involved in determining actions that involve use of coastal and marine resources. Their paper quotes others in stating that governance encompasses the whole of public and private interactions taken to address societal problems and create social opportunities, including the formulation and application of principles that guide these interactions and the institutions that enable them. These principles, rules, norms, and enabling institutions are critical attributes of governance. Agreement on principles and shared visions among stakeholders public and private as well as from civil society is fundamental for good governance.

3.1. Global governance and international treaties

In order to better understand the complexity of LME governance, it is instructive to start at the global level with the array of international legal agreements and international organizations with programs that can influence management of LMEs and their coasts. UNCLOS sets the framework and a number of global and regional agreements complement it. Complementary global legal frameworks range from the Fish Stocks Agreement, London Dumping Convention, Convention on Biological Diversity (CBD), the Port State Measures Agreement, Ballast Water Convention, and MARPOL for pollution from vessels to regional seas agreements with UNEP and regional fisheries agreements with Regional Fishery Bodies (RFBs) often with FAO assistance. The patchwork of laws and programs provides mostly thematic and sector-specific authority for some action. However compliance is questionable in some cases and other issues exist such as trafficking of workers on fishing fleets.

Other global agreements like the RAMSAR convention and CITIES certainly can contribute to conservation of coastal oceans and hopefully, eventually the UN Framework Convention on Climate Change (UNFCCC) will address global warming and acidification and the new Mercury convention will address releases of mercury as newer threats to sustainability. Global intergovernmental programs of UN organizations may also contribute from a voluntary standpoint; or, viewed another way, non-compliance may stand in the way of progress, for example, on land-based pollution and habitat loss (the GPA with UNEP) or the Code of Conduct for Responsible Fisheries with FAO. For example, 12 years of compliance under the FAO Code was reviewed by the University of British Columbia and WWF (WWF-International, 2008) and was found to be poor. The non-compliance contribute to continuing governance failures that deplete and degrade coastal oceans and Areas Beyond National Jurisdiction (ABNJ). These governance failures in terms of IUU (illegal, unreported, unregulated) fishing cost governments an estimated $24 billion in fish revenues each year.

Science concerns are often used as an excuse for inaction in these governance arrangments, and in reality serve as stumbling blocks in trying to advocate for politically unpopular action. The consortium

of marine-related UN bodies and coordinating mechanisms like UN Oceans, marine experts like GESAMP, and professional scientific organizations related to marine specialists all have science roles to play. Other related programs under UNDP, IOC-UNESCO, and the UN University (UNU) make this a crowded field…albeit a very important one to bring sound science to decision-making which contributes to transparency and better governance. For example, a GEF/UNEP/UNU IW project, named GEF IW Science, reviewed the GEF IW portfolio use of science. The synthesis report (UNU, 2012) is instructive, showing that use of science and engagement of the science community in IW projects is limited and needs to be substantially improved. GEF must redouble its efforts to engage scientists and science groups so that they can play a role in facilitating good governance. The involvement of more social scientists and legal specialists in IW projects, including those for LMEs, is especially needed.

The United Nations itself has a role in bringing groups together as diverse as the private sector and civil society to contribute. Global NGOs have programs that can assist in many ways. Of special significance are the World Bank and regional development banks with their ability to undertake policy advice and guidance as well as lending operations that can further degrade and deplete LMEs or be an instrument of restoration and protection. And the GEF, as a grant institution itself, plays a critical role in governance of LMEs and coastal oceans with its incentives.

It is easy to see how fragmented governance can be with all the global actors. Then there are regional institutions and programs under many of these organizations with great potential to influence national level policies, legal frameworks, programs, and public participation opportunities. When seen with their local counterparts often emanating from national capitals and their local programs, local government responsibilities in planning and pollution reduction, community-based activities, co-management opportunities, local customs/norms/taboos, religious groups, cultural groups, science advocacy groups make a crowded field. There is just so much complexity that political and economic considerations, pressure groups, and corruption can frustrate implementation of this patchwork of governance mechanisms. Additionally, ecosystems do not respect national or administrative borders, coastal or inland political boundaries, boundaries at the 200 mile EEZ or boundaries of UN programs such as regional seas programs or Regional Fisheries Organizations (RFOs) with FAO. Consequently, existing programs often do not fit these ecosystem approaches that LMEs introduce. Then there are areas beyond national jurisdiction (ABNJ) with fish stocks that cross LMEs and have nursery areas near coastlines that need to be linked to LME management.

