

# From Coast to Coast

CELEBRATING 20 YEARS OF TRANSBOUNDARY MANAGEMENT OF OUR SHARED OCEANS



GLOBAL ENVIRONMENT FACILITY  
INVESTING IN OUR PLANET



UNITED NATIONS  
UNIVERSITY  
**UNU-INWEH**  
Institute for Water,  
Environment and Health





# From Coast to Coast:

## Celebrating 20 Years of Transboundary Management of Our Shared Oceans

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# Table of Contents

FOREWORD	
Naoko Ishii	VII
INTRODUCTION	1
<u>THEME 1: CATALYZING GLOBAL AND REGIONAL PARTNERSHIPS</u>	<u>6</u>
CHAPTER 1	
Sustaining the World's Large Marine Ecosystems	9
Building the World's First LME Commission	17
Uniting Countries Behind a Region-Wide 10-year Strategic Action Programme	25
CHAPTER 2	
Building Frameworks for Regional Cooperation	39
Catalyzing 20 years of Partnerships in the East Asian Seas	43
Creating a Regional Convention to Safeguard Fisheries in the Western and Central Pacific	49



## THEME 2: IMPROVING ECOSYSTEM HEALTH AND SERVICES 62

### CHAPTER 3

Reducing Coastal Pollution from Land-based Sources	65
Improving Ecosystem Health through Innovative Financing	
Models for Wastewater Treatment in the Caribbean	69
Developing Innovative Financing to Reduce Coastal Pollution	
from Land-based Sources in the Seas of East Asia	79

### CHAPTER 4

Managing Shared Fisheries Resources for Present and Future Generations	95
Taking a Fair Share	99
Sustaining the World's Largest Single-Species Fisheries	111

### CHAPTER 5

Applying an Ecosystem-based Management Approach	127
Revitalizing the Gulf of Mexico	129
Transforming Coastal Management in the Seas of East Asia	137

### CHAPTER 6

Safely Navigating our Oceans	153
Creating a Global Alliance Against Ballast Water Invaders	157
Improving Navigational Safety and Cooperation with	
the Marine Electronic Highway	167

### CONCLUSION

A Roadmap Forward	175
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Local fish catch, Sierra Leone  
(Sub Regional Fisheries Commission)



# Foreword

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Covering over 70% of the planet, our oceans have tremendous economic, social and ecological value. They provide over US\$1 trillion annually to the world economy in market goods and services and many times that in non-market amenities. Services provided by marine ecosystems include food security, tourism opportunities, carbon sequestration and coastal protection. Yet, our oceans are under threat from unsustainable practices, including over-fishing, land-based sources of pollution, habitat destruction and climate change.

Recognizing the critical need for global action to ensure the sustainability of our oceans, the Global Environment Facility (GEF) has provided tremendous support to ocean governance. Since its establishment over 24 years ago, the GEF, the largest investor in transboundary water cooperation, has financed over US\$1.5B in grants to over 170 states.

This publication highlights how the GEF has worked with partners to improve ocean governance by working across nations to promote ecosystem-based approaches to fisheries and other marine and coastal resources, protect coastal habitats from land based sources of pollution, and catalyze the formation of country driven, country owned and — ultimately — country financed regional institutional frameworks. As discussed in the case studies, GEF support has helped:

- Establish the Benguela Current Commission in Southern Africa, which brought together the nations of Angola, Namibia and South Africa, to work towards sustainable ocean governance;
- Create the Partnerships in Environmental Management for the Seas of East Asia, which pioneered best practices in integrated coastal management across 12 East Asian countries; and,
- Ensure the sustainable management of shared marine resources of the Caribbean Large Marine Ecosystem, bringing together over 25 small island states to build an integrated management approach for the Large Marine Ecosystem.

GEF initiatives have enhanced global and regional cooperation and led to improved ecosystem health, services and human wellbeing through stronger governance at regional, national and local levels. These projects apply an integrated cross sectorial approach while engaging the private sector, non-governmental organizations and multilateral institutions. GEF ocean projects have helped solidify powerful approaches of working from ridge to reef and from village chiefs to cabinet ministers. In doing so, these projects are taking innovative approaches showing how regional agreed frameworks may

produce global environment benefits, while incorporating the market value of marine resources into national economies resulting in sustainable economic benefits, such as increased small and large-scale fishing revenues, the creation of new industries and improved sustainable land production and incomes. These GEF integrated projects demonstrate the positive social and economic contribution ocean management can have on national economies.

The manner in which we treat the oceans over the next few decades will determine whether economies will be able to thrive well into the future. The success we have realized to date demonstrates the way to a new paradigm based on partnerships at local to global scales that leads to both transboundary regional cooperation and ecosystem and human wellbeing benefits on the ground. Working in partnership with many countries and institutions, the GEF looks forward to building on successes to date to ensure the sustainability of our oceans for the benefit of present and future generations.



Naoko Ishii  
CEO & Chairperson  
The Global Environment Facility



Tanzania (Lucy Scott)











# From Coast to Coast: Celebrating 20 Years of Transboundary Management of Our Shared Oceans

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The world's oceans and coastal ecosystems provide critical services — food security, livelihoods and coastal protection — for billions of people. Yet these valuable ecosystems lack sustainable governance resulting in continued degradation due to over and destructive fishing, habitat loss and pollution compounded by climate change. Because of their transboundary nature, these multi-country systems represent international public goods making ocean governance particularly complex.

The Global Environment Facility is the largest financial institution with the ability and experience to confront the challenges facing shared marine and coastal ecosystems. Since its establishment in 1991, the GEF, through its International Waters focal area, has allocated a total of \$1.14B in project grants to transboundary marine projects<sup>1</sup> with approximately \$7.7B in co-financing. IW marine projects have addressed the breadth of threats and issues facing ocean governance ranging from fisheries to toxic substances with the majority of funds allocated to addressing land-based sources of pollution and supporting management of Large Marine Ecosystems (see Figure 1). These funds have been distributed worldwide to eligible countries with the highest

portion allocated to Asia followed by Africa and Latin America & the Caribbean (see Figure 2). IW funds have increased significantly from the GEF's pilot phase and initial replenishment of \$237M to the current GEF-6 financing of \$460M demonstrating the GEF's continued commitment to marine issues.

The GEF supports countries to collectively manage coastal and marine ecosystems in order to share the benefits from them. This transboundary approach is unique in bringing together countries to identify threats, problems and issues through a structured, common fact finding and process dialogue between governments, academia, civil society and the private sector. Such a unifying process is essential to move from perceived threats to agreed facts and provide a basis to agree on a shared vision and investment plans towards limiting stress on the shared marine resources. The GEF also emphasizes the "source-to-sea" approach to ensure the inter-linkages among ecosystems are addressed. This watershed approach is particularly critical to ensure not only upstream pollution is addressed, but that the stakeholders

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<sup>1</sup> "IW marine projects" refers to projects that further the sustainability of ocean and coastal ecosystems, including projects that address land-based sources of marine pollution and persistent toxic substances that affect these ecosystems.

Figure 1: International Waters Marine Investments from 1991-2015 (\$1.14 B)

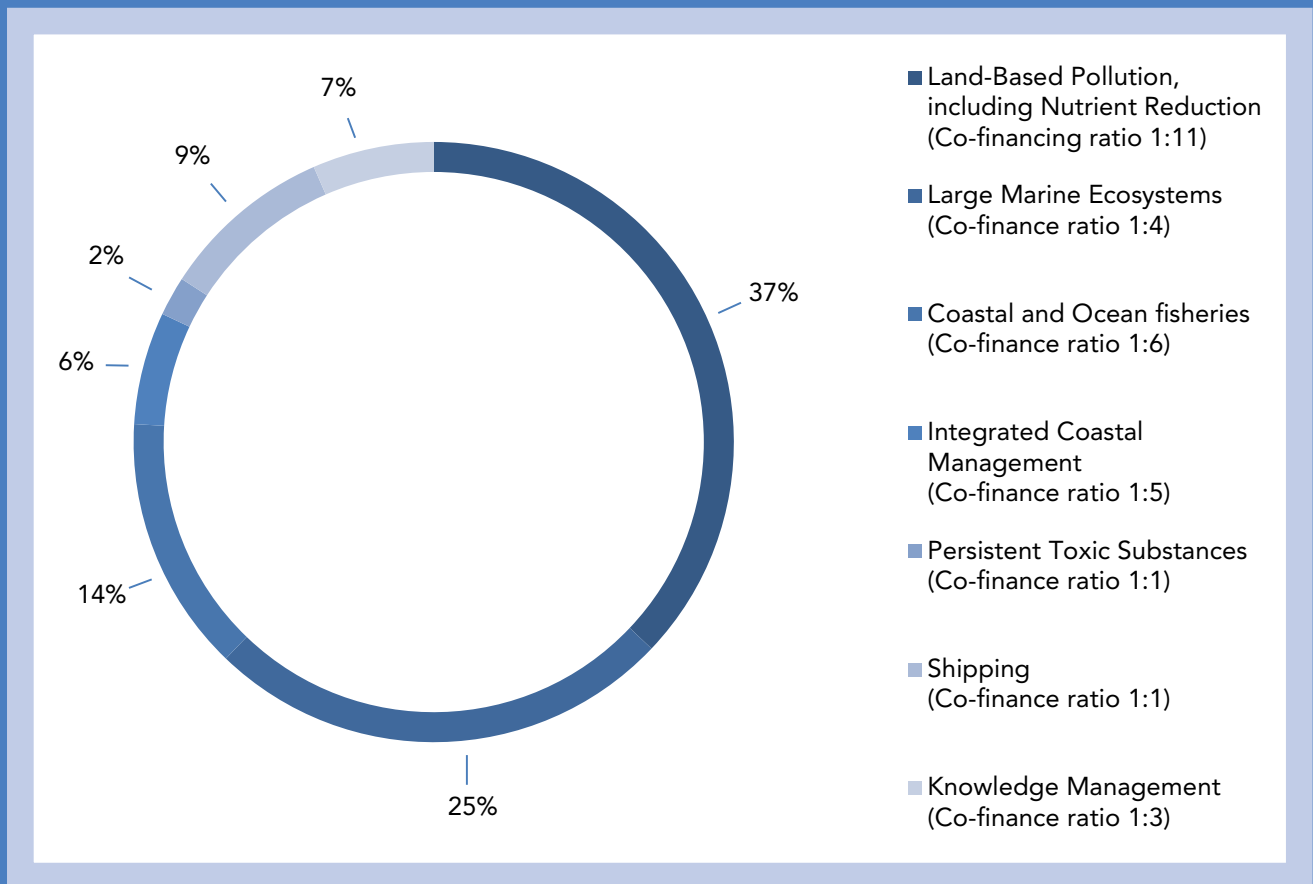
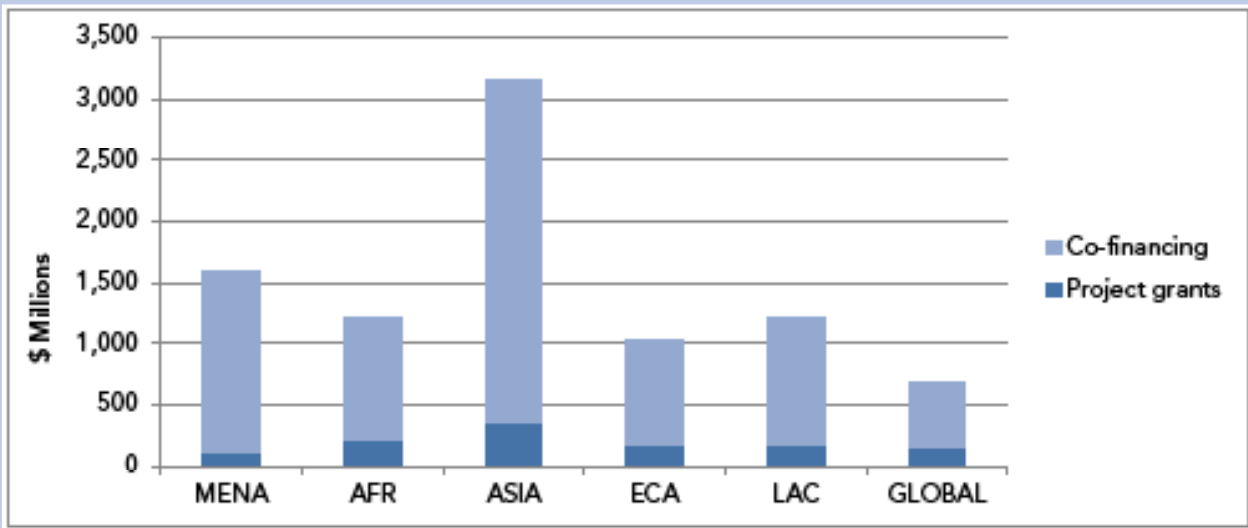




Figure 2: International Waters Marine Investments and Co-financing from 1991-2015  
(Middle East and North Africa, Africa, Asia, Economic Commision for Africa, Latin America and Caribbean, Global)



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benefiting from and/or impacting the coastal and marine resources are engaged in an integrated, multi-sectoral approach to ocean and coastal governance.

As discussed in this publication, GEF initiatives have had a tremendous impact at both galvanizing global and regional political level commitments as well as catalyzing on the ground local to national level actions. At a global scale, GEF projects enabled countries to support, sign and ratify the International Maritime Organization International Convention for the Prevention of Pollution from Ships and the International Convention for the Control and Management of Ships' Ballast Water and Sediments as explained in Chapter 6. Similarly the GEF projects on watershed and integrated coastal management in the Caribbean led to the ratification of the Protocol on Land-Based Sources of Pollution of the Cartagena Convention by six small island developing states as discussed in Chapter 3.

At a regional scale, the GEF has supported 23 Large Marine Ecosystems in which multiple countries collaborate on strategic, long-term ocean governance of transboundary resources. To date Transboundary Diagnostic Analyses (TDAs) and Strategic Action Programs (SAPs) have been developed and signed at the ministerial level in 13 LMEs. During implementation of the SAPs, the countries work toward long-term institutional and financial sustainability. For example, in the Benguela Current LME, South Africa, Angola and Namibia, following the TDA/SAP process, the three nations established the Benguela Current Commission and adopted the Benguela Current Convention. This experience and other examples of the TDA/SAP process are discussed in Chapter 1.

These high level commitments have led to on the ground action through projects focused on reducing land-based sources of pollution, building sustainable fisheries, developing ecosystem-based approaches, and reducing risks from maritime transport. In terms of reducing pollution, among others, Caribbean and East Asia wastewater projects created innovative funds, introduced progressive yet affordable, practical technologies, catalyzed institutional reforms and throughout raised political awareness regarding the social and economic importance of wastewater management as

discussed in Chapter 3. Sustainable fisheries initiatives in West Africa, Latin America and South Asia have established standard stock assessment systems, operationalized satellite-based monitoring, control and surveillance devices, improved inland processing and post-harvest handling, established fisheries co-management schemes and strengthened regulatory frameworks, which are elaborated in Chapter 4. Ecosystem-based approaches exemplified by experiences in Southeast Asia and the Gulf of Mexico have resulted in community-based mangrove restoration efforts, increased community environmental awareness, and established integrated coastal management initiatives as discussed in Chapter 5. Finally, maritime projects have led to a new ballast water treatment industry to protect the marine environment from invasive alien species and created real time observation tools to improve navigation to minimize ship-related accidents discussed in Chapter 6. These national and local efforts ensure the continued benefits of marine and coastal ecosystem goods and services worldwide.

This publication not only explores the global to local achievements of GEF projects; it also examines the key lessons learned, which can inform and guide future initiatives. Looking across the breadth of experiences highlighted in the chapters, several key lessons emerge:

- Project success depends on support and engagement from various institutions, including government, non-governmental organizations, academia and private sector, and across all relevant sectors, including fisheries, tourism, shipping, planning;
- Stakeholders must be engaged early and see the net benefits of engaging in initiatives in order to ensure their long-term involvement;
- Successful ocean governance relies on institutional engagement at all levels from ministers to local users and requires complementary regional, national and local efforts;
- Economic valuations of marine ecosystems have proved to be critical in acquiring the attention of politicians

- 
- towards transboundary agreements on management of the shared marine resources;
  - Strategic partnerships across implementing agencies can facilitate co-financing, institutional reforms, investments and long-term institutional sustainability;
  - A few key partners and trusted champions can be catalytic for building trust and building large partnerships;
  - Local and national demonstration activities can test innovative ideas and foster awareness and support, which can lead to buy-in and scaling up to a regional scale;
  - Monitoring and evaluation is critical for adaptive management and optimization of resources;
  - Private sector companies can contribute significantly to meeting environmental, social and economic goals and often wield strong political leveraging power; and,
  - Sector-specific projects, such as wastewater or fisheries projects, need to be coordinated with relevant projects outside their sector to ensure a holistic, integrated, ecosystem-based approach enabling a sustainable use of resources.
- As the GEF looks to the future of coastal and ocean issues, there is a strong commitment to build on the experiences and lessons of the past to ensure a future network of sustainable initiatives. With an emphasis on integrated approaches, GEF-6 projects are expected to broaden their emphasis by better incorporating relevant sectors, such as climate change and land degradation. At the same time, GEF-6 emphasizes private sector engagement, which ensures that the stakeholders who have the most to benefit and lose economically play an active role in providing for the long-term sustainability of the resources on which their livelihoods and businesses depend. With partnerships at the cornerstone of success, the GEF looks forward to working with partners worldwide to ensure the long-term sustainability of our valuable marine resources.



Fishing boats in mangroves  
(Hanneke Van Lavieren)

# Catalyzing Global and Regional Partnerships

By Andrew Hudson, Head of Water and Ocean Governance, UNDP

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Ocean governance has gradually evolved over the decades, from species-specific and sector management efforts to more holistic, ecosystem-based approaches and integrated management. At the same time there has been a growing recognition of the need to scale-up traditionally national and community-level governance efforts to more collaborative, regional and global-level initiatives. This shift toward more collaborative approaches recognizes that marine ecosystems do not end at political boundaries and instead need to be managed across nations, which is particularly important as economies and cultures become increasingly interconnected.

The GEF has been at the forefront of building the long-term sustainability of our oceans and the services they provide by catalyzing global and regional partnerships. At the cornerstone of these efforts is the concept of Large Marine Ecosystems (LMEs), which is discussed in

Chapter 1. Nearly twenty years ago in its first Operational Strategy, the GEF adopted LMEs — the majority of which are transboundary — as a conceptual and biogeographic framework for promoting the sustainable, ecosystem-based management of the world's oceans and coasts. The LME approach promotes the creation of new and reformed institutions, the reform and implementation of marine resource management policies and legislation, and the leveraging of public and private sector investment for LME restoration and protection. This approach is illustrated by the story of the GEF/UNDP Benguela Current LME (BCLME) Programme, which brought South Africa, Angola, and Namibia together to conduct a transboundary diagnostic analysis of issues facing ocean governance in the region, develop the BCLME Strategic Action Programme, establish the Benguela Current Commission, and adopt the Benguela Current Convention. Similarly, the GEF/UNDP Caribbean

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## THEME 1

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LME Programme demonstrates how 22 countries and 31 ministries can come together to agree on priority LME issues and actions through a 10-year Strategic Action Programme. Finally, in the GEF/UNDP Yellow Sea LME Programme, the People's Republic of China and the Republic of Korea conducted joint LME assessment cruises, a first for the region, which helped to identify shared ecosystem challenges leading to agreement on a Strategic Action Programme in which the countries agreed to reduce fishing effort by 30 percent, reduce nutrient discharges by 10 percent every five years, create a regional network of MPAs, and promote sustainable mariculture through the innovative integrated multi-trophic aquaculture approach.

In addition to supporting Large Marine Ecosystems, the GEF also promotes transboundary cooperation through a variety of regional frameworks discussed in Chapter 2. For example, the GEF/UNDP Partnerships in Environmental Management for the Seas of East Asia Programme has assisted its 12 participating countries in the development and ultimate adoption of the Sustainable Development Strategy for the Seas of East Asia, which provides a common platform for regional cooperation, policy development and investment plans and commits the countries to achieve 20 percent of the region's coast under integrated coastal management by 2015. This specific regional strategic partnership also included an investment component, managed by the World Bank, targeting coastal pollution as highlighted in Chapter 3. Similarly, in the Western and Central Pacific, a series of IW projects have supported the countries and the nascent Western and Central Pacific Fisheries Commission in strengthening national and regional policies, institutions, and legislation. Finally, in the Caribbean, the GEF/UNEP/UNDP Integrating Watershed and Coastal Area Management Programme succeeded in mainstreaming Ridge to Reef approaches by helping countries ratify key legal agreements such as the Protocol on Land-Based Sources of Pollution

of the Cartagena Convention, which led to ratification of the protocol by six small island developing states.

Through programs such as these and many others, GEF's marine and coastal portfolio has demonstrated the tremendous value of partnerships, not only across nations, but across and between GEF agencies, with partners such as the Intergovernmental Oceanographic Commission of the United Nations Organization for Education, Science and Culture, the International Maritime Organization, the Organisation for Central American Fisheries and Aquaculture, the African Union and the Pacific Islands Forum Fisheries Agency. Many of the successes and transformational impacts that the GEF marine portfolio has delivered over the last twenty years could not have been achieved without these kinds of partnerships and cooperation, a driving principle of GEF initiatives.

Agulhas Current flowing past the coast of Madagascar (Lucy Scott)



# Sustaining the World's Large Marine Ecosystems

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Most of the world's 66 Large Marine Ecosystems (LMEs) encompass two or more nations and often individually cover over 200,000 km<sup>2</sup> (Figure 1). These LMEs include near-shore coastal waters from river basins and estuaries, and reach the seaward boundaries of continental shelves and outer margins of major ocean current systems. LMEs are characterized by their unique undersea topography, depth and composition of the seabed, high fisheries productivity, and food chain interactions. LMEs harbor significant biodiversity and provide important ecosystem services, including food security, shoreline protection, and recreational opportunities. Taken together, LMEs contribute about \$12 trillion in goods and services to the global economy (Sherman and Adams 2013).

There is tremendous, growing human activity in the world's LMEs, which places pressure on the natural resources they provide. While 80% of the global fish catch comes from fisheries within LMEs, nearly 70% of these stocks are currently overexploited or have collapsed and about 30% are fully exploited (Sherman and Hempel, 2009). Unsustainable fishing is of special concern in the LMEs in Africa, Asia, and Latin America, where fisheries often have a strong cultural value to local people, provide an important source of protein, and support community livelihoods. As a consequence, mismanagement of fisheries often becomes a serious issue for food security.

The GEF's International Waters (IW) focal area embraced the LME concept as a vehicle for promoting ecosystem-based management of coastal and marine resources in 1995. The approach encourages neighboring nations to manage their shared marine ecosystems along natural rather than political boundaries. Over the course of more than 20 years, the GEF has invested in 122 countries through projects in 23 LMEs — over half of the LMEs in countries eligible for GEF funding — which build regional cooperation to manage these waters. These projects, implemented through strategic partnerships with both national and international entities, have encouraged governmental and non-governmental stakeholders around the world to embrace the LME approach as a mechanism to tackle overfishing, habitat degradation and loss, and pollution, among other serious threats.