This is the challenge the GEF Council faced in 1995 in determining how to address coastal and marine issues in the IW Focal Area of GEF. The 1995 GEF Operational Strategy (GEF, 1995) was the result of a year of negotiations between the North and the South on the GEF Council. The strategy put LMEs front and center in the GEF role of introducing ecosystem-based and comprehensive approaches to improved management of coasts and near-coastal oceans in order to address GEF's mandate for transboundary resources. The key policy point was that GEF was not to fund existing programs of UN agencies but to change them toward ecosystem-based approaches. Many of the programs were underfunded for both legitimate and pernicious reasons. GEF would become the problem if it did not change and just kept substituting for lack of budget commitments on behalf of the governing councils of these UN bodies and their regional programs. This key policy choice of the GEF Council reinforced the argument that LMEs were appropriate ecologically-based assessment and management units capable of introducing the paradigm change to ecosystem-based approaches to management (McLeod et al., 2005).

The 1995 GEF strategy for LMEs is still in effect and serves as the basic building block for the most recent GEF 6 Replenishment Strategic Directions in IW for 2014–2018. And the GEF approach has been successful in leveraging national financial commitments to action far exceeding cost as illustrated for UNDP GEF LME projects by Hudson and Glemarek (Hudson, 2012; Hudson and Glemarec, 2012). Needless to say, global governance for LMEs is fragmented, complex, and daunting; the experience of GEF LME projects shows that reforms take a decade to enact and another to implement.

4. Incorporating ICM+MPAs in GEF LME projects

Fragmented governance arrangements already existed in LMEs at all scales before GEF projects were started. Fragmented, sector management is fine if it works, but it clearly has not worked and the

status of coastal and marine systems is getting worse. These problematic governance mechanisms were not organized around LMEs, so introducing the concept of LMEs and LME-wide governance is hard for those with existing agendas and special interests to maintain. GEF LME projects have as their intent the introduction and operationalization of more effective ecosystem-based approaches to governance.

The importance of Integrated Coastal Management (ICM) and Marine Protected Areas (MPAs) has been recognized by GEFSEC since the first operational Strategy for IW in 1995. An exemplary project linking the two is the Gulf of Aqaba IW project with the World Bank and Jordan in the Red Sea LME. The highly sensitive transboundary marine park was the subject of protection through the project helping Jordan adopt and operationalize the Aqaba Development Authority for ICM in order to sustain the MPA. This illustrated that MPA projects need an ICM institution in their vicinities for sustainability. From the start, separate ICM or MPA projects were eligible through the GEF IW area for sub-LME hotspots, with the Gulf of Aqaba being a hotspot example.

As the inventory of governance features in Annexure I shows, there is no impediment to ICM or MPA elements being part of SAPs and programmed into GEF LME projects at a different scales. However, too many LME projects focus on the LME as a whole and do not include the adjacent rivers and valuable coasts that are part of the definition of LMEs. The Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) series of projects in 7 LMEs of East Asia focused on ICM, spatial management in terms of zoning, and inclusion of MPAs while work at a larger, LME-wide scale was supported in 5 of the 7 individual LMEs—South China Sea LME (SCSLME), Gulf of Thailand LME (GT LME), Yellow Sea LME (YSLME), ATSEA (the Arafura and Timor Seas portion of the Indonesian Seas), and Sulu-Celebes LME (GEF-IW, 2006). As Annexure I illustrates, GEF IW supported projects at different scales for Vietnam in the PEMSEA area show that programming separate GEF projects constitutes one approach, while the other, more desirable approach is to inherently include from the start ICM and MPAs (or fisheries refugia) as local demos at a local scale in LME-wide projects. Thia-Eng et al. (2006), (2009) outlined highly successful experiences of ICM and spatial varying zoning processes in the PEMSEA GEF project.