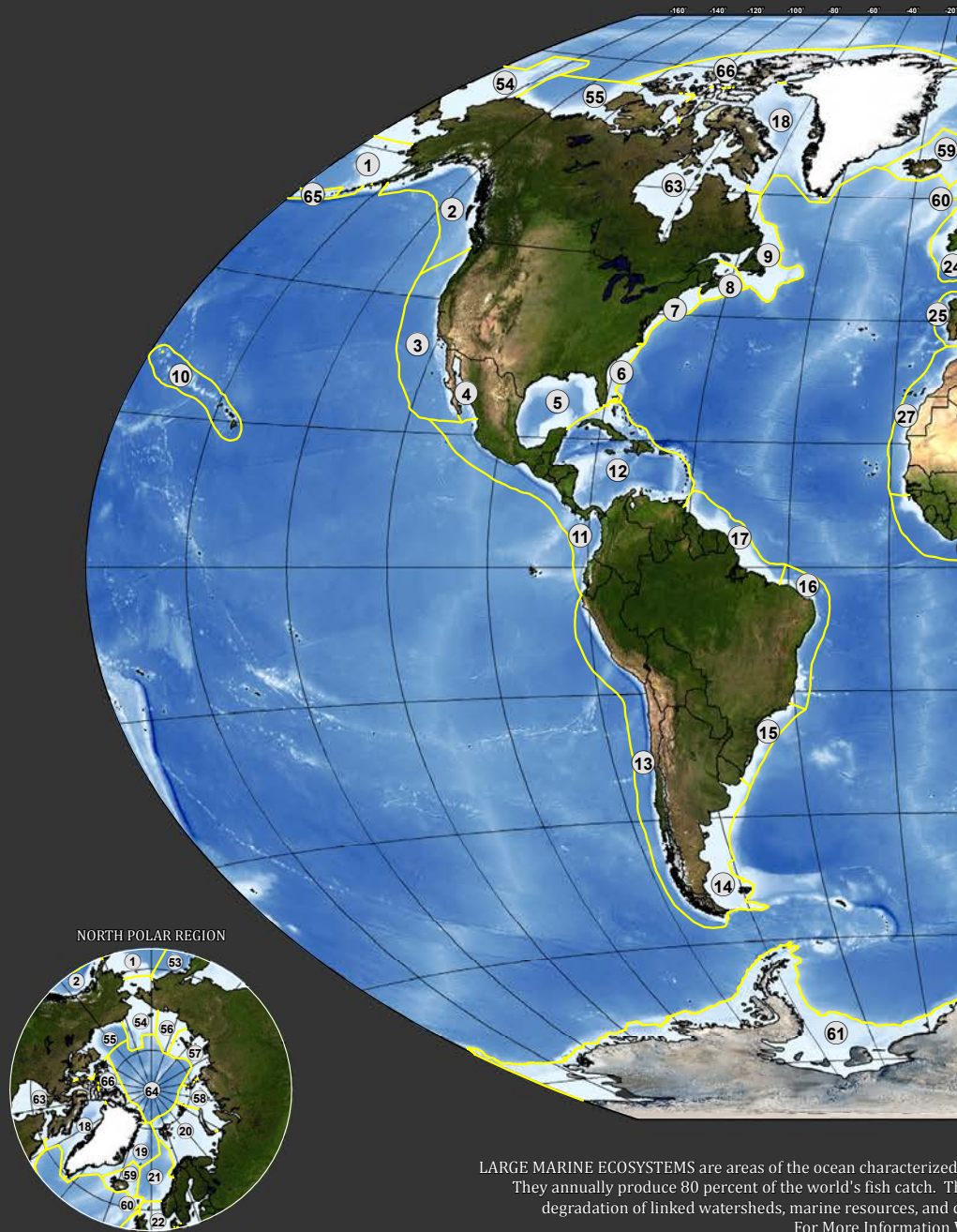
Today, the LME approach is the cornerstone of the GEF strategy for ocean and coastal conservation and the GEF is the leading global funding source for transboundary water systems. As discussed in this chapter, the Benguela Current, Caribbean Sea, and Yellow Sea LMEs illustrate how GEF investments and strategic partnerships have fostered a process that builds trust, cooperation, and collective management of shared marine resources, which has been replicated around the world.



Figure 1.

## 66 Large Marine Ecosystems of the World

(Source: [www.lme.noaa.gov](http://www.lme.noaa.gov))



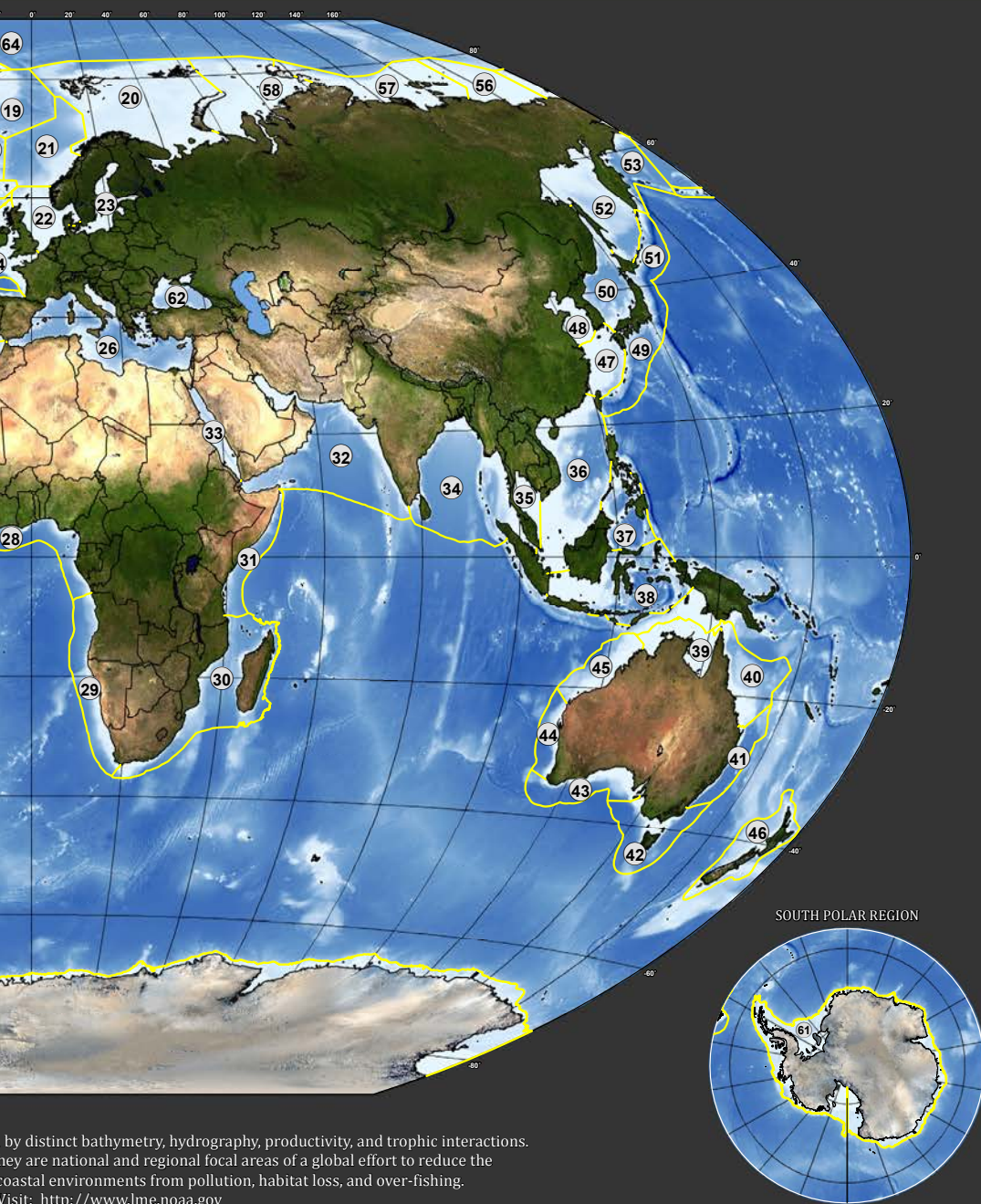
LARGE MARINE ECOSYSTEMS are areas of the ocean characterized by... They annually produce 80 percent of the world's fish catch. The degradation of linked watersheds, marine resources, and... For More Information

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





by distinct bathymetry, hydrography, productivity, and trophic interactions. They are national and regional focal areas of a global effort to reduce the coastal environments from pollution, habitat loss, and over-fishing. Visit: <http://www.lme.noaa.gov>

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

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# Fact Box: The TDA-SAP Process and Modular Approach

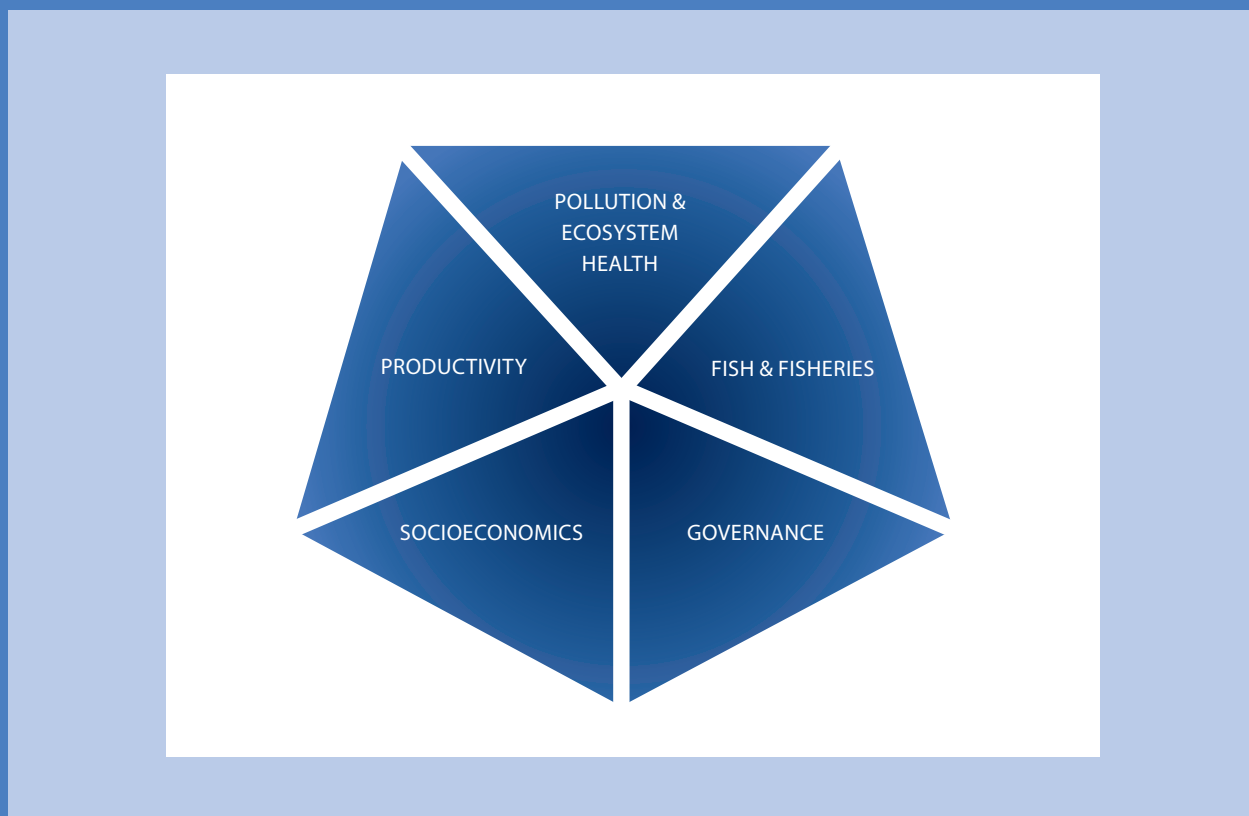
The IW focal area uses the Transboundary Diagnostic Analysis-Strategic Action Programme (TDA-SAP) Process to evaluate issues facing LME projects and develop a way forward. Participating countries first prepare a TDA through a consultative process in which they determine the root causes of the transboundary problems affecting their shared water body. This formal and inclusive process analyzes all pertinent factual and scientific information to set priorities for action. The TDA underpins the GEF LME approach, as it facilitates a science-based strategy to monitor changing LME conditions.

For the TDA, most large marine ecosystem projects apply a 5-module indicator approach to measure the changing states of LMEs (Figure 2). Three of the five LME modules are natural science-based evaluations: productivity, fish/fisheries, and pollution/ecosystem health. The other two modules are social science-based evaluations that focus on the socioeconomic benefits to be derived from a more sustainable resource base and governance mechanisms that provide stakeholders and stewardship interests with legal and administrative support for ecosystem-based management practices. The first four modules support the TDA process, while the governance module is associated with development or update of the SAP, which is helpful in setting priorities for action and in evaluating progress.

Once the TDA is complete the focus shifts from gathering scientific evidence to developing a country-driven SAP. The SAP includes a regional policy framework and the legal/institutional changes needed to address the priority actions identified in the TDA. Countries then agree upon National Action Programs (NAPs); a set of country actions necessary to implement the SAP at the national level.

Overall, the TDA-SAP process helps translate scientific findings into policy actions. Together, the TDA and SAP foster national and regional participation and cooperation to chart an ecosystem-based approach to sustainably manage a water body. The TDA/SAP process provides an effective, practical method for integrating science into management to inform appropriate governance regimes (Sherman, 2006).

Figure 4: Modular Approach for Assessment and Management of LMEs



(Source: Sherman and Hempel, 2008)



“The large majority of LMEs are shared by two or more countries, underscoring the need for regional cooperation to advance sustainable management. The added stress of climate warming makes it that

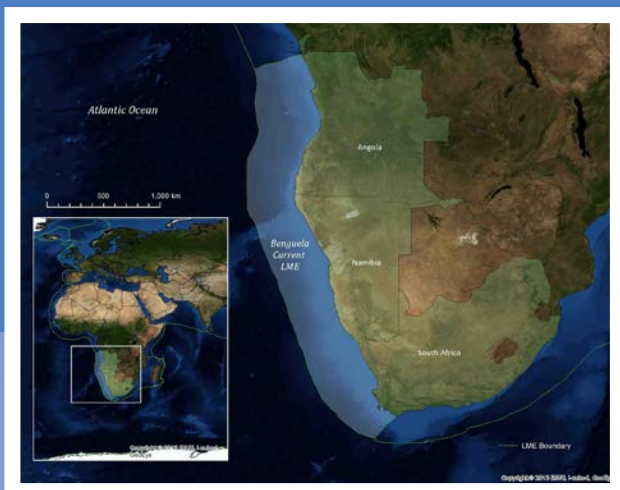


much more important  
that nations cooperate  
to sustainably manage  
LMEs, the areas where  
most marine fisheries are  
produced and caught.”

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Kenneth Sherman, Director, Office of Marine Ecosystem Studies, NOAA.

Lesser and greater flamingos foraging in coastal tidal flats of Namibia (Andrew Dansie)



## Benguela Current LME

# Building the World's First LME Commission

*The Benguela Current is the life-blood of Angola, Namibia, and South Africa. It is the world's most powerful wind-driven coastal upwelling system, and also one of its most productive marine ecosystems, contributing almost \$269 billion per year in ecosystem goods and services. The long-term sustainability of the Benguela Current LME is critical to the security and economic development of these three countries.*

The Benguela Current flows north-northwest for approximately 3,000 km from the Cape of Good Hope in South Africa and along the coast of Namibia before it tapers off in northern Angola. The Benguela Current Large Marine Ecosystem (BCLME) supports a variety of economic activities such as offshore oil and gas production, marine diamond mining, marine and coastal tourism, and commercial fishing. BCLME fisheries, for example, constitute 8.5%, 0.45% and 4% of Namibia's, South Africa's and Angola's GDPs, respectively, and provide over 62,000 jobs in the region (Sumalia, 2005). Angola, where people consume on average 15.7 to 17.3 kg of fish per year, relies heavily on fisheries for its food security (FAO Proceedings).

In the mid 1990s, the governments of Angola, Namibia, and South Africa recognized the need to move beyond

their historical conflicts and cooperate in the integrated management and sustainable use of their shared marine resources. The three governments turned to UNDP and the GEF for assistance in facilitating this cooperation, and the BCLME Programme was born. The Programme's goal was to secure the restoration and sustainability of depleted marine fish stocks and other degraded biodiversity of the Benguela Current through: (1) establishment of a Benguela Current Commission (BCC) to enable the three countries to engage constructively and peacefully in resolving transboundary issues that threaten the BCLME (i.e., the TDA process); (2) development of a framework to implement an ecosystem-based management approach (i.e., through SAP development); (3) improved management and harvesting of shared fish stocks; and (4) increased capacity to manage the human impacts on the BCLME (Sherman and Adams, 2013).

## FOSTERING COLLECTIVE ACTION

A TDA completed in 1999 helped foster the beginnings of regional cooperation and collective action for the BCLME. Regional and international experts, donor representatives, governmental and non-governmental stakeholders, and representatives from various commercial sectors (industrial and artisanal fishing, mining, oil and gas, port authorities,



“One element that sets the Benguela Current Commission apart is the Ministerial Conference. Decisions made here determine our work plan and provide a roadmap for action because the Ministers are able to deliberate and provide leadership and alignment with national priorities. This then allows us to engage the BCC knowing that its work contributes to our broader environmental management and government objectives. Another advantage of the BCC is the cross-sectoral nature of its leadership.”

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Ashley Naidoo, Chief Director,  
Oceans and Coasts, South Africa.

and tourism) contributed to a TDA that utilized the LME five-module approach (Figure 2). The TDA harnessed scientific knowledge to identify the most pressing transboundary environmental concerns, their immediate and underlying causes, and potential solutions. The TDA process also helped build the consensus, trust, and confidence amongst stakeholders that provided a strong foundation to develop a SAP for the entire BCLME. The SAP development process facilitated a common platform for Angola, Namibia, and South Africa to collectively commit to legislative, institutional, and management reforms. The confidence and trust that grew between the three governments throughout the process inspired full endorsement of the SAP by 2002. Perhaps most importantly, the SAP led to the formation of an Interim Benguela Current Commission.



Honorable Bernhardt Esau, Minister of Fisheries and Marine Resources, Namibia, and Hashali HAMUKUAYA, Executive Secretary of the Benguela Current Commission, officially open the Benguela Current Commission office (Nico Willemsse)

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## REGIONAL OCEAN GOVERNANCE

The permanent establishment of the BCC in 2008 stands out as the most important outcome of the BCLME Programme. The BCC constitutes the first fully institutionalized and operational intergovernmental, multi-sectoral LME commission in the world. It is also the first ever inter-governmental commission based on the LME concept for ocean governance, which signifies an important paradigm shift towards managing shared marine resources at the larger ecosystem level while balancing human needs with conservation imperatives. The mission of the BCC, based in Swakopmund, Namibia, is to enable Angola, Namibia, and South Africa to develop an integrated, science-based regional approach for the conservation and sustainable use of the BCLME. The BCC serves as a forum where government representatives with different sector portfolios in all three countries can engage directly with one another. The involvement of key industry players that are both highly influential and economically dependent on the policies and regulations that govern the BCLME also has been critical to the effectiveness of the BCC.

The BCC works to improve management of shared fish stocks, institute environmental monitoring, protect biodiversity and ecosystem health, mitigate pollution, and minimize the negative environmental impacts of marine diamond mining and oil and gas production. Training and capacity building to bolster sound environmental governance has also been at the forefront of the BCC's agenda, while complementary initiatives include an extensive science program funded by the government of Norway, and a comprehensive training and capacity building initiative supported by Iceland.

In 2009, the GEF, through UNDP, awarded another grant to support implementation of the SAP (the GEF/UNDP BCLME SAP Implementation Project), with leveraging and co-financing from other donors and South Africa, Namibia, and Angola. The objective of the SAP Implementation Project was the development and adoption of an effective transboundary LME management structure that would primarily address fish stock and fisheries rejuvenation and sustainability. This effort was supported and made operational by transboundary

and national level institutions and guided by a series of lessons and best practices that culminated in a model for LMEs around the world to replicate.

The SAP Implementation Project has yielded multiple benefits for the BCC. It helped the three participating countries develop and finalize negotiations for the BCC, strengthened its structures and functions, and initiated the development of a strategic plan, a business plan, and a resource mobilization strategy. The SAP Implementation Project also updated the original 2001 SAP, supported a number of capacity development and institutional strengthening initiatives, encouraged the adoption of appropriate financial mechanisms and partnership agreements, and improved the overall participation of non-fisheries sectors in the Commission. Other key outcomes include supporting Namibia's long-term fisheries strategy, which incorporates the ecosystem approach into fisheries management, and initiating the harmonization of national management and operational practices to secure a regional approach to managing the Benguela Current.

“The SAP Implementation Project has been a true catalyst because it has supported sector integration in the Benguela Current Commission at the LME scale. I expect that these efforts will have major positive impacts in the region if outcomes are sustained and further developed into the future.”

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Pinehas Auene, Deputy Director,  
Pollution and Maritime Affairs, Namibia.



“The GEF has served as a critical central coordinating mechanism which has resonated with the development goals and priorities of each of the countries reliant on the BCLME. The creation of the Benguela Current Convention has been a major milestone for the region. We have had unwavering political support since the beginning because the three ministers who signed the Convention have seen how these efforts will contribute to regional cooperation in an effort to secure the long-term sustainability of the BCLME.”



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## SECURING A LONGTERM COMMITMENT

On March 18, 2013, in the culmination of almost two decades of cooperation and high-level policymaker engagement in the process, Angola, Namibia, and South Africa signed the Benguela Current Convention. The Convention serves as a formal treaty among these governments to promote a coordinated regional approach to the long-term conservation, protection, rehabilitation, enhancement, and sustainable use of the BCLME. So far, Namibia and South Africa have ratified the convention, and once ratified by all three countries this groundbreaking legal instrument will come into force. The Convention articulates strong principles that advocate for sustainability, use of the precautionary approach and the polluter pays principle, integrated sustainable development planning, and equitable access to available marine resources. The precautionary approach implies that in the face of scientific uncertainty the Commission will ensure limited or no negative environmental impacts. Under the polluter pays principle, a party responsible for pollution to the marine environment will bear the full cost of clean-up and compensation. The Benguela Convention demonstrates the goodwill and cooperation that has grown between the three countries over the last 20 years, and will allow them to engage in joint management of their shared natural resources through harmonized laws, policies, and approaches.