The use of fisheries refugia was an important demonstration effort to test community support for locally co-managed semi-protected areas in the UNEP/GEF South China Sea and Gulf of Thailand (SCS+GT) project. In a report on South China Sea refugia (UNEP, 2008) UNEP documented the use of fisheries refugia that in many cases are more community-friendly and politically sensitive than MPAs. In some cases MPAs are appropriate and in others co-management with communities as in the South China Sea LME case work well.

Several ICM-related IW projects are listed in Annexure I that were intended to complement the LME project in the area so that local scale ICM-related work could be tested. Integrated Watershed and Coastal Areas Management (IWCAM) is a successful one in the Caribbean SIDS. Demos show how to protect coastal areas, how to reduce land-based pollution to complement ICM, and in cases to utilize protected areas strategies. Similarly, the Pacific Implementing Sustainable Water Resource and Wastewater Management in Pacific Island Countries (IWRM) project accomplished something similar with more emphasis on freshwater drainages and aquifer linkages to coastal areas. This project was highly successful with a series of results notes available on iwlearn.net. This illustrates special emphasis GEF places on land-based activities that can degrade coastal areas. The scale of local ridge to reef or aquifer to lagoon, ecosystem-based approaches have to start on land to protect LMEs.

GEF is not supposed to support existing UN programs unless they undertake different works from their normal programs. Adding Integrated Coastal Zone Management (ICZM) Protocols to UNEP regional conventions has been one strategy for paradigm shifts to national and local ICM implementation that can be eligible for GEF support. The Mediterranean has led the way with a signed Protocol and GEF followed it with an ICZM implementation project that assisted the countries to better understand climate change concerns at the coast and integrate them into ICZM planning. GEF has been an agent of change with support for ICM through legally binding Protocols to regional seas conventions that promote national ICM laws and support for local ICM (GEF-IEO, 2013). MPAs are included in these efforts. Unfortunately, other regional seas conventions beyond the Barcelona and Nairobi Conventions have not chosen to include these in SAPs limiting GEF's ability to introduce ICM reforms.

In sum, depending on countries' commitments to joint action including ICM and MPAs, GEF IW can program change-agent support in LME projects themselves, which is desirable, or in separate projects for the same LME. In any case, GEF projects need to support harmonization of ICM as GEF construes it with the newer concept of Marine Spatial Planning (MSP). In that way, planning and management at coasts will link to the larger LME and to adjacent river and aquifer systems. Engagement of partners with existing guidance documents on MSP such as IOC-UNESCO (Ehler and Douvere, 2009) and the joint work of the Convention on Biodiversity (CBD) and the GEF STAP (CBD-GEF-STAP, 2012) can result in easily produced material to serve as guides of what is expected by GEF IW for governance at the scale of ICM/MSP.

5. Discussion of types of governance structures for LMEs

Given the inventory of characteristics of SAPs summarized in Annexure 1, the following section includes a discussion of the imperative to work at all scales based on the intent of the Council-approved Operational Strategy for IW and GEF practice over two decades. Other projects for ecosystem approaches under the CBD, the Convention on Wetlands—called the "Ramsar Convention" (RAMSAR), and biodiversity interventions involving ICM and MPAs are eligible in the GEF Biodiversity Focal Area and can be chosen for funding under a country's System for Transparent Allocation of Resources (STAR) allocation from GEF. The IW focal area is different with no entitlement for countries to receive money. *Rather, significant changes in LME-wide ecosystem-based approaches to management are expected in SAPs for the IW focal area. If countries do not desire to adopt these governance mechanisms, they should not expect to receive GEF IW funding beyond the initial one project for producing the SAP. Limited funding means funding LMEs without commitments to significant governance reforms and only talk shop meetings are a waste of precious GEF IW funding. Such funding is intended to be used as an incentive for countries willing to make changes. The BCLME example is the preferred approach to follow.*