In addition to strong country ownership, the SAP Implementation Project also benefitted from significant financial commitments. With this project, the GEF contributed \$15.1M through the UNDP, while \$23.45M was catalyzed from the countries (Angola, Namibia, and South Africa), and other organizations, such as the Benguela Environment Fisheries Training Interactions Programme (\$7M). Since early 2014 each of the three countries has made a long-term commitment for the sustainability of the BCC Secretariat and its operations by fully financing all operations, including previously donor-funded salaries for professional staff. This level of commitment will help guarantee the future sustainability of marine resources in the Benguela Current LME. Further, the GEF in 2015, through UNDP, plans to implement an \$11.2M project aiming at supporting the convention and the SAP through policy,

legal, institutional and management reforms at national and regional levels. The project facilitates full participation by communities, public and private sector stakeholders with \$174M estimated co-financing.

Together, the BCLME Programme and SAP Implementation Project foster long-term partnerships between Angola, Namibia, and South Africa as well as partnerships with international partners and donors (e.g., GEF, NOAA, EU, Norway). The regional cooperation, trust, and security that have been nurtured throughout the lifespan of these initiatives are a testament to the positive impact of the GEF's catalytic role, strategic partnership, and investments. These experiences have reinforced the need for science-based understanding as a necessary precursor to political action and effective governance of important shared marine resources. This effort has become a global example for other LME projects to follow and many elements are now being replicated elsewhere. The ability of the three nations to overcome historical tensions to work together for the region's mutual and sustainable benefit provide hope that similar challenges can be overcome to protect the world's vulnerable marine environments.

KEY ACHIEVEMENTS

- Established the Benguela Current Commission, the world’s first multi-sectorial LME commission;
- Crafted a legally binding Benguela Current Convention, which has been signed by all three governments and ratified by Namibia and South Africa. The Convention serves as the overarching legal framework for the use of and access to BCLME;
- Revised and updated a causal chain analysis for the SAP and Science Programme for 2014/15–2018/19 to implement a knowledge-based approach to ocean governance;
- Fostered a long-term commitment to sustain the Commission Secretariat and its operations. Since early 2014 the three governments have been fully financing all operations, including previously donor-funded salaries for professional staff; and
- Supported countries to initiate policy, institutional, and management reforms necessary at national levels to comply with BCC-led strategies.



Great White Pelicans (*Pelecanus onocrotalus*) on the Atlantic African coastline (Yves de Soye)

GEF INVESTMENTS

The Benguela Current Large Marine Ecosystem SAP Development and Implementation

DURATION OF GEF INVESTMENTS

2001-2020  
(Includes the expected implementation period of the next GEF investment, which is currently under preparation.)

RECIPIENT COUNTRIES

Angola, Namibia, South Africa



### LESSONS LEARNED

- Project success depends on high-level political partnership and support, coupled with ministerial trust in senior managers and technical staff to deliver and represent the best interests of participating countries;
- Financial investments are necessary to build confidence and trust amongst technicians, scientists and managers to enable policy level dialogue and partnerships;
- Non-fisheries private sector companies contribute significantly to meeting environmental, social, and economic goals and often wields strong political leveraging power; and
- When there is strong political will and support to achieve something as profound as the BCC and its Convention, senior managers and technicians must meet project milestones.

GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
United Nations Development Program	\$32.88M	\$266.99M	<a href="http://www.benguelacc.org">http://www.benguelacc.org</a>



Coral reef off San Andres Island, Colombia (Patrick Debels)



## Caribbean and North Brazil Shelf LMEs

# Uniting Countries Behind a Region-Wide 10-year Strategic Action Programme

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*The 44 countries and territories within and surrounding the Caribbean and North Brazil Shelf Large Marine Ecosystems make this one of the most geopolitically complex regions of the world. These countries and territories depend on the many critical goods and services that these LMEs offer, providing a strong incentive to manage these ecosystems in a sustainable and cooperative manner.*

The Caribbean and North Brazil Shelf Large Marine Ecosystems cover approximately 4.4 million km<sup>2</sup>. Fisheries, tourism, shipping, and oil and gas production are all critical to the socio-economic development of the region. According to the Caribbean Tourism Organization (CTO), the Caribbean region welcomed more than 25 million stay-over visitors in 2013, up from 24.6 million in 2012.<sup>1</sup> The Caribbean is the world's premier cruise destination and commands over 60% of the global cruise market (CLME SAP). Caribbean coral reefs have been valued at roughly \$4B annually through their contribution to, among other things, shoreline protection, tourism/diving, and fish habitat (GEF-UNDP, 2013). Nearly one million people work in capture fisheries, and another three

million in related activities (GEF-UNDP, 2013). Constituting only one-third of the surface area of the Caribbean LME, but with higher levels of primary productivity, the North Brazil Shelf LME produces a comparatively higher value per unit area from reported fisheries landings, with a total annual value of approximately \$700M (Sea Around Us, 2011). The shrimp resources in the Guianas–Brazil sub-region alone support one of the most important export-oriented shrimp fisheries in the world. Together, the two LMEs bring about \$1.2B yearly in export earnings into local communities (GEF-UNDP, 2013) while much of the region's population has access to the sea, and relies on fish as a vital source of protein. Therefore, any threat to the marine environment also poses a threat to human health and overall well-being.

## A COORDINATED APPROACH TO LME GOVERNANCE

The Caribbean and North Brazil Shelf LMEs includes 26 countries and 18 overseas dependent territories and associated states of the United States, United Kingdom, France, and

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<sup>1</sup> 28 of the 44 CLME+ Countries and Territories are members of the Caribbean Tourism Organization

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the Netherlands. The majority of these are categorized as Small Island Developing States (SIDS). The diverse cultural, economic, and geopolitical realities of the two LMEs have resulted in fragmented and diverse approaches to the governance and management of the marine environment and its resources. However, the shared and interconnected nature of the marine environment makes clear the need for region-wide, cooperative governance systems. With co-financing provided by regional and national entities, in 2009 the GEF partnered with UNDP and the Intergovernmental Oceanographic Commission of the UN Educational, Scientific and Cultural Organization (IOC-UNESCO) to implement the Caribbean Large Marine (CLME) Project<sup>2</sup> to help the countries and territories in the region unite their efforts to establish a more coordinated ecosystem-based approach to management.

## ADDRESSING A MULTITUDE OF THREATS

TDA's of the two Large Marine Ecosystems encompassing the CLME Project adopted an innovative approach. TDAs were conducted for each of the three major ecosystem types that support the region's most important fisheries and biodiversity: (1) coral reefs and associated ecosystems, (2) the continental shelf ecosystem, and (3) the pelagic ecosystem. Human activities have progressively degraded the capacity of these ecosystems to provide goods and services to the people of the region. The TDAs identified the three inter-related transboundary problems of unsustainable fishing, habitat degradation, and pollution as the biggest threats

to the marine environment. The analysis also found that weaknesses in the existing governance systems, and in their implementation, are the root causes of these threats. Based upon the findings of the TDAs as well as on the additional knowledge, insights, and experiences acquired through a series of case studies and pilot projects executed by regional and global partner organizations,<sup>3</sup> the CLME Project, following a highly participatory approach, developed a 10-year SAP for sustainable shared living marine resources management in the Caribbean and North Brazil Shelf LMEs region. The SAP outlines several actions and interventions to address the identified threats and their root causes, using a holistic, inter-sectoral, and integrated approach.

SIDS are particularly vulnerable to the effects of climate change. Climate change adds complexity to the management of shared marine resources by intensifying existing threats to the coastal and marine environments in the region and further threatens economic, environmental, and human security. The SAP therefore treats climate change as a cross-cutting theme, which requires special attention during the selection and implementation of priority actions to deal with the three key threats to the marine environment. The aim is to ensure that the results from the planned investments and interventions under the SAP remain solid and relevant 10-20 years from today.

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<sup>2</sup> The Caribbean Large Marine Ecosystem Project includes both the Caribbean LME and the North Brazil Shelf LME.

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<sup>3</sup> The Caribbean Regional Fisheries Mechanism (CRFM), the Centre for Resource Management and Environmental Studies of the University of the West Indies (CERMES), the Food and Agriculture Organization of the United Nations, the UNESCO IOC Sub-commission for the Caribbean sea and Adjacent Regions (IOCARIBE), the Organization of the Fisheries and Aquaculture Sector of the Central-American Isthmus (OSPESCA), the Caribbean Environment Programme of the United Nations Environment Programme (UNEP-CEP).



“The CLME Project has contributed to improving cooperation between countries in the region. It has given us access to instruments that encourage an ecosystem-based approach to fisheries management. We are now able to engage more effectively in the planning and implementation of programs and projects of Regional Fisheries Bodies and inter-governmental fisheries agencies like the FAO. This project has also given us the possibility for direct cooperation with other countries, fisheries research institutions, and governmental and non-governmental funding institutions, ensuring a straightforward and transparent exchange of knowledge and experiences across the region.”

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Sérgio Macedo Gomes de Mattos, Director of Management and Control,  
Ministry of Fisheries and Aquaculture, Brasil

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## APPLYING AN ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT

The CLME Project has helped the region shift away from a national-focused fisheries and marine resources management approach to a more collaborative, ecosystem-based approach necessary for sustainable development. One of the achievements has been the development of a Joint Action Plan by the sub-regional fisheries bodies of Central America (OSPESCA) and of the Caribbean Regional Fisheries Mechanism (CRFM) on a number of economically important fisheries such as the spiny lobster, queen conch, and large pelagics.



Akumal Beach in Yucatan Peninsula, Mexico (Robin Mahon)

“The CLME project provided the CRFM with the opportunity for strengthening and consolidating its sub-regional scientific and governance frameworks for joint management of the commercially important Eastern Caribbean flying fish. This has led to firm establishment of a CRFM Ministerial Sub-Committee on flying fish, and a management plan that respects stakeholder participatory processes and networking, and of course, which is also keenly tuned to the demands of an ecosystem approach.”

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Susan Singh-Renton, Deputy Executive Director,  
Caribbean Regional Fisheries Mechanism Secretariat.



Caribbean spiny lobster (Mark Butler)

## Fact Box: Protecting Shared Lobster Stocks

The Organization of the Fisheries and Aquaculture Sector of the Central American Isthmus (OSPESCA) estimates that 60,000 people in Central America are involved in the capture, sale, and export of spiny lobster, bringing some \$450M into the region annually (CLME 2013). For the last five years (2010-2014), Belize, Guatemala, Honduras, Nicaragua, Costa Rica, Dominican Republic, and Panama have implemented a joint closed season for the Caribbean spiny lobster fishery to help safeguard the sustainability of the Caribbean's largest commercial fishery. The seasonal ban is in effect from 1 March until 30 June, which covers the lobster's reproductive period. This important achievement is expected to contribute to the reversal of the negative trends in stocks of this lobster species, which has been under heavy pressure from commercial fishing. Together with other measures, this regional agreement is bringing the sector one step closer to achieving sustainable management of this fishery.





Local fishermen catch of queen conch in St. Lucia (Hanneke Van Lavieren)

“This project has the largest number of countries that have jointly endorsed an LME-based Strategic Action Programme in the history of the GEF. It is noteworthy that a very large share of these countries and territories are SIDS. We have seen amazing achievements in a very short time. At this particular moment, however, it is critical that the region can count on continued support from the GEF to kick-start the implementation of the 10-year SAP. Without this support, the financial burden for a transition to enhanced regional cooperation will be too high for the region to bear, but the costs of not acting will be far greater for people and the environment.”

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Patrick Debels, Regional Project Coordinator, CLME Project.

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## KEEPING UP THE MOMENTUM

By June, 2014, 31 ministers from 22 different countries had endorsed the CLME SAP. This exceptional achievement is a clear indication of the momentum that was created in the region with the support of the GEF. The SAP brings together the different countries and sectors with a stake in the region's marine environment, in support of a shared cause: ensuring the important role of marine resources in social and economic development. The high-level regional commitment that has been secured will stimulate further collaboration among stakeholders from different sectors. The SAP provides a clear roadmap towards sustainable governance and management of shared living marine resources in the two Large Marine Ecosystems.

Much of the project's success comes from the fact that decisions on how to respond to challenges were left to partner countries and regional organizations. This helped develop broad-based support and ownership of the project activities, which eventually manifested in the regional agreement to implement the SAP. Through the life of the CLME project, regional cooperative mechanisms have been enhanced and have allowed for more coordination between key regional fisheries and environmental organizations for decision making. Despite the high-level political endorsement of the SAP, critical work remains to be done to keep the momentum going to achieve more sustainable management of this critical marine ecosystem. To this effect, a GEF/UNDP project totaling approximately \$12.5M in GEF resources and \$130M in co-finance is beginning implementation in 2015.

This new project will demonstrate large buy-in from regional stakeholders drawing its co-financing from both regional and national entities. The project will form the cornerstone of the SAP implementation efforts and will contribute substantial benefits to the region.

The CLME Project was critical in supporting a positive shift towards multi-country cooperation and coordination in one of the most geopolitically diverse regions in the world. The strategic partnerships and investments provided by the project have been instrumental in building trust,

coordination, and cooperation among all participating countries. It has encouraged robust governance and management arrangements for marine resources at regional, sub-regional, national and local levels, while at the same time laying the foundation for an ecosystem-based approach to fisheries management. The successes in culturally diverse countries and territories ranging in size from Brazil to Barbados are largely attributed to the commitment of the participating countries and project partners as well as their willingness to move past differences and work together. Geopolitical barriers have been broken and the region is now moving towards a more sustainable, ecosystem-based approach for marine resources management that will have benefits that reach far beyond the CLME and North Brazil Shelf LME.



Lionfish and reef, Caribbean (Patrick Debels)

KEY ACHIEVEMENTS

- Developed a 10-year Strategic Action Program endorsed by 31 Ministers in 22 countries;
- Created a Joint Action Plan between OSPESCA and the Caribbean Regional Fisheries Mechanism on economically important fisheries such as the spiny lobster, Queen conch and various pelagic fish;
- Developed the first Regional Fisheries Management Plan for the four-wing flying fish, and ensured its adoption;
- Worked with Belize, Guatemala, Honduras, Nicaragua, Costa Rica and Panama to implement the 5<sup>th</sup> joint seasonal closed period on lobster fishing during the breeding season along the entire Caribbean coastline of Central America;
- Established a Memorandum of Understanding and Cooperation between OSPESCA and the Central American Commission for Environment and Development;
- Promoted exemplary collaboration among several UN agencies, academia, and regional governance bodies; and
- Fostered enhanced coordination and collaboration among fisheries and environment sectors in several CLME+ countries.



GEF INVESTMENTS	DURATION OF GEF INVESTMENTS	RECIPIENT COUNTRIES
The Caribbean and North Brazil Shelf Large Marine Ecosystems SAP Development and Implementation	2009-2020 (Includes the expected implementation period of the next GEF investment, which is currently under preparation.)	Antigua & Barbuda, Bahamas, Barbados, Belize, Brazil, Colombia, Costa Rica, Dominica, Dominican Republic, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago





## LESSONS LEARNED

- Collaborate closely with and involve key regional organizations and partners during implementation;
- Use on-the-ground pilot and demonstration activities to foster country and stakeholder ownership;
- Manage projects adaptively in dynamic environments; and
- Monitor and evaluate progress and results in order to facilitate adaptive management and optimize resource use.

### GEF AGENCIES

United Nations  
Development Program

### GEF GRANTS

\$20.65M

### CO-FINANCING

\$158.44M

### WEBSITES

<http://clmeproject.org>

# Case Study: Lowering Fishing Pressure through Regional Cooperation

The Yellow Sea Large Marine Ecosystem (YSLME) is a semi-enclosed body of water between the People's Republic of China and the Korean Peninsula. This shallow sea has an area of about 400,000 km<sup>2</sup> and boasts a wide variety of habitats and a high level of marine biodiversity, but the coastline is heavily populated, urbanized, and industrialized. Fisheries have become increasingly important to the region: total annual landings have increased from 425,000 tonnes in 1986 to an average 2.40 million tonnes in 2003 and 2004. The People's Republic of China has been harvesting the lion's share of the catch, averaging approximately 92.6% of the total catch over this period. The number of fishing vessels has risen from about 100,000 in 1986 to an average of 140,000-150,000 in 2004. Not surprisingly, the Yellow Sea has been identified as one of the LMEs most detrimentally impacted by human development.

In 2004, recognizing that sustainable management was essential for continuing exploitation of the natural resources that the Yellow Sea provides, the People's Republic of China and the Republic of Korea partnered with UNDP in the Reducing Environmental Stress in the YSLME Project (Phase 1). The primary focus was to secure sustainable

fisheries management and reduce environmental stresses on the YSLME, which placed this project in a unique position to improve cross-border collaboration between the People's Republic of China and the Republic of Korea. In addition to the two participating countries, the project also successfully involved the Democratic People's Republic of Korea (DPRK) as an observer in some of the major project activities.

Joint regional cruises and fishery stock assessments (both new to the region) were examples of early project activities that contributed to building trust and provided a firm footing for regional cooperation. These activities gathered the information needed to create a regional analysis of the status and trends in fisheries. The analysis served as a baseline for future studies and helped identify shared challenges. The technical, logistical, and political difficulties that arose while these joint tasks were being conducted were resolved collectively by team members from both countries. This was a clear sign of their willingness to work together and find solutions.

A landmark success of the YSLME Project has been the agreement between the People's Republic of

GEF INVESTMENTS	DURATION OF GEF INVESTMENTS	RECIPIENT COUNTRIES
Yellow Sea Large Marine Ecosystem SAP Development and Implementation	2004-2018	People's Republic of China and Republic of Korea



China and the Republic of Korea to reduce the size of the fishing fleet by 30%. The agreement set a precedent in the region with respect to cooperation and establishment of mutual trust and confidence and will help reduce the pressure on fish stocks. In order to alleviate some of the economic impacts on fishermen, the countries have been undertaking boat buy-backs and providing training on alternative livelihoods. Complementary achievements include signing joint agreements to reduce nutrient discharges by 10% every five years, creating a regional network of marine protected areas, promoting sustainable mariculture using baskets in deeper waters to overcome the problem of converting the coastal ecosystems to ponds

for aquaculture, and continuing joint regional stock assessments.

Despite some formidable obstacles, the YSLME Project has helped stimulate a new era of cooperation and environmental progress. Encouraging signs include evidence that the total biomass of the Yellow Sea has been slowly recovering. Building on the successes of Phase 1, which was completed in early 2014, the People’s Republic of China and the Republic of Korea have committed to implement the agreed SAP priorities through a new GEF/UNDP project to secure international, multilateral coordination and cooperation

GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
United Nations Development Program	\$22.30M	\$235.69M	<a href="http://archive.iwlearn.net/">http://archive.iwlearn.net/</a> <a href="http://www.yslme.org">www.yslme.org</a>





Small fisherman's boat filled with conch  
(Robin Mahon)

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# Building Frameworks for Regional Cooperation

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*Working together to solve shared problems of transboundary water bodies can build trust and confidence between countries. At the same time, shared water bodies can be a source of conflict due to territorial disputes or competition over natural resources.*

With over half the people in the world living along or near the coast, the oceans provide global benefits as well as local benefits to near-shore communities. Ocean ecosystems are important for food security, recreation and tourism, and protection from storm surges and floods, among other benefits. Due to the transboundary nature of marine ecosystems (e.g. the migration of commercial fish species) makes coordinated management of countries imperative. One pathway to multi-state environmental cooperation is through the negotiation and adoption of regional agreements and strategic policies — including legal, institutional and policy reforms — that guide and coordinate the management of shared water bodies.

The GEF has long promoted multi-country and multi-sectoral cooperation to balance the often conflicting uses of marine resources and resolve a range of regional, national, and site-specific challenges. The GEF supports initiatives to improve the functionality of existing legal and institutional frameworks

or to create new ones. The GEF has been instrumental in fostering the development and adoption of a number of regional agreements, strategies, and/or frameworks aimed at enhancing cooperation. Most frameworks are developed through the development of the Transboundary Diagnostic Analyses (TDA) and Strategic Action Programmes (SAP) as the fundamental science-to-policy process to enable collaborative action. This process is perhaps best illustrated by the establishment of both a governing convention and transboundary commission for the Benguela Current Large Marine Ecosystem, described in Chapter 1.

As discussed in this chapter, several other GEF investments have contributed to building consensus and cooperation between countries to address priority transboundary water issues by establishing, or improving upon, regional or transboundary basin governance systems and a science-to-policy process. Over its 20-year life, the GEF-funded Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) has fostered and sustained regional cooperation for long-term sustainable development of the East Asian Seas. The UNDP implemented project Pacific Oceanic Fisheries Management Project (OFMP) has played a key role in improving regional cooperation and management of transboundary fishery resources (i.e., focusing on tuna stocks in the West Central Pacific to assist its island nations

and in optimizing sustainable economic returns). And finally, the UNDP and UNEP implemented project Integrating Watershed and Coastal Area Management project (IWCAM) assisted participating Caribbean countries meet international obligations for land-based sources of marine pollution.

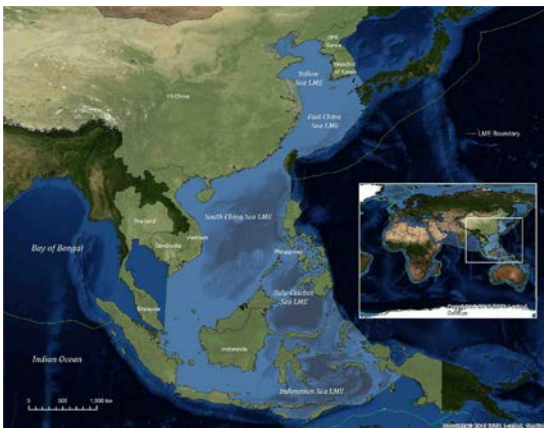


Artisanal fisherman in Kei Islands, Indonesia  
(Yvonne Sadovy, Society for the Conservation  
of Reef Fish Aggregations)





Cowrie shells for sale in Hundred Islands,  
Philippines (Andy Hooten, GEF-IBRD Coral  
Reef Targeted Research Project)



## The Seas of East Asia

# Catalyzing 20 years of Partnerships in the East Asian Seas

*The Seas of East Asia are made up of six sub-regional large marine ecosystems (LMEs)<sup>1</sup> that cover about 5.9 million km<sup>2</sup> and produce about 40% of the world's fish catch (PEMSEA, 2013). The region is a hub for economic development, and regional cooperation is far more than a means to protect the marine environment; it serves as a mechanism for building confidence and trust.*

East Asia's seas harbor rich biodiversity and support one-third of the world's coral reefs and mangroves. The region is also the most densely populated and rapidly developing area on earth, leading to overexploitation, coastal development, habitat destruction, pollution, and other threats to coastal ecosystems. Within a span of 30 years, 11% of the regions coral reefs have collapsed, while 48% are in critical condition. Mangroves have declined by 70% over the last 70 years, and at the current rate of deforestation and degradation all of East Asia's mangroves will disappear by 2030. The region produces about 55 million tonnes of hazardous waste, and 27 billion tonnes of sewage annually, much of which are discharged directly into marine waters. These seas serve

as a major hub for maritime trade which poses additional environmental challenges (UNDP, 2012).

Solving the complex problems of coastal and ocean management and governance requires work at local, national, and regional levels. PEMSEA provides an excellent example of how strategic partnerships and targeted financing can catalyze regional cooperation towards effective management approaches and strategies. The GEF began supporting PEMSEA in 1994 to address priority threats. This unique partnership has not only fostered, but sustained, regional cooperation. PEMSEA demonstrates that countries are willing to come together and commit to long-term sustainable development without a legally binding regional protocol or convention.

## BUILDING A SOLID FOUNDATION FOR COOPERATION

In 1993, the GEF, together with the UNDP and the International Maritime Organization (IMO), launched the first in a series of GEF IW regional projects: the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS) Project

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<sup>1</sup> East China Sea; Yellow Sea; South China Sea; Sulu-Celebes (or Sulu-Sulawesi) Seas; Indonesian Seas; Gulf of Thailand.

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(1994–1999). The subsequent projects included GEF/UNDP Building Partnerships for the Environmental Protection and Management of the East Asian Seas and GEF/UNDP Implementation of Sustainable Development Strategy for the Seas of East Asia (SDS SEA). MPP-EAS evolved into the transboundary institution named PEMSEA. MPP-EAS originally involved six countries (Cambodia, the People's Republic of China, Philippines, Malaysia, Thailand and Vietnam), but during the course of the project expanded to include seven more: Brunei, Indonesia, DPR Korea, RO Korea, Singapore, Japan, Lao PDR and Timor-Leste. In addition, GEF supplemented this ICM project by supporting the establishment of a further strategic partnership of countries and GEF agencies to address land-based marine pollution in East Asia. In 2005 the GEF and World Bank launched the Investment Fund for Pollution Reduction in the Large Marine Ecosystems of East Asia (IF), a mechanism to co-finance innovative projects aimed at reducing land-based marine pollution in selected hotspots. The IF was designed to reduce land-based pollution discharges that have an impact on the seas of East Asia by leveraging investments in land-based pollution reduction through the removal of technical, institutional, and financial barriers (see Chapter 3).

A key lesson from the MPP-EAS Project was that marine pollution is only one of the major threats to the region's environmental and economic sustainability. The countries recognized that in order to protect ecosystems and their services over the long term, they would need to address the cumulative impacts of pollution together with other threats, such as fisheries overexploitation and habitat destruction, in a holistic and integrated manner.

PEMSEA provided a solid foundation for regional cooperation, bringing together the different countries to establish interagency, multi-sectoral, and intergovernmental partnerships for sustainable development. PEMSEA has also raised awareness and confidence among the local governments in the use of integrated coastal management (ICM) as an effective management tool to reverse the negative environmental trends in the Seas of East Asia (see Chapter 5).

## A SUSTAINABLE DEVELOPMENT STRATEGY

Years of extensive consultation, building on the successes of GEF-supported projects at local and national levels, spurred the 12 participating countries to adopt the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA) in 2003 through the Putrajaya Declaration. The SDS-SEA provides a non-legally binding common platform for regional cooperation, as well as a framework for policy development. Most importantly, the strategy includes a commitment to place 20% of each participating country's coastline under ICM by 2015.

In 2006, the project created the East Asian Seas (EAS) Partnership Council to facilitate implementation of SDS-SEA. The Council includes Country Partners and Non-Country Partners — national, regional, and international organizations and institutions operating in the region that share the vision of the SDS-SEA. The Council currently has 11 Country Partners and 20 Non-Country Partners and has formally recognized PEMSEA as the regional coordinating mechanism for the implementation of the SDS-SEA.

PEMSEA and the SDS-SEA thus forged a regional governance mechanism for integrated and collaborative planning and implementation, as well as a forum for the promotion of good practices in ICM (PEMSEA, 2013). Member countries have committed to three priority targets: 1) development of coastal and ocean policies; 2) implementation of ICM programs covering at least 20% of the region's coastline by 2015; and 3) preparation of State of Coasts reports, including climate change adaptation measures.

In 2009, eight countries formally recognized the international legal personality of PEMSEA as an independent entity tasked with SDS-SEA implementation. This important milestone was followed by two more key achievements: in 2011, the PEMSEA Network of Local Governments for Sustainable Coastal Development (PNLG) adopted the Dongying Declaration by which the countries committed to ocean governance actions and targets; and, in 2012, country partners adopted the Changwon Declaration, which serves as the region's response to the Rio+20 outcomes by promoting



“PEMSEA has laid a solid partnership foundation and an operational model for ocean and coastal governance that could help achieve the common goals of sustainable development.”

Dr. Chua Thia-Eng, Chair Emeritus,  
East Asian Seas Partnership Council, PEMSEA.

the development of an ocean-based blue economy through strengthened implementation of the SDS-SEA.

## MOVING TOWARDS A SUSTAINABLE FUTURE

PEMSEA has built an effective platform for collaboration and cooperation between donors, governments, local communities, financial institutions, the private sector, UN and international organizations, and academic, research, and development institutions to improve the coastal zone management around the East Asian Seas.<sup>2</sup> The GEF's \$48.46M in grant funding catalyzed over \$200M in co-financing that has enabled PEMSEA to mobilize actors at every level in the region (UNDP, 2012). PEMSEA's scope continues to expand and now includes the growing demands and needs of the region as well as emerging issues. In order to build on the progress to date, the GEF is funding a World Bank project Applying Knowledge Management to Scale up Partnership Investments for Sustainable Development of Large Marine Ecosystems of East Asia and their Coasts (Applying Knowledge Project), the goal of which is to share



experiences and lessons learned between regional PEMSEA and national World Bank investments and to inform ongoing investments and decisions.

Collaborative planning, development, and implementation of SDS-SEA related projects and programs are priorities as PEMSEA moves into the next GEF/UNDP project, Scaling up the Implementation of the SDS-SEA.<sup>2</sup> And also on p59, pls change \$48.46M to \$47.46M and \$2B to \$200M. PEMSEA is steadily moving towards becoming a fully-fledged and self-reliant organization, building more partnerships and fostering a cooperative spirit among the nations and stakeholders of the East Asian Seas. At the regional level, SDS-SEA implementation is expected to contribute to harmonizing transboundary competitions and territorial claims and promote regional cooperation for the best use of the ecosystem services provided by the six LMEs. Guided by a common vision and framework, and with full commitment and engagement of its partners, PEMSEA will continue to steer the region towards achieving the goal of sustainable coastal and ocean development. So far, ICM initiatives cover about 14% of the region's 234,000 km coastline, benefiting more than 146 million people (PEMSEA, 2013).

<sup>2</sup> Other key regional organizations that have contributed to regional cooperation include 1) the Association of the Southeast Asian Nations (ASEAN); 2) Network of Aquaculture Centers in Asia; 3) Southeast Asian Fisheries Development Center and the UNEP Coordinating Body of the Seas of East Asia.

## KEY ACHIEVEMENTS

- Created a partnership model for stakeholder cooperation and collaboration at local, national and regional levels;
- Negotiated and developed the SDS-SEA, the first well-designed regional framework, strategy, and action plan for protecting, rehabilitating, sustaining ecosystem goods and services and managing coastal areas in an integrated way;
- Created a network of national and regional experts and local governments for implementation of the SDS-SEA;
- Formulated and adopted Five-Year SDS-SEA Implementation Plans at national levels;
- Established the East Asian Seas (EAS) Partnership Council to coordinate SDS-SEA implementation;
- Established PEMSEA as an international legal personality allowing it to develop and implement coastal and ocean governance programs independently within its own legal framework as an international organization; and,
- Adopted the Changwon Ministerial Declaration.



Artisanal fisherman's home in Indonesia (Yvonne Sadovy, SCRFA)

## GEF INVESTMENTS

Protection and Management of the East Asian Seas  
(GEF Projects: MPP-EAS, PEMSEA, SDS-SEA, Development and Implementation of Public-Private Partnerships in Environmental Investments, Applying Knowledge Management to Scale up Partnership Investments for Sustainable Development of Large Marine Ecosystems of East Asia and their Coasts, Scaling up the Implementation of the Sustainable Development Strategy for the Seas of East Asia.)

## DURATION OF GEF INVESTMENTS

1994-2018



### LESSONS LEARNED

- Engage key partners and stakeholders; their commitment is essential to the success of PEMSEA and achieving the SDS-SEA vision;
- Ensure that sovereign nations and all levels of stakeholders see that they are the main beneficiaries of the initiatives at the local level, through cleaner cities, sustainable livelihoods, effective protection of lives and properties, adequate supply of clean drinking water, and good quality aquatic products; and,
- Build strategic partnerships. The partnership with World Bank, UNDP, and UNEP was key to mobilizing the necessary co-financing, institutional reforms, and investments.

RECIPIENT COUNTRIES	GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
Cambodia, Democratic People's Republic of Korea, Indonesia, Malaysia, People's Republic of China, Philippines, Republic of Korea, Singapore, Thailand, Vietnam, Lao Peoples Democratic Republic, Timor Leste (Other countries have participated, or are currently participating, on a cost sharing basis.)	United Nations Development Program and the World Bank	\$48.46M	\$208.41M	<a href="http://www.pemsea.org">http://www.pemsea.org</a>





Fish market in Samoa  
(Secretariat of the Pacific Community)



## Western and Central Pacific Region

# Creating a Regional Convention to Safeguard Fisheries in the Western and Central Pacific

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*Fishing is fundamental to the island nations of the Western and Central Pacific. This oceanic realm holds the most commercially important tuna fishing grounds in the world, providing almost 60% of the global supply at about 2.4 million tonnes per year (Hamilton 2011).*

The waters of the Western and Central Pacific (WCP) region cover about 10% of the earth's surface, and hold the world's largest tuna stocks, as well as large numbers of sharks, billfish, and other large pelagics. These fish species are known as highly migratory stocks because of the great distances they can swim, often across national maritime boundaries and the high seas. Within the WCP, also known as the Western Pacific Warm Pool Large Marine Ecosystem, are 22 Pacific islands and territories, 15 of which participated in the GEF/UNDP Pacific Islands Oceanic Fisheries Management Project (OFMP): Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu. The natural migratory extent of the Western and Central Pacific tuna traverses this LME.

Since the 1950s, this fishery has provided the majority of the world's tuna harvest, mostly skipjack, (*Katsuwonus pelamis*); yellowfin (*Thunnus albacares*); bigeye (*Thunnus obesus*);

and albacore (*Thunnus alalunga*). The LME is thus of great ecological and economic significance not only for the WCP countries, but also for the global community. The tuna fishery directly and indirectly provides employment to 6-8% of the region's 10.6 million inhabitants. The tuna catch makes up 90% of the total combined fish harvest by volume, and is worth six times that of all other Pacific Island fisheries (e.g., swordfish, billfish and coastal fisheries) combined. For many islands in the Pacific, tuna represents a critical source of revenue and the only commercially viable natural resource. However, the lack of a legally binding framework governing cooperation between countries with a real interest in the resource created management gaps across the range of the stock, including in areas of high seas beyond national jurisdictions.

The SAP for International Waters in the Pacific identified key challenges for the tuna fishery, including deficiencies in national and regional level fisheries management and governance. The SAP process prompted the 15 participating countries to agree to initial actions that address priority issues facing sustainable fisheries in the region. An oceanic fisheries component of the SAP was the pilot phase (2000-2011) that would expand to become a full sized project supported by GEF and UNDP, the Pacific Islands Oceanic Fisheries Management Project. The project's principal objectives



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were to improve the understanding of the transboundary oceanic fish resources and related features of the Western Pacific Warm Pool LME and to create regional institutional arrangements, while at the same time strengthening national fisheries management arrangements that enable Pacific island countries to meet their obligations to international fisheries conventions and instruments.

## SETTING A LEGAL FOUNDATION

A critical precursor to improving fisheries management in the WCP was the establishment of a foundational governance institution. Therefore, the OFMP placed a high priority on supporting the participation of Pacific island countries in the negotiations and eventual adoption of the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPF Convention). This Convention is one of the first regional fisheries agreements to implement principles from the 1995 UN Fish Stocks Agreement.<sup>3</sup> It also seeks to apply the precautionary approach; base management decisions on the best available science; and take into consideration the ecosystem approach to fisheries management. An ecosystem approach to fisheries strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries.

Negotiations for the Convention began in 1994. It was adopted and signed in 2000, and entered into force in 2004. The advice and support provided under the OFMP helped support the participating countries take the necessary legal steps for ratification and subsequent early entry into force of

the WCPF Convention. The OFMP also supported reforms to legal and institutional arrangements at the regional and national level for improving the conservation and management of tuna stocks and other highly migratory fish. Throughout the negotiation process, the OFMP helped ensure that the interests of the Pacific Island countries were properly represented. As a result, the WCPF Convention and the operations of the Commission are unique in recognizing the special requirements of Small Island Developing States (SIDS). The Commission must assess the impact of all proposals for conservation and management measures on SIDS, and the Convention requires the Commission to ensure that the burden of management actions on SIDS is not disproportionate.



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<sup>3</sup> The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. Straddling stocks are fish stocks that migrate through, or occur in, more than one Exclusive Economic Zone. The Agreement was adopted in 1995, and came into force in 2001.



A photograph of two women in Kiribati, each carrying a large basket of skipjack tuna on their heads. They are standing outdoors, with a sandy ground and some foliage in the background. The image is overlaid with a semi-transparent blue filter.

“This project played a critical role in enabling Pacific island nations to maintain a strong influence and avoid any disadvantageous outcomes throughout the process of negotiating the Western and Central Pacific Fisheries Convention with distant water fishing nations. There is no doubt that GEF support was a major factor contributing to a successful outcome.”

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Andrew Wright, former Executive Director,  
Western and Central Pacific Fisheries Commission.

“Support from the GEF under the Pacific Islands Oceanic Fisheries Management Project has changed the legal and policy advice that the Forum Fisheries Agency and Secretariat of the Pacific Community have been providing to Pacific Island Countries. They are now in a much stronger negotiating position and are able to stand on an equal footing with rich fishing nations during international deliberations.”

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Dr. Transform Aqorau, Pacific fisheries leader,  
Director of the Parties to the Nauru Agreement.

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#### GIVING SMALL ISLANDS A VOICE

The OFMP was operational from 2005 until 2011, during which time a governing body for the WCPF Convention was established. The Western and Central Pacific Fisheries Commission (WCPFC) is made up of representatives from 25 countries that have ratified the Convention. Another eight countries participate as cooperating non-Members. To ensure that the Pacific Island countries were well represented, throughout the WCPFC's preparatory period the OFMP supported the active participation of SIDS that would otherwise not have had the financial means to engage. Through the Commission, all stakeholders, especially the small islands of the region, have been empowered to be actively involved, and to negotiate their positions at Commission meetings. The Commission has provided a platform for Pacific islands to sit as equals at the same table as much larger countries that operate fishing vessels in the region. In addition to enabling Pacific island countries to contribute fully to Commission deliberations, the OFMP has helped them meet their Convention obligations by enabling them to reform, restructure, and strengthen national fisheries laws, policies, and institutions.

The WCPFC is a Regional Fisheries Management Organization (RFMO). As an RFMO, it has signed a number of Memoranda of Understanding (MOU) with other relevant fisheries organizations, including the Inter-American Tropical Tuna Commission, the Commission for the Conservation of Southern Bluefin Tuna, the Indian Ocean Tuna Commission and the Commission for the Conservation of Antarctic Marine Living Resources. These agreements help foster a closer relationship between the WCPFC and these organizations and they ensure open discussions on matters of common interest. The Fisheries Forum Agency (FFA) and Oceanic Fisheries Programme of the Secretariat of the Pacific Community (SPC/OFPP), the two regional organizations largely responsible for execution of the OFMP, are also important regional partners for the Commission, providing data as well as scientific and technical services to the Commission. The Commission's institutional design serves as a model for ensuring the full participation of small islands and regional fisheries management bodies.

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## SHIFTING TOWARDS SUSTAINABLE FISHERIES MANAGEMENT

In order to implement the decisions made by the WCPFC and to improve regional governance, the OFMP has helped strengthen the FFA Pacific island member countries' national oceanic fisheries management capacities, focusing on strengthening legal and policy frameworks. It also contributed to the establishment of national and regional Vessel Monitoring Systems (VMS) to provide information on vessel movements. The VMS has now been further developed by FFA and the WCPFC into the world's largest international satellite-based vessel tracking program, tracking over 2,000 tuna vessels in national waters and high seas. Other key outcomes include contributions to the adoption of national and regional on-board observer programs (with 100% coverage of tropical purse seine vessels), vessel registries, licensing systems, boarding and inspection efforts, and measures to reduce incidental catches of non-target species (such as sea birds, sharks, and turtles). Together, these measures have significantly enhanced the capacity of the Pacific island countries to conserve and manage regional oceanic fisheries and fish stocks, and protect species affected by oceanic fisheries.

The OFMP contributed to improved fisheries management when it supported the signing of the 3<sup>rd</sup> Implementing Arrangement of the Nauru Agreement<sup>4</sup> in 2010. This implementing arrangement led to the establishment of a wide range of new innovative management measures in the region, including setting terms and conditions for purse seine fishing licenses and limiting fishing activities through the use of a Vessel Day Scheme (VDS) mechanism in the waters of the Parties to the Nauru Agreement. The VDS caps the total number of fishing days permitted for this particular fishery and is now the largest rights-based cap and trade management scheme used in international fisheries globally, substantially increasing revenues to participating Pacific Island countries.



Tuna stored in brine at market in Solomon Islands  
(Secretariat of the Pacific Community)

Overall, this initiative helped bring countries that share the WCP fish stocks together to work towards securing the sustainable management of fisheries within a regional framework. The multi-country cooperation that was achieved, together with the application of a more ecosystem-based approach to fisheries management, has led to more environmentally sustainable management of tuna fisheries in the Western and Central Pacific.

Sustainable management of the Western and Central Pacific tuna stocks is critical not only to the wellbeing of the region's people, but also for the international community seeking to conserve an economic resource of global value. The processes and strategies that the OFMP helped implement set global precedents for how distant water fishing nations and coastal states can collaborate on resource management. It serves as a showcase for empowering small islands to engage on an even footing with larger and more politically influential countries. The scientific knowledge base for migratory, oceanic fishery species has been significantly improved for this region and the level of information exchange and sharing has been enhanced. These advancements have helped close gaps in understanding and provided information that is necessary to achieve sustainable management of stocks of tuna and other large pelagics, which will contribute to a more secure and sustainable future for Pacific islanders.

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4 The original agreement setting out the Parties to the Nauru Agreement and their key objectives to control terms and conditions of fishing in their waters — see more at: <http://www.pnatuna.com/Documents#sthash.3mxW8aQP.dpuf>



## KEY ACHIEVEMENTS

- Negotiated and helped bring into force the Western and Central Pacific Fisheries Convention. All coastal states in the region and all eligible fishing states have ratified the convention;
- Supported establishment of the Western and Central Pacific Fisheries Commission and its subsidiary bodies;
- Fully involved all Pacific small island developing states in the work of the WCPFC, along with environmental NGOs and industry stakeholders;
- Strengthened Pacific Island countries' capacities to apply conservation and management measures at national level, through improved legal and policy frameworks, and national monitoring and control programmes;
- Contributed to the development of the purse seine vessel day scheme, the largest rights-based cap and trade management scheme in international fisheries;
- Supported the world's largest on-board observer programme, including 100% coverage on tropical purse seine vessels;

“This project has certainly made a positive difference to the people of Tonga. The GEF has provided

Tuna fishing fleet (Secretariat of the Pacific Community)

### GEF INVESTMENTS

Pacific Islands Oceanic Fisheries (OFMP)

### DURATION OF GEF INVESTMENTS

2000-2011

### RECIPIENT COUNTRIES

Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu

critical resources  
which have facilitated  
legal support and also  
supported key trainings  
on enforcement and  
prosecution for illegal  
fishing activities.”

Viliami Mo'ale, Head of Delegation from Tonga.

- Supported adoption of vessel tracking programmes that led to establishment of the world's largest international satellite-based vessel tracking programme, tracking over 2,000 tuna vessels in national waters and high seas; and
- Supported improved scientific understanding and monitoring of the status of stocks of tuna and other large pelagic species in the region, and use of this information by Pacific island countries.

LESSONS LEARNED

- Use regional fisheries management bodies to empower small island developing states and provide a means for effective engagement with larger nations and international organizations;
- Involve all stakeholders including the public, NGOs, and private sector in the work of a Commission; and
- Create partnerships for transformative projects, particularly with key inter-governmental agencies and non-governmental organizations.

GEF AGENCIES	GEF GRANTS	CO-FINANCING
United Nations Development Program	\$24.10M	\$87.15M

## GEF and the UNEP Regional Seas Conventions and Action Plans

An important vehicle for the regional level implementation of the GEF's work on land-based sources of pollution is the UNEP Regional Seas Conventions and Action Plans (RSCAPs; currently 18 exist). The RSCAPs provide a platform for developing a regionally coordinated and strategic approach to address transboundary pollution problems and to catalyze the necessary policy,

legal and institutional reforms and investments to achieve improved pollution management. Some RSCAPs have negotiated legally-binding protocols on land-based activities and sources of marine pollution.

<http://www.unep.org/regionalseas>

## The GEF and the Global Programme of Action to Protect the Marine Environment from Land-Based Activities

Within its work to address the LBS challenge, the GEF has operated within the framework of the Global Programme of Action to Protect the Marine Environment from Land-Based Activities (GPA), the principal global agreement targeting reduction of nutrients and other land based sources of pollution to the ocean. This global mechanism encourages governments and regional organizations to prepare and implement comprehensive, continuing, and adaptive action plans to protect

the marine environment from land-based sources of pollution. The GPA, while voluntary and not legally binding at a global level, has made meaningful progress in a number of areas such as adopting the Land-Based Pollution Protocols in seven RSCAPs, promoting National Programmes of Action, and creating Global Partnership on Nutrient Management.

<http://www.gpa.unep.org>



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## Case Study: Integrating Watershed and Coastal Area Management

One of the GEF's flagship efforts to promote an integrated (Ridge-to-Reef) approach to watershed and coastal area management is Integrating Watershed and Coastal Areas Management in Caribbean Small Island Developing States (IWCAM), which was implemented by UNEP and UNDP from 2006 to 2012. Recognizing the highly integrated and closely interlinked nature of watersheds and coastal areas in the Small Island Developing States (SIDS) of the Caribbean, the IWCAM project developed a multi-sectoral approach to watershed and coastal management, looking specifically at land-based sources of marine pollution (LBS) problems in 13 Caribbean SIDS. The project was primarily aimed at addressing existing barriers at the national and regional level that had previously hampered integrated planning and management.