Another consideration is that in the other GEF focal areas, countries are not eligible for GEF grants unless they ratify the appropriate legal framework like the CBD, UNFCCC, UNCCD, and the Stockholm Convention. In the Operational Strategy, the GEF Council waived this requirement for IW, especially in the first project with its intent noted above as an enabling activity. The hope was that, like the Danube Basin, Caspian, Guarani, Pacific Warm Water Pool area (not an LME), BCLME, and most recently as part of the ASCLME-SWIOFP suite of projects, countries would decide to negotiate a new, more ecosystem-based and effective LME-wide mechanism.

The GEF experience with LME-wide governance changes included in SAPs (as noted in the Annexure 1 inventory) illustrates 5 general types of governance mechanisms: (a) adopting numerical targets/deadlines in UNEP regional seas programs with reporting that can give some commitment to action in these framework programs; (b) adding a Protocol or new legally binding component to an existing legally-binding convention arrangement; (c) choosing a new legally binding agreement/mechanism for the LME be negotiated to overcome the fragmentation/inaction; (d) establishing a new, non-binding intergovernmental institution/Commission with numerical targets/deadlines/other features; and (e) several variants of narrative, non-binding actions using the existing, fragmented governance institutions with the hope that coordination, science, awareness, capacity building funded by GEF in the future will result in some ecosystem-based approaches being adopted. A number of advantages and disadvantages of these 5 types of mechanisms are discussed below.

Expressing intent to adopt a new legal framework like the Benguela Current LME SAP is the most desirable approach. GEF help can be provided to negotiate the agreement. Especially if numerical targets are included, strong cases can be made for SAP implementation funding from GEF. Next in order of desirability would be a decision to use an existing legal framework like the Barcelona Convention and add provisions related to ecosystem-based approaches. The Mediterranean is a good example with the Global Program of Action for the Protection of the Marine Environment from Land-based Activities (GPA) Protocol. The numerical targets in the SAP now support action under that protocol and the new ICZM Protocol can help energize the older regional seas program with more ecosystem-based targets and components for action. The Mediterranean even includes in its SAP-Bio work by the Mediterranean Regional Fisheries Body (RFB) as well. With its existing protocols

on oil/gas, IMO ship Conventions, and its Specially Protected Areas (SPA) Protocol, a good test is underway to see if existing LME-wide institutions with new Protocols can achieve adoption of practical ecosystem-based approaches.

Next in desirability is the equivalent of convention commitments based on numerical targets/deadlines, transparent reporting, secretariats funded by countries, and use of intergovernmental procedures by intergovernmental organizations that are voluntary in nature. The PEMSEA and Yellow Sea Large Marine Ecosystem (YSLME) cases are testing the good will of countries to honor their voluntary numerical commitments and the Arafura and Timor Seas Ecosystem Action Program (ATSEA) is following a somewhat similar approach. If existing secretariats of regional seas treaties or FAO-brokered Regional Fishery Bodies (RFBs) incorporate numerical objectives/targets/deadlines from their SAPs that relate to ecosystem-based approaches like the Mediterranean, then they would be worthy to test effectiveness.

SAPs for two groups of two LMEs deserve special discussion. The South China Sea and Gulf of Thailand SAP contains numerical targets with deadlines related to habitat conservation and some other important measures. It also included a study in a few years to determine whether a legal agreement is needed. No ministers signed the SAP; instead lower level government officials at a meeting declared it was approved. It would serve as a best practice if it was signed by Ministers and if it contained the recommendation to begin negotiation of a legal arrangement for the two LMEs that incorporated the SAP.