This unique project placed a high priority on helping participating countries meet commitments required to ratify the Cartagena Convention<sup>5</sup> and its protocols; in particular, the Protocol on

Land-Based Sources of Pollution (LBS Protocol).<sup>6</sup> Such multilateral environmental agreements (MEAs) are important tools for strengthening legislative and management frameworks and can provide the momentum countries need to address growing threats to their marine and coastal environments. The LBS Protocol requires its Parties to use integrated approaches while developing national environmental policies and effective measures to prevent, reduce, and control marine pollution from land-based sources and activities. The LBS Protocol provides a legally-binding mechanism that sets effluent limitations for domestic wastewater (e.g., sewage) and requires countries to prepare specific plans to address (agricultural) non-point sources. It also commits parties to make improvements in wastewater management by introducing innovative and cost-effective treatment technologies, improving policy, regulatory and institutional frameworks, and expanding access to affordable financing. However, the project faced a significant challenge as the existing policy, legal, and institutional frameworks in participating countries did not support the development or implementation of specific requirements under the LBS Protocol. A number of reforms at both national and regional level were needed first.

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5 The Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region (Cartagena Convention) is a comprehensive, umbrella agreement for the protection and development of the marine environment. This regional environmental convention provides the legal framework for cooperative regional and national actions in the WCR. It was adopted in Cartagena, Columbia on 24 March 1983, and entered into force on 11 October 1986.

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6 Contracting Parties to the Cartagena Convention, adopted the Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) on 6 October 1999.



To address this need, the IWCAM project conducted a comprehensive inventory of existing national institutional, legislative, and policy frameworks in project countries, and identified the different hurdles and barriers to applying a true integrated (watershed and coastal) management approach, especially as it related to the reduction, control and management of marine pollution from land-based sources. It quickly became clear that the environmental laws of Caribbean SIDS generally had a robust terrestrial focus, while provisions for marine environmental protection were weak. The review also concluded that while numerous pieces of legislation touch on the different aspects of IWCAM and LBS issues, they were both uncoordinated and not sufficiently comprehensive. The review confirmed that some

of the countries have national legislation where certain MEAs or treaties could only be accepted by the State if parliamentary approval is first obtained, often a slow and difficult process. Other fundamental problems highlighted by the review were weak enforcement regimes, and limited human and technical capacity.

As a result of this review, IWCAM supported the creation of a toolkit<sup>7</sup> containing a set of regional guidelines to assist Caribbean countries in reforming, amending, and drafting appropriate national legislation, policy, and institutional frameworks required to apply an integrated approach to managing watersheds and coastal areas and to advance their ratification of the LBS Protocol. The guidelines propose a mix of legal, institutional,

7 Toolkit for Institutional, Policy, and Legislative Improvements: IWCAM Approach in Caribbean SIDS.

GEF INVESTMENTS	DURATION OF GEF INVESTMENTS	RECIPIENT COUNTRIES
Integrated Management in the Caribbean Small Island Developing States	2006-2019	Antigua & Barbuda, The Bahamas, Barbados, Cuba, Grenada, Dominica, Dominican Republic, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago
Testing a Prototype Caribbean Regional Fund for Wastewater Management (CReW)	2011-2015	Antigua & Barbuda, Barbados, Belize, Costa Rica, Jamaica, Guatemala, Guyana, Honduras, Panama, Saint Lucia, Saint Vincent & the Grenadines, Suriname, and Trinidad & Tobago

and capacity-building solutions that countries may exercise to implement the LBS Protocol, and provides options for finding human and financial resources necessary to implement the required reforms for addressing land-based sources of pollution. While the guidelines were prepared with direct relevance to the LBS Protocol, they can also be replicated and used by other SIDS (e.g., in the South Pacific) in the drafting or amendment of legislation in support of the implementation of other (regional, global) environmental treaties or agreements such as the 1989 Convention for the Control of Transboundary Movement of Hazardous Wastes.

One of the major achievements of the project was that six of the SIDS that participated in the IWCAM project ratified the LBS Protocol: Antigua & Barbuda, the Bahamas, the Dominican Republic, Grenada, Saint Lucia, and Trinidad & Tobago. Signing onto the LBS Protocol committed these governments to make major improvements in wastewater management by introducing innovative and cost effective treatment technologies, improving policy, regulatory and institutional frameworks, and expanding access to affordable financing. These commitments are being followed-up through the GEF/IADB/UNEP Caribbean Regional Fund for Wastewater Management (CReW) Project. The CReW Project aims to provide sustainable financing for the wastewater sector, support policy and legislative reforms, and foster regional dialogue and

knowledge exchange. It achieves these objectives through three inter-linked components: investment and sustainable financing; reforms for wastewater management; and communications outreach and training (see Chapter 3).

Although the IWCAM project is considered one of the most successful IW projects in the Wider Caribbean Region, there were also some shortcomings. Any changes made to policy, legislation, and institutions at the national level lie beyond the mandate and reach of an international development project. Also, despite strong governmental support for the project, the transition from ideas and concepts to actual national legislation proved to be a slow process. The project faced challenges with harmonizing and aligning project objectives with other, related initiatives taking place at the national and regional level. An important lesson learned from IWCAM was that even if a particular country adopts and ratifies a regional legal agreement that commits it to achieving a set of regionally-agreed environmental protection targets and goals, the concepts and objectives of such regional agreements are rarely captured effectively under national policies and legislation, making achieving these targets and goals difficult if not impossible to achieve. A comprehensive review of these barriers to effective implementation should be a prerequisite for any country planning on ratifying such agreements.

GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
United Nations Development Program and United Nations Environmental Program	\$35.41M	\$166.29	<a href="http://www.cep.unep.org/iwcam">http://www.cep.unep.org/iwcam</a>
Inter-American Development Bank and United Nations Environment Program	\$20.38M	\$251.70M	<a href="http://www.gefcrew.org">http://www.gefcrew.org</a>



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HealthyCaribbeancoralreef(StuSeldon)



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# Improving Ecosystem Health and Services

By Chua Thia-Eng, former Executive Director, PEMSEA

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Oceans are vital for life on earth and the well-being of humanity. Oceans sustain the goods and services we need, including food, oil, gas, transport, and minerals, and they support the ecosystem services from which we derive numerous benefits, including climate regulation, coastal protection, and oxygen production. The importance of the oceans to human wellbeing is increasing with the global population expected to reach 9.6 billion people by 2050, with the highest concentrations expected in coastal urban areas (United Nations, 2013). Consequently, we face the tremendous challenge of safeguarding the food supply and livelihoods of billions of people while protecting natural ecosystems, and the services they provide, for future generations.

As early as the mid-1990s, the GEF, through its IW focal area, recognized that sustaining the benefits the oceans provide and addressing the challenges faced by these marine ecosystems and their linked river basins required coordinated, ecosystem-based, and multi-country management approaches. The GEF has supported initiatives that account for the complexity and interconnectedness of the environment and human interactions to address a suite of transboundary environmental concerns. As discussed in the following chapters, these investments have resulted in significant improvements in ecosystem health and services in several areas and in some cases have helped shift sizable ocean industries, such as shipping and tuna fisheries, to more environmentally sustainable paths. The GEF investments have improved ecosystem health and services through strategies to reduce land-based sources of pollution, build sustainable

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## THEME 2

fisheries, apply an ecosystem-based approach, and reduce risks from maritime transport.

GEF investments demonstrate that the degradation of our oceans by pollution can be reversed when efforts are coordinated and targeted at the removal of constraints and barriers to integrated management. The GEF recognizes that efforts targeted at prevention, reduction, and control of coastal pollution are crucial to maintaining the ecological, social, and economic wellbeing of countries as demonstrated by examples from the Caribbean, East Asia, and the Black Sea discussed in Chapter 3.

In recognition of the vital role fisheries play in eliminating hunger, promoting health, and reducing poverty, the GEF has promoted more sustainable fishing practices and wider ecosystem stewardship. The decline of the world's fishery resources has major implications for the livelihoods and wellbeing of coastal communities, especially in developing countries. Consequently, the GEF has promoted improved management of shared fishery resources, as experienced in West Africa, the Humboldt Current, Bay of Bengal, and the Coral Triangle discussed in Chapter 4.

To ensure a healthy ocean providing ecosystem services that benefit human wellbeing, the GEF promotes an integrated 'ridge-to-reef' management approach that operates across multiple sectors, borders, and scales. This approach is illustrated, for example, in the Gulf of Mexico, Southeast Asia, and South China Sea discussed in Chapter 5.

Finally, we depend on seaborne shipping for the distribution of goods around the world, but the high volume of shipping traffic poses numerous environmental, economic, and public health challenges, such as marine and air pollution and the introduction of invasive species. The GEF, together with key

partners, has played a major role in catalyzing concerted global action to develop necessary management improvements and regulations to address these issues, as demonstrated by projects addressing invasive species in ballast water and furthering safe shipping discussed in Chapter 6.

It is vital that we recognize that our planet as well as our health and future food security hinge on the health of coastal ecosystems and the services they provide. We need to forge the pathways necessary for sustainable economic growth while recognizing the intimate inter-linkages between social, economic, and environmental challenges. We need to ensure that that environmental well-being is compatible with human well-being in order to make long-term, sustainable prosperity a reality for all. Only through concerted efforts at local, national, regional, and international level can we develop the scientific, technical and management capabilities necessary for sound coastal and ocean governance. GEF has indeed made significant contribution towards this direction over the last two decades, and will continue to do so.

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Cadmium, a toxic heavy metal, is dumped as effluent from a phosphate mine directly into Togo's coastal waters, which are part of the Guinea Current Large Marine Ecosystem (Christian Susan)

# Reducing Coastal Pollution from Land-based Sources

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*Approximately 80% of ocean pollution originates from land-based sources and reaches the oceans via runoff, river transport, groundwater seepage, or direct dumping. Outside Europe and North America, over 80% of the sewage that enters coastal areas is untreated, and the situation is worsening as coastal populations grow (UNEP, 2010).*

Coastal waters are often a repository for a wide range of urban, agricultural, and industrial wastes. Coastal pollution caused by land-based activities is one of the most serious threats to the world's Large Marine Ecosystems (LMEs) and to human health and well-being. The high population density along coastlines exacerbates the impacts on human well-being. Today, 44% of the world's population lives within 150 km of a coastline, and two-thirds of the planet's largest cities are located in low-lying coastal areas (WRI, 2001; Duarte et al., 2008). Assuming that the current pace of urbanization and demographic trends continue, the anthropogenic impact on coastal ecosystems will increase dramatically as the world's population grows from 6.8 billion to an estimated 9.2 billion by 2050 (Duxbury and Dickinson, 2007). The predicted increased frequency and intensity of storm events associated with climate change will further heighten the risk of coastal water contamination and deteriorate the natural resources that many countries depend on for food security

and economic growth. One of the most alarming signs of the negative effects of land-based sources of pollution on marine environments is the rising number of 'dead zones' occurring throughout the world's oceans (see Box: Ocean Dead Zones). The number of dead zones has doubled in each of the last four decades: approximately 500 dead zones have been officially identified (STAP, 2011) and this number is expected to rise as the oceans warm.

The multitude of point and non-point sources of pollution, their often transboundary origins, and fact that tides and currents can carry pollutants vast distances combine to make coastal pollution a complex management issue. The GEF recognizes that efforts targeted at prevention, reduction, and control of coastal pollution caused by land-based activities are crucial to maintaining the ecological, social, and economic well-being of countries situated along the coasts of the world's LMEs. The threat from nutrient pollution to coastal zones has historically been one of the priorities within the GEF's International Waters focal area.

Tackling the land-based sources of pollution challenge requires a 'ridge to reef' management approach that is integrated and ecosystem-based, and operates across multiple sectors, borders, and scales. For example, the GEF/World Bank Strategic Partnership for a Land-Based



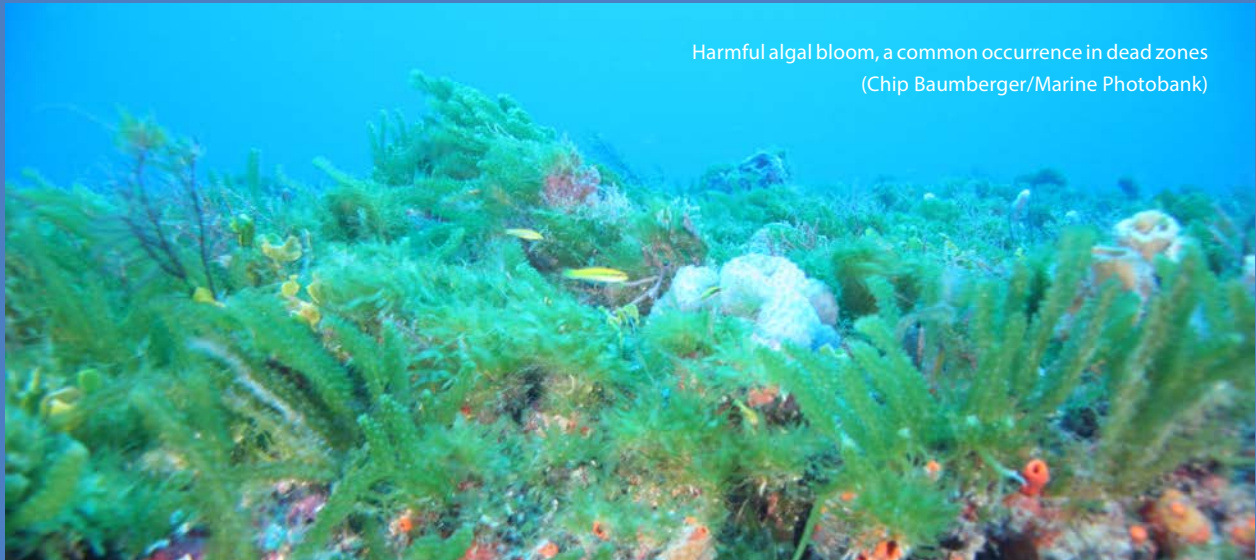
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Pollution Reduction Investment Fund for the LMEs of East Asia project is an innovative financing partnership that seeks to limit the introduction of pollution from land-based sources and promote integrated coastal management. The GEF/IADB/UNEP Caribbean Regional Fund for Wastewater Management (CReW) project and the GEF/UNEP/UNDP Integrating Watershed and Coastal Areas Management in Small Island Developing States of the Caribbean (IWCAM) project showcase efforts to improve wastewater management

within the Caribbean. Finally, the GEF made an early, catalytic investment in the Danube-Black Sea region that played a key role in the first reversal of a large-scale dead zone. As discussed in this chapter, each of these initiatives provides evidence that the degradation of our oceans by pollution can be significantly lowered or sometimes reversed through coordinated efforts that target the removal of constraints, the development of common mechanisms, and the implementation of appropriate governance reforms.



Crews respond to Deepwater Horizon oil spill (J Henry Fair/MarinePhotobank)



Harmful algal bloom, a common occurrence in dead zones  
(Chip Baumberger/Marine Photobank)

## Fact Box: Ocean Dead Zones

The oceans are often thought of as teeming with life and energy. Yet this is not always the case. Just below the surface, huge expanses called “dead zones,” can be devoid of living creatures due to the absence of oxygen. In a process called “eutrophication”, excess nutrients, especially nitrogen and phosphorous reach oceans, lakes, and rivers mainly from land-based sources such as sewage and effluent from agricultural and industrial run-off. The enrichment stimulates excessive growth of certain types of plants, especially algae. As the plants die bacteria break them down and in the process consume all the dissolved oxygen over large areas.

In dead zones, also called “coastal hypoxia”, the lack of oxygen impairs and even kills fish and other marine organisms, disrupting natural food-chains and threatening human health and well-being. Coastal hypoxia has cost coastal communities that depend on fisheries, tourism, and other coastal activities an estimated \$200-790B annually (UNDP, 2012). Coastal hypoxia can only be addressed by reducing the occurrence of eutrophication through measures targeted at the reduction of nutrient pollution. Doing so often requires collaboration between nations as well as between agencies involved in managing both coastal and land-based resources. The GEF has placed a high priority on addressing this problem and has made numerous successful efforts to reduce nutrient overloading into coastal waters of many LMEs around the world. Nonetheless, much work remains to be done, and the growing problem of coastal hypoxia requires accelerated attention (STAP, 2011).



St. Vincent and the Grenadines, which exemplify multiple use of the Caribbean Sea. (Robin Mahon)



## Wider Caribbean Region



# Improving Ecosystem Health through Innovative Financing Models for Wastewater Treatment in the Caribbean

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*Many countries in the Wider Caribbean Region have almost no access to sewer systems and effective wastewater treatment. As much as 85% of the domestic wastewater that enters the Caribbean Sea is not adequately treated. This is a serious environmental concern, as the economic well-being of many people in this region depends heavily on fisheries and tourism, both of which require healthy marine ecosystems.*

Minimizing pollution caused by the release of untreated sewage is a major challenge, especially in developing countries where sewage collection and treatment facility infrastructures have not kept pace with population growth. In the case of the Wider Caribbean Region (WCR), an estimated 51.5% of households do not have sewer connections, and only 17% are connected to adequately functioning treatment systems (PAHO, 2011). Even where wastewater treatment facilities exist, they only reach primary or secondary treatment standards. The resulting poorly-treated water causes organic and inorganic loading of coastal waters and consequent declines in ecosystem and human health, and in economic activities that rely on a healthy marine ecosystem, including fisheries and tourism. These impacts are major concerns given that healthy Caribbean reefs are estimated to be worth about \$625M annually via their support to fisheries

(Burke and Maidens, 2004). In addition, tourism is the largest economic sector in most WCR countries, worth almost 30% of the region's GDP (IDB, 2014). The main constraint for addressing inadequately treated wastewater is lack of funding for wastewater treatment facilities, which are often a low priority compared to other infrastructure investments (UNEP/GPA, 2006).

Wastewater is a combination of one or more of: domestic effluent consisting of blackwater (excreta, urine and faecal sludge) and grey water (kitchen and bathing wastewater); water from commercial establishments and institutions, including hospitals; industrial effluent, storm water and other urban run-off; agricultural, horticultural and aquaculture effluent, either dissolved or as suspended matter (Corocan et al. 2010).

Defunct Jamaican wastewater treatment plant prior to refurbishment through project financing (Donna Spencer)

“Beyond just the implementation of a financing mechanism, the CReW Project will be beneficial for Guyana in that it brings into focus an issue that has long been left in the backwaters of development. Through this project, a National Development Outlook for Wastewater Management could result, that is, awareness could be created in Guyana among the private sector, communities and government, of the issue of wastewater management.”

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Emil Mc Garrel, Permanent Secretary,  
Ministry of Housing and Water, Guyana.

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## LAUNCHING INNOVATIVE FINANCING MECHANISMS

In 2011, the Inter-American Development Bank (IDB) and UNEP with assistance from the GEF, launched the Caribbean Regional Fund for Wastewater Management Project (CReW). The project tests mechanisms that provide sustainable financing for environmentally-sound and cost-effective wastewater management. This initiative also contributes to policy and legislative reform and fosters regional dialogue and knowledge exchange amongst key stakeholders. The ultimate objective is to catalyze a change in the current wastewater management practices across the WCR and capture and share lessons so that project elements can be replicated and adapted in other countries that face similar challenges. The CReW's innovative approach represents the first major regional attempt to test financial mechanisms that fund the wastewater sector.

The CReW will test four individual pilot financing mechanisms (PFMs) that provide innovative financing modalities for wastewater management projects. Resources are targeted at the capitalization of these four PFMs, and provide technical assistance, such as design services, to ensure that financed projects satisfy the technical, financial, socio-economic, and environmental requirements of the CReW and local governments. Four of the thirteen participating countries have been selected to test the first financial mechanisms: Belize, Guyana, Trinidad and Tobago are testing revolving funds, and Jamaica is testing a credit enhancement facility.

In Belize, the \$5M Belize Wastewater Revolving Fund has been established and funds disbursed to provide below-market interest rate loans for eligible wastewater treatment projects. Revolving funds are one of the more flexible, innovative, and effective financial management mechanisms available. A revolving fund can take different forms but in essence it is an account established to finance a continuing cycle of operations through repayments of past loans. In Belize the fund is administered by a board that studies both the financial and technical feasibility of each proposed loan. Interest rates, grace time before repayment begins, and the reimbursement period of the loan all help determine whether a loan is approved or not. The first loan has been

distributed to the Belize Water Services Company to fund the construction of a wastewater treatment facility on the Placencia Peninsula, an important tourist destination. The fund will also provide financing for an upgrade of the existing Belmopan Treatment Facility in the nation's capital.

The Guyana Wastewater Revolving Fund is valued at \$3M and focuses on public-private partnerships. This fund is being actively promoted by the government to ensure that local applicants from different sectors are aware of the benefits, application process, and requirements for qualification to access the fund.

When the Trinidad and Tobago Revolving Fund is established, it will support an upgrade of the Scarborough Wastewater Treatment Plant (WWTP) in Tobago, the country's major tourism destination. The plant was commissioned in 1994 to collect and treat wastewater generated by the town of Scarborough and its surroundings. It was designed for a population of 10,000, but fewer than 200 property owners made the commitment to connect to the sewerage network. Hence the project will see to both the refurbishment of the WWTP as well as an increase in the number of household connections so that its use is maximized.

“We are all too aware of the issues faced by Caribbean countries when it comes to wastewater management, its implications for our health, tourism and economic sectors and the challenges that result consequent to inadequate resources.”

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Sylvester Clauzel, Permanent Secretary,  
Ministry of Sustainable Development, Energy,  
Science and Technology, Saint Lucia.





Jamaica established a Credit Enhancement Facility in 2012. The facility provides credit enhancement support for local commercial bank financing of wastewater projects. The funds are placed in a reserve account and pledged to local lenders as collateral for financing. The CReW provided \$3M as collateral and the government of Jamaica, through the National Water Corporation, has pledged an additional \$12M. Total financing is expected to grow substantially and 13 projects are initially to be implemented from this financing, involving either rehabilitation of existing wastewater facilities or construction of new facilities.

#### UPGRADING WASTEWATER INFRASTRUCTURE

The CReW supports more than 16 pilot projects across the four countries involving a range of activities, from the construction of two new plants to the rehabilitation of existing plants. Each of the pilots will bring different experiences that can be shared across the region and beyond. In addition, the development of these projects will enhance

technical capacity and, through the construction of new plants, introduce technological approaches that have not yet been tried in the region.

The CReW is attempting to change attitudes towards wastewater at national and local levels. Overall, the project will benefit the region by focusing much needed attention on wastewater as an important governmental and societal issue. Finally, testing new financial mechanisms opens the door for the region to provide sustainable sources of financing towards sustainable and innovative low-tech solutions for addressing the wastewater challenge in the WCR and beyond.

#### IMPROVING KNOWLEDGE

Many significant capacity building activities have been completed under the CReW. More than 200 technicians, government officials, and other stakeholders have been trained in various aspects of wastewater management. The CReW completed comprehensive national wastewater baseline assessments



for all 13 participating countries. These assessments will form the foundation for ongoing capacity building and support policy reforms, legislation, awareness raising and outreach efforts. The CReW also facilitated operational audits for water and wastewater utilities in two participating countries — Antigua & Barbuda and Barbados.

### FOSTERING REGIONAL COOPERATION

The CReW provides guidance and assistance with the development of tools to improve and strengthen legislative frameworks for wastewater management, but success depends on the level of commitment from participating countries. This commitment includes improving compliance with obligations of the Cartagena Convention, and in particular, its Protocol on Land-Based Sources of Marine Pollution (the LBS Protocol, 1999), for which the UNEP Caribbean Environment Programme Regional Coordinating Unit (UNEP CAR/RCU) serves as the Secretariat. The LBS Protocol focuses on addressing sources of pollution and proposes common regulations and

standards for effluent discharge and targets wastewater improvements. Currently, 11 of the 13 CReW participating countries have ratified the Cartagena Convention and 6 have ratified the LBS Protocol. In 2013, the CReW facilitated an assessment of the status of the LBS Protocol and found that poor financing and inadequate policy, legislative, and institutional frameworks are the main impediments preventing countries from fulfilling their obligations. The CReW supports reforms for wastewater management in specific countries to address these deficiencies through UNEP CAR/RCU. UNEP CAR/RCU is also working with regional partners such as the Caribbean Water and Wastewater Association, the Caribbean Development Bank, the Caribbean Water and Sewerage Association, and the Global Water Partnership-Caribbean, to foster collaborative relationships, high-level dialogue, and coordinated activities at various regional fora, ensuring a level of institutionalization and sustainability for initiatives.

“The CReW Project will make a major difference to wastewater management in Belize. First and foremost, it will provide the first opportunity for wastewater management in both the public and private sectors. Next, it will also help to reduce marine pollution arriving from land-based sources, provide access to much needed funds for industry to comply with environmental legislation, and last but not least, it will promote a healthy environment where people can co-exist.”

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Maria Cooper, Pilot Project Coordinator, Belize.

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#### MOVING AHEAD

Access to effective wastewater treatment is a priority in a region where the well-being and livelihoods of people depend on healthy marine ecosystems. The CReW is an ambitious project and its outcomes and lasting impacts will be based on the entire WCR adopting a long-term integrated approach for the wastewater management sector. Through the CReW, the GEF and its partners provide a significant impetus and the essential elements to move in this direction. The CReW offers new thinking and innovative approaches that support wastewater management reforms and sustainable financing for environmentally sound and cost-effective wastewater treatment. It promotes education at all levels to raise awareness about the importance of wastewater and sanitation issues among decision makers, relevant professional groups, wastewater plant operators, and community groups. The CReW has fostered the beginnings of a regional dialogue and knowledge exchange that will lead to much needed improvements in wastewater management across the WCR. Finally, the increasing demand for cost-effective, appropriate solutions to pollution problems means that the CReW includes elements that offer great potential for replication, not just within the region but across the globe.



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School of jacks (Caranx) off the coast  
of Belize (Robin Mahon)



KEY ACHIEVEMENTS

- Established Pilot Financing Mechanisms, which provide innovative financing modalities for wastewater management projects in Belize, Guyana and Jamaica;
- Completed national wastewater baseline assessments in all 13 participating countries;
- Increased awareness of wastewater as an environmental issue; and
- Trained more than 200 technicians, government officials, and other stakeholders in various aspects of wastewater management, e.g., wastewater treatment technologies, operator assessments, management of revolving funds, facilitation, and outreach.



GEF INVESTMENTS

Testing a Prototype  
Caribbean Regional  
Fund for Wastewater  
Management (CReW)

DURATION OF GEF INVESTMENTS

2011-2015

RECIPIENT COUNTRIES

Antigua & Barbuda, Barbados, Belize, Costa Rica, Jamaica, Guatemala,  
Guyana, Honduras, Panama, Saint Lucia, Saint Vincent & the Grenadines,  
Suriname, and Trinidad & Tobago





Reef, seagrasses and mangroves in Belize  
(Jason Valdez/Marine Photobank)

### LESSONS LEARNED

- Ensure strong commitment of governments with adequate, sufficiently enforced national policies, laws and regulations, and sufficient, ongoing funding for upgrading, operating, and maintaining sewage systems and wastewater treatment plants;
- Ensure that government agencies that coordinate and manage public-private investment partnerships have access to targeted training in order to develop the necessary technical and operating skills to manage effectively, since these partnerships for wastewater management are a relatively new option for local development financing;
- Consider wastewater as part of the broader, integrated coastal and freshwater resource management framework at national and regional levels;
- Involve local stakeholders early on in the process to address local concerns; and
- Identify champions early in the process and focus on public outreach to build awareness and demand from the private sector.

GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
Inter-American Development Bank and United Nations Environment Program	\$20.38M	\$251.7M	<a href="http://www.gefcrew.org">http://www.gefcrew.org</a>



Harvested squid drying on racks, Thailand  
(Timana Photography — Julie McGowan/Marine Photobank)



## The Seas of East Asia

# Innovative Financing to Reduce Coastal Pollution from Land-based Sources in the Seas of East Asia

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*The East Asian Large Marine Ecosystems — Yellow Sea, East China Sea, South China Sea, Gulf of Thailand, Sulu-Celebes Sea, and Indonesian Sea — possess significant global economic value: they hold 30% of the world's coral reefs, produce 40% of the world's fish catch, and are home to more than 80% of the world's aquaculture activities.*

The seas of East Asia are interconnected by natural processes, ocean currents, and shared living marine resources. Rapid economic growth and large scale migration of commerce to coastal areas have increased pressure on East Asian LMEs, problems exacerbated by a booming population: close to 75% of the 2 billion residents of the East Asian seas region inhabit coastal areas (COBSEA, 2011). Over the last 70 years, nearly 70% of the original coral reefs bordering the South China Sea have been destroyed, with the resultant loss of biodiversity and ecological goods and services, including fish habitat and wave attenuation (PEMSEA, 2013). Coastal pollution has been a primary culprit, since almost 90% of the region's municipal wastewater is released into the marine environment untreated, and large quantities of industrial wastes are directly discharged (World Bank, 2013). While access to appropriate sanitation is moderate (77% in urban areas), adequate collection and treatment rates are significantly lower and less than 6% of sewage or wastewater reaches a

properly functioning treatment plant (World Bank, 2013). Further, contamination caused by dumping of solid wastes and agricultural and industrial practices also poses widespread problems due to the introduction of a high concentration of pesticides, chemical fertilizers, metals, pesticides, and oil. These problems are of significant public concern as they have led to severe degradation of coastal water quality and have created high environmental, social, health, and economic burdens on people living within the region.

## INNOVATIVE INVESTMENTS

In 2007, the GEF and World Bank initiated the Partnership Investment Fund for Pollution Reduction in Large Marine Ecosystems in East Asia (The Partnership Fund). This \$80M fund catalyzed co-financing to coordinate and streamline investments and activities designed to reduce land-based sources of pollution throughout the seas of East Asia. The Partnership Fund operated within the overarching regional marine strategy, the Sustainable Development Strategy for the Seas of East Asia, and the Partnerships for Environmental Management of the Seas of East Asia (PEMSEA), complementing the series of GEF/UNDP projects described in Chapter 2. This fund also sought to replicate cost-effective pollution reduction technologies and techniques while promoting







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private investment and public/private partnerships for pollution reduction.

More specifically, the Partnership Fund's investments were intended to reduce nutrient inputs to the East Asia Seas by an estimated 25,000 tonnes of nitrogen per year and 7,500 tonnes of phosphorous per year. The Partnership Fund also broadened the policy discourse and scope of investment programs, and promoted adoption of innovative technologies, best practices, and knowledge sharing.

## EFFECTIVE WASTEWATER MANAGEMENT

The Partnership Fund was designed to achieve practical results and benefits by promoting innovative, environmentally friendly technologies to reduce coastal pollution arriving from land-based sources. The fund included seven national level projects implemented through the World Bank (a.k.a. the International Bank for Reconstruction and Development) which covered a wide range of technical and institutional innovations:

- introducing innovative technologies and methods for wastewater and sanitation;
- creating natural and artificial wetlands to treat wastewater;
- introducing combined sewage/septic tank systems;
- improving the management of septic tank systems;
- enhancing existing wastewater and sanitation infrastructure;
- improving the management of wastewater utilities;
- addressing rural and agricultural non-point sources of pollution;
- improving cooperation among agencies to manage wastewater; and
- improving the management of water flow in coastal zones.

These innovations have enabled recipient countries to experiment with new technologies or new management options to reduce pollution. In some cases, the availability of The Partnership Fund seed financing and the goal of achieving significant reductions in pollution loads from land based sources has encouraged project authorities to contribute nearly \$1.1B of co-financing.

Three of the Fund's national projects illustrate its innovative approaches. The GEF/IBRD Livestock Waste Management in East Asia Project benefited the People's Republic of China, Thailand, and Vietnam by developing and replicating pollution mitigation technologies throughout the region. The project reduced both the impacts of livestock-induced pollution in fresh and marine surface waters and risks to human health by: improving pollution control practices and regulations; altering the spatial distribution of livestock production facilities; promoting awareness; and exchanging information on pollution threats and health problems from livestock waste.

The GEF/IBRD China Ningbo Water and Environment Project targeted reduced land-based pollution along the Cixi coast. The project replicated innovative low-cost waste water treatment techniques and promoted coastal zone conservation. The project also oversaw the restoration of wetlands, which contributed to a 25% increase in bird sightings and number of species (ICR, Ningbo, 2011).

In Vietnam, the GEF/IBRD Coastal Cities Project funded the construction of a chemically enhanced treatment plant to reduce the discharge of pollutants from the City of Huy Nhon into the Ha Thanh River and the Thi Nai marine lagoon. A chemically enhanced treatment plant features the addition of chemicals that encourage solids to coagulate. Coagulation improves the overall efficiency of the treatment process, in addition to making it significantly cheaper. The new plant treats 3500 m<sup>3</sup> of wastewater per day, and 85% of phosphorus and nitrogen are removed from this wastewater with the enhanced treatment technique. Approximately 35,600 pupils now have access to improved sanitation in schools, 7,935 households have accessed and repaid loans to improve sanitation, and 203 tonnes of solid waste has been properly disposed (World Bank Database, 2014).

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The GEF/IBRD Manila Third Sewerage Project assisted the government of the Philippines by identifying reforms to attract private investments to the wastewater sector, increasing the effectiveness of the agencies responsible for water pollution control, and promoting innovative and effective wastewater treatment techniques. The project contributed to partnership strengthening, planning and policy development, innovative financing, creation of market-based incentives, and rate rebasing. The project also helped the government improve sewage treatment, project management, and water quality monitoring, and strengthened institutions and training programs. By 2013, the project had provided sewerage services to 20% of the 12 million residents of the Metropolitan Manila Area, which covers 640 km<sup>2</sup> and includes the capital. The project provided sanitation services to 57% of the population, and reduced the biochemical oxygen demand (BOD) load in Manila bay by 9000 tonnes per year (ICR, Manila Bay, 2014).

## SCALING UP EFFORTS

In 2011, the Partnership Fund entered a second phase through the GEF/IBRD Scaling up of Partnership Investments for Sustainable Development of Large Marine Ecosystems of East Asia and Their Coasts project. The project is a joint effort of the GEF IW and Biodiversity focal areas, for a total grant of \$43.5M and \$774.5M in co-financing. The goal of this second phase is to promote sustainable development of the shared marine and coastal ecosystems of these countries and to improve the livelihoods of local populations by reducing pollution and promoting sustainable marine fisheries, integrated coastal management, and ecosystem-based management.

The World Bank and GEF have worked closely with PEMSEA to promote investments in knowledge management to support the sustainable development of large marine ecosystems of East Asia and their coasts. PEMSEA's role in the GEF/IBRD Applying Knowledge Management to Scale up Partnership Investments for Sustainable Development of Large Marine Ecosystems of East Asia and their Coasts is to strengthen and scale-up efforts beyond the scope of

the original Partnership Fund investments and provide an opportunity to engage regional and local public & private organizations on broader investments and financing under blue and brown agendas of governments in the region. The brown agenda describes desired investment projects which will provide insights and tools for use in developing and managing upstream-downstream alliances in integrated river basin and coastal area management, total allowable pollutant loading assessment and allocation, innovative and effective management interventions, non-point pollution monitoring, and nutrient management in the agricultural sector. The blue agenda describes a similar set of investments covering rural infrastructure, enhancing agri-, aqua- and maricultural value-added works, economic diversification through alternative sustainable livelihoods; sustainable aquaculture practices and promotion of sustainable near-shore capture fisheries; mainstreaming decentralized, ecosystem-based management of coastal resources and strengthening sustainable, marine-based economies in coastal districts; and promoting the links between healthy coastal ecosystems, ecosystem services and local benefit capture to community welfare and marine conservation. This promotion will be facilitated by the project through development of an e-library and knowledge sharing portal, delivery of knowledge products and services and creating and operationalizing communities of practices and commensurate support services. PEMSEA identifies, prepares, promotes, and facilitates the replication and scaling-up of good practices financed under the original Partnership Fund and the Program Framework for Scaling up Investment Partnerships in East Asian Seas. All partners are involved in disseminating lessons learned and best practices throughout the region.



Thailand coast(LinaOliveros/MarinePhotobank)



## KEY ACHIEVEMENTS

- Demonstrated innovative financing mechanisms and technologies for future scaling-up;
- Demonstrated affordable and practical wastewater and sanitation management and treatment options that improve water quality through reduction of land-based sources of pollution;
- Increased pollution control in rural and peri-urban areas particularly for livestock, agriculture and aquaculture pollution waste;
- Established coastal ecosystem management programs that include the creation, restoration and preservation of wetlands;
- Catalyzed institutional reform by creating opportunities for collaboration between NGOs, government agencies, and private companies;
- Developed innovative legal, regulatory, and policy solutions to land-based pollution challenges; and
- Created reforms through the establishment of public-private partnerships and private sector management concessions for pollution control.



Fisherman in Indonesia (Wolcott Henry 2005/Marine Photobank)

### GEF INVESTMENTS

Partnership Investment Fund for Pollution Reduction  
in the Large Marine Ecosystems of East Asia

Scaling up of Partnership Investments for Sustainable Development  
of Large Marine Ecosystems of East Asia and Their Coasts

### DURATION OF GEF INVESTMENTS

2005-2015

2012-2015



### LESSONS LEARNED

- Share innovative approaches between national projects to ensure they benefit each other with regard to improving regulations, planning and management of public utilities;
- Strengthen harmonization of management frameworks and tools for marine and coastal management from local to national to regional levels through coordination of financial support to programs and projects operating at different scales; and
- Attract private investments by demonstrating anticipated cost-savings for tangible projects involving innovative technologies.

RECIPIENT COUNTRIES	GEF AGENCIES	GEF GRANTS	CO-FINANCING
People's Republic of China, Indonesia, Cambodia, Lao PDR, Malaysia, Philippines, Thailand, Vietnam	World Bank	\$54.66M	\$1,134.9M
People's Republic of China, Indonesia, Philippines, Vietnam	World Bank	\$43.5M	\$774.5M

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## Case Study: Demonstrating Watershed Management Innovations

The GEF/UNDP/UNEP Integrating Watershed and Coastal Areas Management in Small Island Developing States of the Caribbean (IWCAM) Project<sup>1</sup> was a collaboration between 13 Caribbean nations: Antigua & Barbuda; The Bahamas; Barbados; Cuba; Grenada; Dominica; Dominican Republic; Haiti; Jamaica; Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; and Trinidad and Tobago. This project, funded by the GEF, implemented by UNEP and UNDP, and executed by UNEP's Caribbean Regional Coordinating Unit, the Caribbean Environmental Health Institute and United Nations Office for Project Services (UNOPS), strengthened national commitments and capacities to implement an integrated approach to the management of watersheds and coastal areas on a sustainable basis.

A unique element of IWCAM was that it provided a regional focus to the management of shared water resources through nine innovative demonstration projects in eight of the thirteen participating countries, smaller-scale activities in all of the participating countries, and a range of regional capacity building initiatives. Each demonstration project promoted practical approaches to integrated watershed and coastal areas management including water resource management, aquifer protection,

wastewater treatment, rainwater harvesting, and sustainable land use. The demonstration projects were designed to capture and exchange knowledge and best practices to facilitate replication elsewhere. Recognizing the constraints to developing and implementing integrated and inter-sectoral management, the projects emphasized innovative cross-sectorial management approaches, institutional/infrastructure realignment and policy reforms, the sharing of information, stakeholder participation and coordination, and capacity building in a number of areas, including water quality monitoring, sewage treatment plant management, community-based resource assessment, and improvements in laboratory capacity.

### INNOVATIVE DEMONSTRATION PROJECTS<sup>2</sup>

In Jamaica, the demonstration project, located in the Driver's River Watershed, developed a model Watershed Area Management Mechanism (WAMM), which the National Environmental Planning Agency adopted and replicated for management of other watersheds across the island. Relying on a community-based approach and working in close partnership with national agencies, non-governmental

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<sup>1</sup> The IWCAM Project ended in 2012. In 2013, the GEF approved a second follow-up phase through UNEP and UNDP. The project has been renamed "Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (IWeco Project). <http://www.cep.unep.org/news/introducing-the-gef-iweco-project>

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<sup>2</sup> <http://iwcam.org/demonstration-activities-1>





organizations, community groups, and the private sector, NEPA identified and implemented solutions to inappropriate garbage disposal, destructive agricultural practices, unsustainable coastal development, poor sewage treatment infrastructure, and other threats to watershed and coastal environmental integrity and human welfare.

In Tobago, the demonstration project sought to alleviate the causes of environmental degradation in the Courland Watershed, the island’s most important water catchment area, and the Buccoo Reef, one of Tobago’s biggest tourist attractions and coastal buffers. Major project activities included reforestation and wildfire suppression awareness in the Courland watershed; diversion of surface drains into a constructed artificial wetland; upgrading of the land use plan in the targeted part of the watershed; establishing a sustainable and effective data-collection program; and implementing a public awareness and sensitization campaign. Each year the newly constructed artificial wetland treats approximately 4,500 m<sup>3</sup> of wastewater

coming from a fish processing plant located in a local village that lies adjacent to the Buccoo Reef. Other major achievements were the introduction of GIS mapping techniques to identify potential areas of pollution and the introduction of data collection and databases as major inputs in long-term, sustainable land use planning.

In Antigua & Barbuda, the demonstration project addressed inadequate sewage and wastewater collection and treatment infrastructure in the town of St. John’s. This is a common problem in many of the larger towns in Caribbean SIDS. Twenty households in Antigua, along with a large supermarket and resort hotel, were equipped with effective sewerage connections to divert domestic and commercial sewage from a natural and ecologically sensitive salt pond into a newly constructed treatment plant. The treated wastewater is now used for irrigation purposes. Best lessons and practices developed through this demonstration project were replicated nationwide and transferred to other Caribbean SIDS.

GEF INVESTMENTS	DURATION OF GEF INVESTMENTS	RECIPIENT COUNTRIES
Integrating Watershed and Coastal Area Management in the Small Island Developing States of the Caribbean (IWCAM)	2006-2012	Antigua & Barbuda, The Bahamas, Barbados, Cuba, Grenada, Dominica, Dominican Republic, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago



IWCAM played an important role in the entry into force of the LBS Protocol under the Cartagena Convention<sup>3</sup> by demonstrating the importance and viability of implementing waste water treatment measures. The LBS Protocol commits governments of the Wider Caribbean to make major improvements in wastewater management by introducing innovative and cost effective treatment technologies, improving policy, regulatory and institutional frameworks, and expanding access to affordable financing. Some other key achievements under IWCAM include the establishment of baseline information on levels of pollution at eight demonstration project sites, the initiation of innovative measures aimed at mitigating pollution of water resources, the introduction of, or guidance towards the introduction of new policies on integrated water resources (and coastal area) management in 10 participating countries, and significant stakeholder involvement, including relevant government agencies and local communities.



Outdoor lecture to raise awareness on steps to protect Buccoo Reef and Courland Watershed, Tobago (Donna Spencer)

3 Protocol Concerning Pollution from Land-Based Sources and Activities. Adopted in 1999 and entered into force 2010; Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region. Adopted in 1983 and entered into force on 1986.

GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
United Nations Development Program and United Nations Environment Program	\$14.39M	\$98.27M	<a href="http://archive.iwlearn.net/iwcam/">http://archive.iwlearn.net/iwcam/</a> <a href="http://www.iwcam.org">www.iwcam.org</a>





## Case Study: Achieving the World’s First Reversal of a Dead Zone in the Black Sea

One of the most remarkable success stories of a GEF investment in water quality improvement and regional cooperation can be found in the Danube and Black Sea region. The Black Sea experienced unprecedented degradation in the 1990s when widespread nutrient loading caused a large dead zone. The main sources of nutrients were runoff from the agricultural sector (fertilizers and livestock waste) as well as domestic and industrial wastes. The Danube River alone contributed 80% of the land-based inorganic nutrients and 50% of the phosphorus loading. This dead zone resulted

in loss of aquatic life and reduction of total fish catch from 850,000 tonnes in the mid-1980s to 250,000 tons by 1991. The total annual economic losses from fisheries, tourism, and other sectors were estimated at \$500M (UNDP, 2012).

Over a twenty year period, the GEF invested \$97.70M and there was an additional \$288.76M of co-financing in pollution-reduction measures targeted at reversing a massive 40,000 km<sup>2</sup> dead zone that had formed in the northwest shelf of the Black Sea. These investments have been largely

### GEF INVESTMENTS

Danube/Black Sea Basin  
Strategic Partnership on  
Nutrient Reduction

### DURATION OF GEF INVESTMENTS

2001-2015

### RECIPIENT COUNTRIES

Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic,  
Georgia, Hungary, Moldova, Romania, Russian Federation,  
Serbia, Slovak Republic, Slovenia, Turkey, and Ukraine

successful: nitrogen and phosphorus emissions have fallen by 20% and 50% respectively over the last 15 years, and the number of recorded benthic species doubled between 1980 and 2000 (STAP, 2011).

These improvements were the result of combined efforts. The GEF, UNDP, and World Bank worked through a strategic partnership featuring UNDP regional projects and a World Bank Strategic Investment Fund, which provided policy guidance and capacity building while demonstrating a suite of technologies through national investments. The GEF/IBRD Strategic Investment Partnership consisted of a portfolio of nine projects addressing national nutrient reduction activities towards addressing the rehabilitation of the Danube River and Black Sea. Meanwhile the GEF/UNDP regional projects promoted pollution reduction, including through policy and regulatory reform and technology transfer. At the same time two pivotal events accelerated the institutional reforms needed to reduce pollution levels in the Black Sea; 1) the economic collapse in Central and Eastern Europe during the 1990s, which led to a decrease in agricultural production and nutrient use; and, 2) increased obligations for countries to comply with strong environmental legislation in order to be granted accession into the European Union. The Strategic Investment Fund and the UNDP regional projects played a central role in helping

partner countries reach these stringent standards. Some of the lessons learned from these investments include the importance of: 1) bringing freshwater and marine stakeholders together to apply a true source-to-sea approach; 2) investing in capacity development for decision makers to help accelerate the formulation of new policy and the adoption and implementation of new regulatory and economic instruments; and, 3) having the patience and foresight to allow for the long time frame (typically 15-20 years or more) necessary to transform policy through science-based integrated planning, barrier removal, and market transformation.