The SAP for the Caribbean Sea LME (CLME) was also notable. It divided the LME into smaller sub-LME portions spatially because of certain similarities and followed up with sub-LME SAPs. The United Nations General Assembly (UNGA) issued a special statement for establishment of a Caribbean Sea Commission to serve as a high level coordinating body to make the other fragmented institutions and frameworks incorporate the ecosystem-based approaches and work more effectively. This commission is mentioned in the SAP but, like the South China Sea and Gulf of Thailand SAP, it is referred to for future study and dialog. If that was included as an element of the SAP, this too would be a best practice example—different from others—but legitimate. If there were numerical targets to accompany it, then the Caribbean Sea LME project would also be well within GEF IW funding priorities for SAP implementation. As submitted, many would question country commitments to action.

Different LMEs demand different governance mechanisms consistent with the cultures of countries. The global framework will continue to be fragmented with so many global conventions and mechanisms based on sectors. However, overarching, LME-wide governance arrangements are being adopted by some countries in some LMEs and GEF needs to reward those willing to make changes for a sustainable future.

6. Summary: good practices for portfolio-wide actions related to LME institutional governance structures

This review has identified concerns about governance at all levels for GEF support of LME projects. The intended paradigm shift to ecosystem-based approaches for sustaining benefits of LMEs and their coasts may not be occurring everywhere. While governance for every LME must necessarily be different and the transformation process is decadal in time frame, good practices with some chance of success have been identified. It seems logical to include a number of recommendations in this paper about these good practices in governance structures related to LME-wide management. The recommended Good Practices are offered for consideration.

6.1. Good practices for GEF LME projects

(1) *SAP formulation and implementation projects should both include ICM/MSP and MPAs/refugia as local demonstrations to introduce these important governance tools that can address multiple global issues, including climatic variability and conservation of "blue forests" within the LME governance framework. All ICM efforts need to utilize spatial planning and conservation of important habitat and links to the work of adjacent RFBs or relevant ABNJ institutions.*

(2) *SAP implementation projects should include formulation of a revised TDA and SAP 6–7 years after the first SAP to introduce adaptive management. SAPs should be based on agreed principles like the precautionary principle, a shared vision of the state of the LME desired by the countries in the future, and LME-wide governance mechanisms based on governance analyses.*

(3) *All GEF LME projects should include emphasis, funding, and outputs for national inter-ministry committees as very important tools for cross-sector ecosystem-based governance improvement.*

(4) *All GEF LME projects should include engagement of civil society, the business community, and science organizations in its work. The public involvement plan and the M & E plan should reflect indicators for this engagement. Additionally, IOC Regional Sub-commissions are very important assets and should be utilized in GEF LME projects. The science community can help provide estimates of the annual value of goods and services of the LMEs and the carbon trapping ability of coastal ecosystems. Such estimates should be required in every LME project.*

(5) *LME-wide governance mechanisms should be included in all SAPs. They can consist of an array of LME or LMEs-wide Protocols or amendments to regional conventions for different ecosystem-based aspects. They can consist of LME-wide new legal frameworks that are ecosystem-based. They can include new non-binding commissions with numerical targets and deadlines in the SAP, commitments to fund the joint secretariat and to use intergovernmental procedures with reporting of progress toward the numerical targets. If these options are not chosen, GEF should not fund the SAP implementation project because of likely lack of sustainability.*

(6) *GEF does not have sufficient funding to support SAP implementation everywhere. GEF should consider targeting its modest funding to LMEs where governments are willing to enact comprehensive reforms with a chance of reversing the degradation and depletion. LME-wide governance reforms need to be included in SAPs, and the SAPs must be signed by ministers or approved by cabinet level officials. GEF should not fund SAPs where countries choose to use existing mechanisms or have lower level staff sign the SAPs.*

(7) *FAO is a GEF agency. The FAO Code of Conduct addresses the precautionary approach, fishery impacts on biodiversity, discards and by-catch, implementation of Marine Protected Areas (MPAs) and no take areas, small-scale fisheries, control of excess fishing capacity, extent and control of illegal fishing, and the use of flags of convenience to circumvent regulations. The UBC-WWF analysis cited earlier demonstrated poor compliance in 50+ countries constituting 95% of fisheries. Relying on this voluntary measure has been shown to perpetuate poor fisheries governance. More voluntary guidelines for Flag State Performance related to IUU fishing were to be presented to the FAO COFI for endorsement at its June 2014 meeting. WWF (2008) estimated up to $24 billion annually is lost from national incomes for fishing because of this IUU fishing. Even with endorsement, these guidelines remain voluntary. High level GEF and FAO staff should join forces to fix this very critical LME governance problem by incentivizing countries in GEF LME projects to adopt more stringent, national implementation of the many measures covered by these voluntary instruments. At the same time, work with the private sector to address these fishery issues must become a more important priority for LME projects, GEF agencies, and GEFSEC with fisheries being a priority transboundary concern in virtually every LME.*