Over 20 years of investment, these projects helped reform national agricultural policies, improved industrial and municipal wastewater treatment, rehabilitate ecosystems, and strengthened the region’s legislative framework and related enforcement. It also enhanced cooperation between all Danube/Black Sea countries to efficiently implement joint policies and actions and operate common management and control mechanisms. The Danube/Black Sea demonstrates that the GEF’s timely and persistent support can bring together a multitude of countries across a wide region to improve environmental conditions, but also to contribute to regional stability through a cooperative management framework.

GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
World Bank and United Nations Development Programme	\$97.70M	\$288.76M	<a href="http://www.undp-drp.org">http://www.undp-drp.org</a> <a href="http://archive.iwlearn.net/www.bsepr.org/www.bsepr.org/index.htm">http://archive.iwlearn.net/www.bsepr.org/www.bsepr.org/index.htm</a> <a href="http://www.worldbank.org/blacksea.com">http://www.worldbank.org/blacksea.com</a>

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Coastal waters of the Black Sea (Laptev)





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School of tuna (FAO)

# Managing Shared Fisheries Resources for Present and Future Generations

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*The world's oceans are the primary source of protein for over a billion people and, through the fisheries and aquaculture sectors, provide employment opportunities to over 200 million. However, the current state of marine fish stocks is a cause for serious concern; 53% of commercial fishery stocks are considered fully exploited, 28% are overexploited, and 3% are depleted or recovering from depletion (FAO, 2010).*

Overexploitation has not only led to serious declines, but has also caused substantial impacts on ecological systems by disrupting natural food chain patterns. Other factors contributing to the global decline of commercial fish stocks include the use of more effective fish tracking technologies and fishing gear, weak enforcement of fishing regulations, increased pollution from land-based sources, coastal habitat loss, inappropriate fishing subsidies, over-capacity of fishing fleets, and illegal, unreported, and unregulated (IUU) fishing.

Many of the most valuable fish species migrate across national boundaries and are shared and exploited by multiple countries. Stocks that are found within the Exclusive Economic Zones (EEZs)<sup>1</sup> of one country are often impacted by what occurs in the EEZs of adjacent countries, as well as on the high seas. Additionally, both local and foreign fishing fleets target commercial fish stocks and supply global markets. Migratory marine fish species such as tuna, anchovy, and herring are particularly vulnerable to exploitation. The decline of the world's fishery resources has major implications for the livelihoods and well-being of coastal communities, especially in developing countries. Yet, the management and governance of commercial fisheries is often uncoordinated and piecemeal, and enforcement over extensive and remote areas can be difficult.

Many coastal developing nations have turned to the GEF to improve management of shared fishery resources. The GEF's science-based, collaborative approach positions

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<sup>1</sup> EEZs are demarcated waters under UNCLOS, usually extending 200 km beyond a country's coast, in which that country has a legal right to prevent other countries from extracting resources, such as fish.



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it to facilitate multi-country, coordinated action towards sustainable fisheries management. For example, the GEF/IBRD West Africa Regional Fisheries Program (WARFP) helps West African countries capture more of the wealth from their marine fisheries by building the foundation for improved management. The GEF/UNDP Humboldt Current Large Marine Ecosystem Project (HCLME) assists Chile and Peru protect one of the world's largest fisheries, the Peruvian anchovy. In Indonesia, the long-running GEF/IBRD Coral Reef Rehabilitation and Management Program (COREMAP) contributes to the

protection of coral reef ecosystems that are indispensable to directly and indirectly sustaining the fisheries benefits to local communities. The GEF/FAO Bay of Bengal Large Marine Ecosystem Project (BOBLME) supports multiple activities that help countries implement an ecosystem approach to fisheries management for sustaining some of the region's most important shared fish stocks. Overall, these projects are facilitating the creation of enabling mechanisms that promote sustainable fishing practices and wider ecosystem stewardship of marine fishery resources.



Artisanal fishing canoes on the beach of a marine protected area in Kayar, Senegal (Sub Regional Fisheries Commission)





Local fisherman mending his fishing net after a fishing trip in Goderich fishing community, Sierra Leone (Sub Regional Fisheries Commission)



## The Coast of West Africa



## Taking a Fair Share

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*The waters off the coast of West Africa are rich in marine life. Approximately 2.7 million people from Mauritania to Liberia are engaged in coastal and inland fishing activities on a full or part-time basis, and fish provide up to 60% of the daily animal protein intake (FAO, 2012). However, these waters have the highest levels of IUU fishing in the world, representing up to 37% of the region's total catch (EJF, 2012). Fueled by demand from overseas markets, as well as decades of unsustainable fishing, valuable fish stocks are being rapidly depleted, limiting the region's economic growth and threatening the livelihoods and food security of millions of people.*

The fishing sector along the coast of West Africa contributes approximately \$1.5B per year to national GDPs. It is the single largest contributor to rural income and employment, attracts considerable local and foreign investment, and is vital to food security. However, West African countries capture only a fraction of the fishing sector's true value. As elsewhere in coastal Africa, both local and foreign fishing fleets have been fishing in de facto open-access conditions. Foreign vessels and industrial fishing fleets rarely land catches in the region or contribute to local economies. IUU fishing also occurs frequently and is estimated to be worth about a third of the total value of fish catches in the region (EJF, 2012). Besides

IUU, other unsustainable fishing practices are common, such as bottom trawling, the use of monofilament nets, dynamite fishing, and beach seining, where large numbers of fish are unselectively caught, including juveniles before they have a chance to mature and reproduce (World Bank, 2013). The main challenges for countries in this region have been their inability to prevent overexploitation, regulate access to marine resources, or protect the habitats that support them. Growing populations and overfishing reinforce cycles of coastal poverty for millions of people living in rural fishing communities across West Africa.

### PROMOTING SUSTAINABLE FISHERIES MANAGEMENT

In 2010, recognizing that sustainable management of fisheries resources would contribute to economic growth and poverty alleviation in the region, eight West African countries (Cabo Verde, Ghana, Guinea, Guinea Bissau, Liberia, Mauritania, Senegal, and Sierra Leone) teamed up with the World Bank and the GEF to create the GEF/IBRD West Africa Regional Fisheries Program (WARFP). The goal of the WARFP is to promote sustainable management of marine fishery resources and increase the overall wealth that West African countries capture by: (1) improving fisheries governance by strengthening each country's capacity to sustainably govern

“In Africa, fisheries support some 10 million livelihoods. With better governance, these fisheries could generate at least an additional \$2B each year. Unlike minerals and other non-renewable resources, this would be a continual contribution to economic growth throughout the region.”

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Jamal Saghir, Director of Sustainable Development  
for the Africa Region, World Bank.

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and manage their own fisheries; (2) reducing illegal fishing; (3) increasing the profitability generated by fisheries and the proportion of that value captured by the countries. The WARFP is coordinated by the Commission Sous-Régionale des Pêches (CSRP), the main regional fisheries body. The CSRP is charged with harmonizing national fishery laws and regulations to secure the sustainable use of fishery resources amongst its member states (Mauritania, Senegal, Guinea-Bissau, Guinea, Cabo Verde, and Sierra Leone). Its mandate is also to strengthen resource management and increase monitoring, control, and surveillance activities to reduce illegal fishing, which aligns well with the WARFP goals.

The WARFP helps countries build more sustainable and profitable fisheries through governance reforms focused on limiting and securing access rights, and empowering stakeholders. Individual country projects are at various stages

of implementation, yet the first impacts and results are already being seen. For example, promising progress has been made with respect to the creation of vessel registries for fishing vessels in five countries. Both Cabo Verde and Liberia have reached full registration; Sierra Leone and Senegal have reached 80% and 75%, respectively (Table 1). An important milestone was reached in July, 2013 when Ghana's Fisheries Commission published a list of all industrial and semi-industrial licensed vessels (Prince, 2013a). The establishment of such registries is an important first step in improving fisheries governance, as they provide insight into fleet size and fishing effort of the artisanal sectors, thereby providing a basis for sustainable management and exploitation of resources. Registries also make it possible to identify whether a vessel is fishing legally, and thereby restrict access.

Illegal, Unreported, and Unregulated (IUU) Fishing is fishing that is conducted in oceans around the world in violation of national laws or internationally-agreed conservation and management measures (NOAA, 2014). It includes fishing without a license or beyond the quota for certain species, conducting unauthorized trans-shipments to cargo vessels, failing to report catches or making false reports, keeping undersized fish or fish that are otherwise protected by regulations, fishing in closed areas or during closed seasons, and using prohibited fishing gear.

IUU fishing is of serious and increasing global concern. It undermines efforts to conserve and manage fish stocks in all capture fisheries. It can prevent national and regional fisheries management organizations from achieving management goals. This impact can lead to the loss of both short and long-term social and economic opportunities and to negative effects on food security and environmental protection. IUU fishing can contribute to the collapse of a fishery or seriously impair efforts to rebuild already depleted stocks (FAO, 2014).

IUU fishing threatens marine ecosystems, food security, and socio-economic stability worldwide, but especially in developing countries. It is estimated that worldwide economic losses are between \$10 to 23B annually, representing between 10 and 23 million tonnes per year (Agnew et al. 2008).



TABLE 1: FISHING BOAT REGISTRATION IN REGION AS OF 2013 (KANE 2011)

COUNTRY	NUMBER OF REGISTERED CANOES	% REGISTERED
CABO VERDE	1,239 CANOES; 91 SEMI-INDUSTRIAL	100
LIBERIA	3,262	100
SENEGAL	16,291	75
SIERRA LEONE	10,500	80
GHANA	PROCESS IS ONGOING	N/A

The governments of West Africa have shown a strong commitment to reform the fisheries sector and early results are already being seen in the development of regulatory frameworks. For example, the Government of Liberia has passed its first new fisheries regulation and has established a fisheries monitoring center to track industrial fishing activities (Virdin, 2011). In Senegal, unsustainable artisanal fishing has led to the overexploitation of many local fish populations. In response, the Senegalese government, through the Senegal Ministry of Fisheries and Maritime Affairs, issued an Executive Order to freeze the registration of new marine artisanal fishing vessels. Possibly even more far reaching was the 2012 decision made by Senegal's President, Macky Sall, to rescind foreign fishing permits in the country's EEZ, a 158 km<sup>2</sup> marine area zoned for commercial fishing (World Bank, 2013).

#### IMPROVING FISHERIES DATA AND TRANSPARENCY

Understanding the status of key fish stocks plays a central role in sustainable fisheries management. The WARFP has supported stock assessments in Cabo Verde and Sierra Leone, while assessments are scheduled to take place in Ghana and Guinea Bissau. This information will assist fisheries

managers to monitor and regulate various stocks. The CSRP has begun reviewing the monitoring and data collection systems for fisheries in Cabo Verde, Liberia, Senegal, and Sierra Leone. The review will enable them to establish a national 'dashboard' of key management indicators consisting of biological, social, and economic information about these fisheries. Indicators include: effort data (the vessel registry, the number of licenses issued per fishery, etc.); catch data (the total fish catch per fishery, target species, by-catch, and as far as possible discards); monitoring, control, and surveillance data (number of fish surveillance patrol days, the total number of fishing vessels sighted by surveillance patrols as well as vessels boarded, the number of fishing vessels charged with an infraction and by type of infraction, etc.) as well as trade data (volume of fish products sold on the local markets or for export, including their price and their origins). The ultimate aim is to aggregate this information into a regional dashboard that will serve as a knowledge portal for fisheries activities across the entire region (Virdin, 2012). In addition to the dashboard, Liberia and Sierra Leone are publishing lists of all licensed industrial vessels and the lists of all registered and marked artisanal canoes and revenues generated from fisheries in national newspapers and websites.

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## TACKLING THE ILLEGAL FISHING CHALLENGE

Besides the creation of registries to help identify illegal fishing vessels, some countries have made considerable progress in improving surveillance capacity, a vital component of efforts to reduce illegal fishing. In Cabo Verde, Liberia, and Sierra Leone, over 110 inspectors received training in how to enforce anti-IUU measures (Table 2). In Sierra Leone and Liberia, police now routinely pursue illegal fishing boats and arrest the crews (Prince, 2013b). In Sierra Leone, the government has established a fisheries monitoring center to launch fisheries surveillance patrols (Virdin 2011). Patrol vessels in Sierra Leone became operational in mid-2012 and arrests have already netted \$1M in fines (Prince Berengere, 2013). In Sierra Leone, an increase of 45% in artisanal catch landings has been reported by the Ministry of Fisheries. In Liberia, the Bureau of National Fisheries has collected \$5M from fines on vessel infractions. These penalties have helped reduce IUU from 83% to less than 50% of total catch, while buttressing governance capacity with additional funds. Local artisanal fishers in major fishing communities in both Sierra Leone and Liberia have reported that the incidence of illegal trawling in the 6-mile inshore exclusion zone (IEZ)<sup>2</sup> has been reduced considerably (Kane 2011). Local fishermen are now content not only with the space that is being safeguarded for their use, but also with the gradual increase that they have been witnessing in both average catch landings and average sizes of the fish in these catches per canoe of targeted coastal pelagic and demersal fish stocks.

Enforcement has improved significantly, including the establishment of operational monitoring, control, and surveillance devices (VMS) linked with vessels monitoring center platforms in Cabo Verde, Liberia, Sierra Leone, Senegal, and Ghana. This system allows for 24-hour monitoring of

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2 IEZ is a zone where fishing by industrial trawlers is prohibited. Prior to the project, trawlers were competing with artisanal canoes in the IEZ leading to net destruction, collisions, and deprivation of an income and food source for local fishermen. The first phase of the project therefore focused on this zone while at the same time policing the EEZ for IUU vessels.

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“Promoting the recovery of Africa’s fish resources and preserving the ocean environment requires cooperation among Africa countries and their international partners. Programs such as regional fisheries research and management, already underway as pilot projects, will lead the way towards improved protection of Africa’s marine environment.”

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Colin Bruce, Director for Strategy,  
Operations and Regional Integration, World Bank.

the activities of all industrial vessels (Kane 2011). Equipping countries in West Africa with such technologies contributes to improved fisheries management.

### GIVING CONTROL TO FISHING COMMUNITIES

Other encouraging news from West Africa includes progress in the establishment of community-based co-management associations (CMAs) which have taken direct responsibility for management of local fisheries activities. So far, almost 50 CMAs have been established in Cabo Verde, Liberia, Sierra Leone, and Senegal (Table 3). In Sierra Leone, four new marine protected areas have been created and new management structures, such as the CMAs, are ongoing in some of these MPAs. A CMA serves as an important first step in setting up Territorial Use Right Fisheries (TURF) management in the region. TURFs are based on a traditional rights-based approach where rights are assigned to individuals and/or groups to harvest fish in a particular location, generally, although not necessarily, based on long-standing traditions (Cochrane, 2002). The establishment of TURFs will give fishing communities more control and is expected to increase the local economic benefits generated by near shore fishing.

Another key action under the WARFP is to support local processing of fish catches and improve post-harvest handling practices. This not only further develops the artisanal sector, but also creates new jobs in the commercial fishing sector. The creation of new jetties in Sierra Leone and Liberia is a good example of such action. The jetties support a wide range of fishing activities, including landing and handling of fisheries products, temporary storage, processing, and transportation.

Ngaparou, Senegal, a coastal fishing community about 40 miles south of Dakar, is one notable success story. This community worked closely with international and regional organizations under the WARFP to create co-management associations in order to take direct charge over its marine resources. The community has taken full responsibility for setting limits on the number of fishing boats that can harvest fish at a given time, registering all fishing vessels,

TABLE 2: STATUS OF EACH COUNTRY WITH REGARD TO FISHERIES INSPECTIONS (KANE 2011)

COUNTRY	PERFORMANCE
CABO VERDE	<ul style="list-style-type: none"><li>• 22 Inspectors trained</li></ul>
LIBERIA	<ul style="list-style-type: none"><li>• 40 Inspectors/observers trained</li><li>• 33 tuna vessels detected committing infractions</li><li>• \$5M in fines collected</li><li>• Illegal fishing reduced from 83% to less than 50% of total catch</li></ul>
SENEGAL	<ul style="list-style-type: none"><li>• Increased participatory surveillance patrols</li></ul>
SIERRA LEONE	<ul style="list-style-type: none"><li>• Over 50 Inspectors/observers trained</li><li>• Illegal fishing reduced from 88 to less than 50% of total catch</li></ul>

TABLE 3: CMAS ESTABLISHED IN COUNTRIES (KANE 2011)

COUNTRY	NUMBER OF CMAS ESTABLISHED
CABO VERDE	2
LIBERIA	1 (Consisting of 15 fishing communities)
SENEGAL	22
SIERRA LEONE	22
GHANA	Process is ongoing



Salted and fermented processed fish sun drying, sourced from the Joal-Faiouth  
Marine Protected Area in Senegal (Sub Regional Fisheries Commission)

“Ngaparou is currently one of the most productive coastal marine areas in the country. In the beginning, the main objective was restoration. Now, the fish are really abundant.”

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Issa Sagne, President, Local Committee of Fishers of Ngaparou.



and self-policing to enforce catch limits. While the WARFP has only been in existence since 2010, the Ngaparou community is seeing early benefits: rebounding fish stocks, and increases in local employment opportunities and fishery related revenue. Unique to this region in Africa is that women often own capital and are directly involved in the coordination of the fisheries supply chain, from production to the sale of fish. Women manage fishing supply stores, perform most fish processing, and are responsible for as much as 60% of the seafood marketing (FAO, 2012). Local women in Ngaparou saw an opportunity and came together to manage a small fishing supply store. In another area, community members pooled resources to purchase a refrigerated truck so that the harvest of local fishermen could be easily transported and sold at other village markets. The key catalyst for success was that local stakeholders were empowered and given ownership, providing the incentive to innovate and improve local practices and form new entrepreneurial ventures.

The fish stocks found off the coast of West Africa constitute a significant shared natural capital asset and play a critical role in the wellbeing of people in this region. Through a combination of actions aimed to improve regional cooperation, enact national reforms, improve fisheries monitoring and surveillance, encourage better enforcement of regulations, improve fisheries data, enhance management capacity and community empowerment, the WARFP has helped countries decrease levels of IUU fishing and increase the overall wealth generated by the exploitation of shared marine fishery resources, especially the proportion of that wealth that is retained by West African countries themselves. Although there have been differing levels of progress, this unique GEF initiative has helped put these countries on track to strengthen local and regional governance of their coastal waters, and rebuild fisheries. Notable improvements in surveillance of illegal fishing activities and in controlling access to the fishery and its resources are a critical step towards achieving sustainable fisheries, improving food security, and reducing poverty in the region.





Getting fish ready for processing in a landing site in  
Sierra Leone (Sub Regional Fisheries Commission)



## KEY ACHIEVEMENTS

- Established registries for fishing vessels in Cabo Verde, Liberia, Sierra Leone and Senegal;
- Initiated regulatory frameworks for the fisheries sector at the national level;
- Completed stock assessments for key fish stocks in Cabo Verde and Sierra Leone and scheduled assessments for Ghana and Guinea Bissau;
- Set up operational monitoring, control and surveillance devices linked with regional based satellite based vessel monitoring system technology in Cabo Verde, Liberia, Sierra Leone, Senegal and Ghana;
- Reduced illegal fishing in Cabo Verde, Liberia, Sierra Leone, and Senegal through improved capacity, surveillance, and enforcement;
- Established community-based management associations in Cabo Verde, Liberia, Sierra Leone, and Senegal; and,
- Improved inland processing and post-harvest handling.



Fishing boats on Tarrafal Beach, Santiago, Cabo Verde (Yves de Soye)

### GEF INVESTMENTS

West Africa Regional  
Fisheries Program (WARFP)

### DURATION OF GEF INVESTMENTS

2010-2014

### RECIPIENT COUNTRIES

Cabo Verde, Guinea Bissau,  
Liberia, Senegal, Sierra  
Leone and Ghana



### LESSONS LEARNED

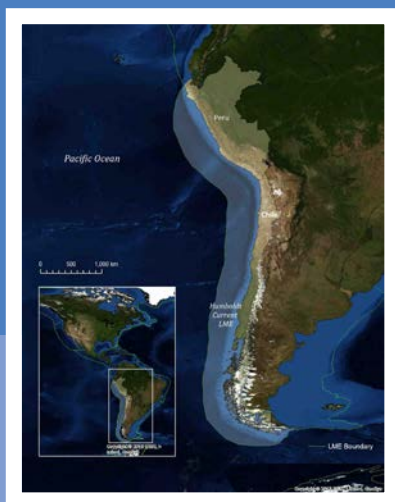
- Ensure community engagement and provide education, as they are critical to convince fishermen to shift to more sustainable fishing practices;
- Empower and give ownership to local communities to manage and regulate local marine resources to deliver sustainable local benefits;
- Demonstrate the overall benefits of reducing fishing capacity; and,
- Ensure the following governance measures are in place: a sound legal framework; an institutional mechanism for coordination; measures for direct engagement of empowered fishing communities in surveillance; and training and other capacity building efforts for prosecuting cases.

GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
World Bank	\$31.6M	\$80.45M	<a href="http://www.worldbank.org/projects/P106063/west-africa-regional-fisheries-program?lang=en">http://www.worldbank.org/projects/P106063/west-africa-regional-fisheries-program?lang=en</a>





Fresh Peruvian anchovy (Michael Akester)



## Humboldt Current LME



# Sustaining the World's Largest Single-Species Fisheries

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*The Humboldt Current Large Marine Ecosystem (HCLME) extends along the coast of Chile and Peru. Its cold and nutrient-rich waters support one of the world's largest fisheries, the Peruvian Anchovy. Watching local fishermen chase the enormous schools of anchovy that form in upwelling areas is a unique sight. Once harvested, much of the catch is destined to become fishmeal and oil products to support the world's booming aquaculture industry.*

The anchovy fisheries of the HCLME are of national, regional, and global significance. The fishmeal and essential oils generated from these fisheries are a primary food source for farmed fish, an increasingly important component of global food security. Between 1980 and 2010, global aquaculture production expanded twelvefold; aquaculture now accounts for roughly half of all seafood consumed on earth (FAO, 2012). The annual biomass of anchovy in Peruvian waters typically ranges between 10 and 12 million tonnes (Serra et al, 2012). Total annual landings in Chile and Peru are approximately 7.5 million tonnes, of which about 6 million tonnes (80%) are harvested in Peruvian waters, making Peru the largest fishmeal exporter in the world. In 2011, annual exports of fishmeal and oil were worth \$2.1B, more than double the value of fish for direct human consumption, and 80% of exports of fishmeal and oil were used to feed

farmed fish. The anchovy harvest generates important local employment opportunities and income for artisanal fishermen, e.g., in anchovy salting and processing plants. The significant economic value of this species provides a strong incentive to sustain the fishery (Villy et al, 2014).