(8) *GEF and its agencies (as granting, supervision, and evaluation institutions) have important roles to play in the desired governance paradigm shifts toward ecosystem-based approaches to management. GEF's mission in IW is to address transboundary concerns and LMEs are shown to be appropriate management units. Through the interagency GEF International Waters Task Force, GEF has a responsibility to: enforce these various measures and good practices related to LME governance improvements at all scales, concentrate funding on LMEs where governments make commitments to new LME-wide inter-governmental action, suspend GEF IW projects when commitments are not met, and press for linkages among LME projects and those coastal ones in the GEF Biodiversity and adaptation areas. In essence, the GEF IW focal area serves globally and regionally as an over-arching collaboration mechanism for integrating and improving governance for LMEs and their coasts with its incentive funding. Any less vigilant effort would mean that GEF will fail to catalyze significant impacts, will fail to stimulate coherence in its fragmented focal areas that waste funding and miss opportunities, and will be seen as contributing to the problem rather than catalyzing solutions to the depletion and degradation of coastal oceans.*

Annexure 1. Key Features of Strategic Action Programs (SAPs) in GEF Supported Core and Component LME Projects

Date funded LME-related project	Acronym	Special governance-related features in SAP
Pre-2000		
Black Sea LME Second SAP (adaptive management)	BSLME	*Principles; Specific narrative targets with deadlines; NAPs; BD Protocol; fisheries treaty; national laws; operationalize 1992 Bucharest Conv.;BS NGO Net; ICZM Strategy.; special habitat/marine mammal protect; *Ministerial Declaration; new numerical+narrative targets/deadlines-EcoQOs; adopt regional fisheries agreement; regional BD SAP; science conferences; BS NGO Network involvement; joint surveys.
Red sea LME	RSLME	Sub-LME SAP with narrative measures; ICZM+MPA+MARPOL emphasis; port state controls-1982 Conv.
Mediterranean sea LME land-based*	MSLME	Legally-binding numerical targets/deadlines; NAPs; 112 hotspots+77 sensitive; GPA Protocol; 1976 Conv.
(b) Med sea LME SAP BIO		Links to fisheries org; suggestions of ICZM Proto; MPAs to implement SPA Proto; science bodies; mostly narrative(some numerical) targets with deadlines; reporting; implement thru 1976 Conv.
Benguela current LME	BCLME	Principles; Agreement for Interim IBCC; LME Convention/ BCC; Science Advisory; D-List; joint survey; RFB
Second (adaptive management)		Under review stakeholders. Convention signed 2013. Joint surveys.
Pacific warm water pool LME equivalent	PWWPLME	Decision related to negotiate Fisheries Convention/Commission; general narrative measures; emphasis on ICZM+water quality-IWRM; implementation through 1986 Noumea Conv.
Patagonia shelf partial LME (Freplata)	PSLME (partial)	Principles; Integrate 2 Commissions under 1973 treaty; Shared Vision; Narrative EQOs with deadlines; NAPs; focus on pollution; cannot touch key transboundary concern fisheries
2000–2005		
Baltic sea JCP LME SAP equivalent	Baltic-JCP	Vision; Ministerial decl; targets 132 hot Spots with deadlines; ICZM plans; national policies/laws/reg adopt;funded NGO/public participation; reporting and implemented thru 1974+Revised Convention/Commission;
South China sea & Gulf Thailand LMEs	SCS+GTLMEs	Narrative+numerical targets/deadlines/costs for habitat; narrative/deadlines for MPAs, fish; narrative+numerical/deadlines 26 hotspots pollution; make decision legal framework 2002; mayors conf; sci conf; SGP
Yellow sea LME	YSLME	Some principles; voluntary YSLME Commission; Sci Conf; Parliamentary Dialog; narrative+numerical targets/deadlines for 11 mgmnt measures based on ecosystem carrying capacity; joint surveys;
Guinea current LME	GCLME	Principles; Interim LME Commission; Ministerial Decl; Decision Treaty/LME Commission link with 1981 Conv; NAPs, Science adv; ICARM; 16 countries signed; narrative targets with indicators/deadlines; joint surveys
Agulhus Somali (WIO) LMEs Land-based*	WIO-Lab	GPA Protocol signed+Decision for ICZM Protocol; Shared vision with principles; 3 EQOs; Detailed mgmnt targets/ind/deadlines; ICZM laws; flows; SADC; MPAs; impl thru 1985 Conv (and 2010); WIOMSA-science;
(b) Agulhus Somali LMEs+Coast*	ASCLME	Not signed 12/15/13; Draft: narrative EQOs; science based, science bodies/ WIOMSA; joint surveys; DLIST local demos; spatial TDA/spatial planning recomm; science/study Alliance of regional partners funded by GEF. No legal changes. Existing governance does not work—link them together; SAPPHIRE. ABNJ demo.
(c) S.W. Indian Ocean fisheries	SWIOFP	Decision to move from FAO Art VI Commission to more serious FAO Article XIV Fisheries Convention
2006–2013		
Canary current LME	CCLME	UNEP regional seas plus RFMO centered on collaboration UNEP+FAO
Gulf of Mexico LME	GLME	UNIDO implemented
Bay of Bengal LME	BoBLME	FAO implemented
Caribbean Sea+N Brazilian Shelf LMEs	CLME	Sub-LME TDAs and SAP elements; Vision; Narrative EcoQOs with deadlines; regional governance mechanism funded by GEF to coordinate existing frameworks; NAPs; indicators; reporting; Carib. Sea Commiss. Review
Humboldt current LME	HCLME	
Sulu-Celebes LME	S-CLME	Pending 2014
Arafura-Timor (Indonesian Seas) LME	ATSEA	Principles; narrative EQOs with numerical targets; NAPs; new regional mechanism; links others; reporting

West Bering sea LME	WBSLME	
ICM-related Projects		
Jordan Gulf of Aqaba Envir Mgmnt Plan	GoAq	Plan approved; MPA; ICM institution created to protect MPA; several single country plans/ Peace Process
PEMSEA—7 LMEs of East Asia-SDS SEA	PEMSEA	SDS-SEA=SAP equivl; 217 narrative actions for 20 obj+6 strats toward WSSD/ etc targets; focused on ICM; local officials ICM net; coastal/marine spatial planning; Ministerial Decl. in 2006 for target 20% coast under ICM with PEMSEA Res Facility as intergovernmental organization; 11 country Parties; Pub-private; MPAs
Tumen River/Coast	TRADP	General narrative SAP emphasis on inland; TDA; SAP not signed; no follow-up GEF project.
Caribbean IWCAM GPA	IWCAM	GPA Protocol ratified and operationalized;
Pacific IWRM	PacIWRM	SAP equivalent; local demos; national inter-min com; incorp into national policies/laws/budgets, reporting
Mediterranean ICZM implementation		ICZM Protocol signed;
Other Multi-country Comparators		
North Sea LME+	OSPAR	Ministerial Confs/declarations; OSPAR Treaty (spatial+beyond N Sea); numerical; reporting; links to RFB,
Caspian Sea (GEF)		3 GEF agencies; narrative EQOs, targets/deadlines; sign convention/ Commission; indicators for targets; NAPs; private sector participation
North American Great Lake System		Treaty/Amended/Protocol; national inter-min; narrative+numerical targets/ deadlines; science advisory body; reporting; NGO network; science research network; Council of Industries

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