A range of anthropogenic activities, including overfishing, pollution, and coastal development, exert continuous pressure on the Humboldt Current LME. Overfishing and climatic factors caused the sudden collapse of the anchovy fishery in the 1970s, which proved to be a painful lesson for the Humboldt's fishermen. In 2010, to help avoid another collapse, the GEF and the UNDP, initiated the Humboldt Current Large Marine Ecosystem Project. The ultimate goal of this initiative is to establish a holistic ecosystem-based approach for managing fish and other marine resources based on five key thematic areas: (1) ocean productivity, (2) fish and fisheries, (3) ecosystem health, (4) socioeconomics; and, (5) governance.

The transboundary nature of the HCLME's anchovy fish stocks once had the potential to be a source of tensions between Peru and Chile due to a long-standing maritime border dispute over a marine area of about 38,000 km<sup>2</sup>. However, a recent International Court of Justice ruling settled the dispute amicably in January, 2014, and laid the

The background image shows two women in a food processing facility. They are wearing white hairnets and face masks. They are working with large blue plastic barrels filled with small fish, likely anchovies. The scene is brightly lit, and the overall color scheme is dominated by the blue of the barrels and the white of the workers' attire.

Women salting and packing anchovy (Michael Akester)

“We can thank stakeholders from both countries, the UNDP and the GEF for bringing people together to create links and partnerships which have encouraged regional cooperation for the common good of both the HCLME and the coastal peoples of Peru and Chile.”

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Michael Akester, Regional Project Coordinator Chile-Peru, HCLME Project.



groundwork for the project to promote constructive dialogue to enhance regional cooperation and more collaborative management of the LME. The project facilitated further improvement in relations between the two countries with their bi-national agreement to develop an objective, science-driven Transboundary Diagnostic Analysis (TDA) for the entire HCLME. National working groups for each of the project's five thematic areas have been established to inform this process. The TDA will serve as the basis for coordinated policies to ameliorate the root causes of challenges facing the HCLME.

### ACTION ON THE GROUND

Stakeholder engagement is central to the design and success of any GEF intervention, and the HCLME project is no different. Much of the project's work to date has been conducted in tandem with the artisanal fishermen in the Juan Fernandez Islands in Chile as well as various pilot sites in Peru. The residents of these communities are key stakeholders due to their acute sensitivity to the effects of ecosystem degradation on their livelihoods and communities. Local communities have been engaged in the project from the

beginning, and identified specific problems that were included in national ecosystem diagnostic analyses. These analyses served as inputs into the TDA to inform the development of an agreed upon suite of policies in a regional Strategic Action Programme (SAP) and subsequent National Action Plans (NAP) that give effect to the SAP.

This project has supported the establishment of fisheries co-management schemes that restrict access in defined areas to specific fishing communities, and set regulations for catch levels through associated management plans. So far, over 1 million hectares of co-managed marine areas have been established in Chile and a smaller area for macro algae repopulation have been established at a pilot level in Peru. Under a partnership with the Spanish Consorcio, S.A. company, and the Peruvian Centre for Environmental Sustainability at the Cayetano Heredia University, the project promotes consumption of anchovy at local and national levels across Peru via private and public sectors. Anchovy is particularly rich in proteins and essential oils, and is sold for less than \$1 per kilogram in rural areas of the country, providing a nutritious and inexpensive food source for poorer communities that often have limited alternatives.



“I would like to see the Chilean government safeguard our marine ecosystems and create more protected space to care for our natural resources as much as possible for future generations.”

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Jordan Alexander Lopez,  
fisherman Selkirk Island.

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#### IMPROVING ECOSYSTEM HEALTH

A key element in the application of an ecosystem-based approach to managing this LME has been the creation of a network of marine protected areas (MPAs) to protect important and vulnerable habitats, including submerged seamounts and canyons, as well as to conserve vulnerable marine biodiversity. So far, the project has helped create over 1.1 million hectares of new MPAs, with over 1 million hectares of multiple use protected areas approved for the Juan Fernandez (Robinson Crusoe) Islands in 2014. In Peru, the HCLME project is helping the Peruvian National Parks Authority develop a Master Plan for the Guano Islands and Capes National Reserve. These activities, together with existing MPA efforts, will constitute an important network of MPAs along the entire 4,000 km length of the Humboldt Current LME.

#### ENCOURAGING MARINE STEWARDSHIP COUNCIL CERTIFICATION

A key component of this project is to encourage the Marine Stewardship Council (MSC) certification scheme for anchovy stocks that are targeted for human consumption. This international standard certifies to consumers that a fishery has been independently validated as being well managed and harvested in a sustainable manner. For example, Consorcio S.A. is actively working with fishers in San Andres Pisco towards attaining MSC certification of its anchovy operation in Peru. Project collaborators, including the Undersecretariat for Fisheries (SUBPESCA), Fisheries Promotion Institute, the University of Concepcion (via a MSC grant), and local fishing communities in the Juan Fernandez Islands are carrying out similar work in Chile. Encouraging MSC certification fosters sustainable harvesting practices, while simultaneously securing access to the rapidly growing market for sustainable seafood products. These organizations are also actively working towards obtaining MSC certification for the rock lobster fishery, which provides the main income for the isolated Juan Fernandez islanders. MSC certification will guarantee market access and may provide a small added value premium.

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## MOVING FORWARD

The project, in conjunction with Conservation International, promotes the Ocean Health Index (OHI), an increasingly accepted measure of ocean health based on 10 globally applicable indicators, to improve assessments in Chile and Peru. The OHI evaluates the condition of marine ecosystems according to 10 human goals that represent the key ecological, social, and economic benefits that a healthy ocean provides: food provision; artisanal fishing opportunities; natural products; carbon storage; coastal protection; coastal livelihoods and economies; tourism and recreation; sense of place; clean waters; and biodiversity. By providing a means to advance comprehensive ocean policy and compare future progress, the OHI can inform decisions about how to use or protect marine ecosystems.

Once assembled, one application for the data will be to improve climate change monitoring. El Niño and La Niña ocean-atmosphere disruptions impact marine ecosystems and anchovy production at local, regional and global levels, and OHI data will assist in the development of adaptation strategies for the anchovy fisheries.

The HCLME project helps Chile and Peru protect the globally important anchovy fishery through the adoption of an ecosystem-based management process that looks beyond frontiers and seeks to harmonize protection efforts. The mix of initiatives and partnerships supported under this project raises international awareness of the pressing problems faced by major marine ecosystems like the HCLME, and more importantly helps find innovative and cost-effective solutions to solve them. Future efforts will focus on habitat restoration, promotion of sustainable repopulation and aquaculture using native species, finalization of the TDA, and the development, adoption, and implementation of a suite of policies to address the HCLME's main issues through a regional Strategic Action Programme (SAP). These efforts will help Chile and Peru secure a holistic and ecosystem-based approach for managing their shared marine resources for present and future generations.

“We will be assessed based on the 10 Ocean Health Index indicators. With assistance from the GEF/UNDP HCLME Project and Conservation International, we will actively work towards improving both the indicators and national response from the inside.”

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Jose Alvarez Alonso, Director General Biological Diversity, Ministry of the Environment, Peru.

KEY ACHIEVEMENTS

- Created 1,140,833 ha of new MPAs, with 1,017,500 ha of multiple use protected areas approved for the Juan Fernandez;
- Established five national working groups for each of the projects thematic areas: ocean productivity; fish and fisheries; ecosystem health; socioeconomics; and governance;
- Completed two Ecosystem Diagnostic Analyses along with causal chain analyses in both countries;
- Completed draft TDA;
- Promoted anchovy consumption at local and national levels across Peru; and,
- Initiated Marine Stewardship Council certifications for anchovy and lobster fisheries in Peru and Chile, respectively.



Fresh anchovy catch (Michael Akester)

GEF INVESTMENTS

Towards Ecosystem Management  
of the Humboldt Current LME

DURATION OF GEF INVESTMENTS

2010-15

RECIPIENT COUNTRIES

Chili, Peru





## LESSONS LEARNED

- Collaborate and create partnerships, both through government and public-private interventions, to promote sustainable resource use;
- Involve key stakeholders in all problem identification exercises;
- Incorporate social aspects in projects with a large scientific component through direct involvement of stakeholders and communities.

### GEF AGENCIES

United Nations  
Development Program

### GEF GRANTS

\$7.00M

### CO-FINANCING

\$24.62M

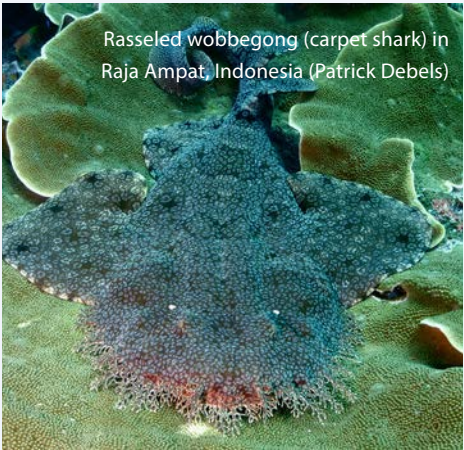
### WEBSITES

<http://www.humboldt.iwlearn.org>

# Case Study: Coral Reefs for Tomorrow

Indonesia has nearly one-eighth of the world's coral reefs, some 75,000 km<sup>2</sup>. Coral reef ecosystems serve as essential habitat for many commercially valuable fish species. Coral reefs support artisanal subsistence fishing, commercial fisheries, aquaculture, live reef fish for food industry, recreational fishing, aquarium/marine ornamental trade, and the curio and fashion industries. Coral reef ecosystems account for 30% of Indonesia's GDP and generate employment for about 20 million people in 67,500 coastal villages (ADB, 2012a). Reefs also provide an effective natural barrier against wave erosion (UNEP WCMC, 2006; Van Lavieren et al., 2012), thereby protecting coastal dwellings, agricultural lands and tourist beaches. Altogether, an estimated \$1.6B per year of net economic benefits can be derived from the coral reefs in Indonesia, mainly through fisheries, coastal protection, and tourism (Burke et al., 2002). Despite these benefits, two-thirds of Indonesia's coral reefs are at risk due to pollution, overfishing, destructive fishing practices, mining, and coastal development (ADB, 2013).

In May, 1998, in order to improve the management of coral reefs and promote sustainable use of marine resources, the GEF, together with the



Government of Indonesia and the World Bank, launched the GEF/IBRD Coral Reef Rehabilitation and Management Project (COREMAP I). This project ran from 1998-2004 at an experimental site in Sumatra, Indonesia. The project focused on raising awareness of the importance of sustainable, non-destructive fishing practices to coral reef conservation, and therefore saw high levels of community involvement. The project was a success: illegal fishing practices decreased by more than 50% and fishermen began using reef-friendly

GEF INVESTMENTS	DURATION OF GEF INVESTMENTS	RECIPIENT COUNTRIES
Coral Reef Rehabilitation and Management Projects (COREMAP Phases I, II, III)	1998-2019	Indonesia

fishing gear. The initial investment also firmly established a strong policy, strategic, and legal framework that both enabled community-based coral reef management in Sumatra, and laid a solid foundation from which the COREMAP Program would evolve.

A second project phase, COREMAP II (2004-2011), continued with an objective to replicate and improve upon the community-based management scheme to eight districts in Indonesia — Batam, Bintan, Lingga, Natuna, Nias, Nias Selatan, Taanuli Tengah and Mentawai. At a national level, the project led to the drafting of a law that prohibits coral mining and destructive fishing practices. At a local level, the project helped governments develop regulations targeted at ensuring more sustainable management of coral reefs. In order to implement these new policies, COREMAP had a strong focus on community empowerment and provided formal training in coral reef management to more than 8,500 citizens. This training included monitoring and survey techniques to assess coral reef health as well as how to investigate and deal with illegal activities. The development, implementation, and enforcement of these new policies contributed to a 9.4% average annual growth rate of coral cover in all project sites (ADB, 2012b). Furthermore, COREMAP enhanced community welfare and livelihoods by providing

alternative income and employment opportunities for fishing and non-fishing communities. Overall, this investment reinforced the close link that exists between healthy marine ecosystems and potential economic benefits for local communities.

Building on these successes, the Government of Indonesia, the World Bank, and the GEF approved a third round of funding to begin the GEF/IBRD Coral Reef Rehabilitation and Management Program: Coral Triangle Initiative Phase III (COREMAP-CTI). COREMAP-CTI will run over a five-year period in seven MPAs across the original COREMAP region, as well as three national MPAs in three new districts in Indonesia. The objective of COREMAP-CTI is to integrate an integrated coastal management approach into government and village programs, and to provide communities incentives and the capacity to sustainably co-manage their coral reefs. This final phase will see a strengthening of MPA management capacities, an enhancement of MPA management effectiveness and biodiversity conservation, and the promotion of sustainable livelihood activities. COREMAP-CTI will also contribute to Indonesia's country partnership strategy for inclusive growth and environmental sustainability, and is the principle mechanism adopted by the Government of Indonesia to achieve their 2020 target of establishing 20 million hectares of effective MPAs.

GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
World Bank (IBRD) & Asian Development Bank (ADB)	\$29.60M	\$146.68M	<a href="http://www.coremap.or.id">http://www.coremap.or.id</a>



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## Case Study: Enough Fish for Future Generations



Fishermen at sunset, Indonesia  
(Wolcott Henry, 2005, Marine Photobank)

The Bay of Bengal Large Marine Ecosystem encompasses a marine area of over 6 million km<sup>2</sup> between India and Indonesia. It contains important tracts of the world's most vulnerable marine habitats, including 12% of the world's coral reefs, 8% of the world's mangroves, extensive seagrass beds, and large estuaries, which together support some of the most productive fishing grounds on the planet. This LME is a complex area spanning two different geopolitical sub-regions (South and Southeast Asia) bordering countries with a combined human population of 1.78 billion, equal to one quarter of the world's population: Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka, and Thailand (BOBLME TDA Executive Summary, 2012). Fishing is absolutely critical both economically and in terms of food security for the lives of the region's people; over

4.5 million people are employed in fisheries-related activities, including about 2.2 million fishers working on some 400,000 fishing boats (BOBLME, 2011). Around 6 million tonnes of fish are caught annually, with a value of \$4B (BOBLME, 2011). Rapid population growth, a high dependence on marine and coastal resources for food, trade and livelihoods, as well as changing land-use patterns all have negative impacts on the Bay of Bengal. These pressures heighten concerns that the Bay will not be able to support the future needs and aspirations of the 450 million people who live along its coastline.

In 2009, the countries that share the Bay of Bengal launched the Bay of Bengal Large Marine Ecosystem (BOBLME) Project in partnership with the GEF, FAO, and other partners. The \$31M, six-year project

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is funded mainly by the GEF, Norway, Sweden, FAO, national governments in the region, and the National Oceanic and Atmosphere Administration (NOAA). The BOBLME Project's overall aim is to ensure that (1) fisheries and other marine living resources are restored and managed sustainably; (2) degraded, vulnerable and critical marine habitats are restored, conserved and maintained; and (3) coastal and marine pollution and water quality are controlled to meet agreed standards for human and ecosystem health. This project is the only intervention in the region that has drawn together all eight countries into one forum, including the national agencies for environmental and fisheries management.

The BOBLME Project has been supporting many activities that help countries implement an ecosystem approach to fisheries management (EAFM) to sustain some of the region's most important shared fish stocks; including Hilsa shad (*Tenualosa ilisha*), Indian mackerel (*Rastrelliger kanagurta*), and shark species. The Hilsa shad fishery is an important subsistence food item for many poor coastal communities and is especially important in India, Bangladesh, and Myanmar for generating employment opportunities for millions of people and is worth over \$2B (BOBLME 2012). Hilsa shad is Bangladesh's national fish species, with around 500,000 fishers involved in harvesting, and another 2-2.5 million involved in distribution and sale, as well as ancillary activities such as net and boat making, fish processing and export (BOBLME 2012). However, urgent action is imperative to safeguard the Hilsa fishery from unsustainable overfishing, as recent stock assessments show major declines in overall abundance.

The EAFM was re-affirmed by the 2012 Rio+20 Conference as the global standard approach to manage capture fisheries. This approach signifies a paradigm shift from traditional fisheries management that focused on target fish species. Instead, EAFM seeks to ensure healthy ecosystems through balancing environmental and human and social well-being without jeopardizing the options for future generations. To assist countries with improving management of shared resources like Hilsa, the BOBLME Project is helping set up a regional EAFM framework with three tiers: (1) technical working groups which provide information and support for ongoing interactions between scientists and/or policy makers from all participating countries; (2) a Regional Fisheries Management Advisory Committee (RFMAC) that interprets fisheries data so that ecosystem based fisheries management advice can be delivered to decision makers; and (3) a Regional Fisheries Management Forum (RFMF) that will provide an opportunity for decision makers to deliberate on the advice of the RFMAC and make decisions for national actions. So far, seven Technical Working Groups (Fisheries Statistics, Hilsa Assessment, Indian Mackerel, Sharks, Ecosystem Indicators, MPAs, and Pollution), made up of fisheries and environment officers from the different countries have been formed and are operational. The RFMAC has been created with members from each BOBLME country, as well as representatives from the Southeast Asian Fisheries Development Center (SEAFDC), FAO, the Bay of Bengal Programme — Intergovernmental Organisation (BOBP-IGO), and IUCN. The RFMF has not yet been established; management advice is therefore currently directed at national authorities. The process of setting up

this EAFM framework has increased collaboration between scientists and policy makers both within and between countries, while encouraging the formation of enduring partnerships with other bodies and agencies working in the region.

In order to effectively implement EAFM, a deep knowledge and understanding of the processes and trade-offs and sophisticated skill must be rooted in the national ministries and management institutions. The BOBLME project recognized this as a gap in the region, and responded with capacity building activities so that countries are able to develop, implement, and monitor their fisheries. These efforts resulted in the development of an EAFM training course called Essential EAFM. This effort is the result of a unique partnership involving the BOBLME Project, the Asia-Pacific Fisheries Commission, the US Coral Triangle Initiative, NOAA and the Coral Triangle Support Partnership. The training course provides participants with the skills to manage fisheries more holistically to reduce user group conflicts, unlock financial resources, work cooperatively with other stakeholders, and resolve fisheries issues and challenges. The first pilot training took place in June, 2013 in Malaysia, and since then the course has been taken up

readily by Malaysia, Philippines, and Indonesia and is being rolled out regionally by SEAFDEC (in South East Asia) and the BOBP-IGO (in South Asia). The ultimate goal is to build knowledge and skills on EAFM and establish a pool of qualified EAFM trainers in the region.

The BOBLME Project is laying the foundation for a cooperative mechanism to develop a better understanding of the Bay of Bengal and to promote a more comprehensive regional approach to the establishment and management of MPAs and fish refugia. In collaboration with the World Fish Centre and the BOBLME Project, an MPA learning network has been developed to facilitate communication among MPA practitioners and help in the diffusion of innovative practices. One positive outcome has taken the form of an MPA Atlas (<http://boblme.reefbase.org/mpadatabase.aspx>), an interactive, online database of MPAs for the Bay of Bengal LME. This portal contains a variety of information and knowledge products including, but not limited to technical reports, case studies, scientific articles, and maps. The Atlas is accessible to a wide community of MPA practitioners (managers, researcher,

GEF INVESTMENTS	DURATION OF GEF INVESTMENTS	RECIPIENT COUNTRIES
Bay of Bengal Large Marine Ecosystem	2009- 2015	Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka, and Thailand





Fisherman selling catch at market in Indonesia  
(Raymond Kacso/Marine Photobank)

policy makers, etc.) and will contribute towards sustainable fishmanagement and conservation in the Bay of Bengal.The BOBLME Project has also developed MPA awareness materials for the Bay as a whole and for each country to promote the use of MPAs in fisheries management and biodiversity conservation.

The BOBLME Project is at the forefront of efforts to improve fisheries management in the Bay of Bengal. This project has greatly enhanced scientific knowledge and understanding of this Large Marine Ecosystem, and has improved the capacity of resources managers throughout the region. These efforts are critical precursors to establishing a functional EAFM regime that will strengthen fisheries governance and ensure a healthy ecosystem for present and future generations. At the heart of the BOBLME Project’s future is a shared vision for healthy ecosystems and sustainable use of marine living resources for the benefit of the countries which rely on the Bay of Bengal LME.

GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
Food and Agriculture Organization	\$12.78M	\$18.91M	<a href="http://www.boblme.org">http://www.boblme.org</a>

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Gulf of Mexico (Paoloma Ladrón de Guevara)

# Applying an Ecosystem-based Management Approach

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*Effective ocean governance requires working beyond single sectors, species, and scales. An integrated approach that addresses the breadth of relevant sectors is necessary to maintain ecosystem health and services. At the same time, effective governance also requires recognizing ecological systems for what they are: complex combinations of interdependent elements that interact in diverse ways. Ecosystem-based management (EBM) is a holistic approach that acknowledges the complexity of the environment and human interactions with it.*

EBM evolved from the need to plan and manage various economic activities, human uses, and policy and management interventions across geographical and political boundaries. EBM recognizes that humans are an integral part of ecosystems and that human well-being is inextricably linked to the health of the environment. The arguments supporting EBM are strong: (1) it secures greater impact with reduced cost compared to uncoordinated sectorial management; (2) it allows for wider scale action and prohibits fragmentation of jurisdictions and decision-making; (3) it is inclusive and promotes cross-sector integration of key sectors like fisheries, tourism, shipping, and energy; and (4) it is adaptive and can build upon or transcend existing legal and regulatory frameworks.

The GEF has long supported initiatives that account for the complexity and interconnectedness of ecosystems and societies. The GEF invests in both ecosystem-based and integrated management to address a suite of transboundary concerns. Some of these investments have resulted in significant ecosystem health and service benefits as discussed in this chapter. The GEF/UNIDO Gulf of Mexico Large Marine Ecosystem Project (GOMLME) that led to a series of efforts that are kick-starting LME-wide ecosystem-based management. The GEF/UNDP Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) Programme supported integrated coastal management activities and the scaling up of project experiences, which have empowered local communities and strengthened the capacities of local and national governments. The GEF/UNEP Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand Project resulted in the rehabilitation of mangrove and seagrass habitats through improved community engagement as well as the creation of fisheries refugia, an innovative approach for rebuilding depleted fisheries.



Silky sharks swim near an oil rig, Gulf of Mexico  
(Jake Levenson/Marine Photobank)



# Gulf of Mexico LME



# Revitalizing the Gulf of Mexico

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*The Gulf of Mexico Large Marine Ecosystem, a vital economic engine that generates \$120B annually for the United States and Mexico, faces serious environmental management challenges. For instance, in early spring each year a hypoxic dead zone covering more than 18,000 km<sup>2</sup> — largely caused by high nutrient agricultural runoff — forms near the mouth of the Mississippi River. Risk from economic activity is also widespread: in 2010, the Deepwater Horizon spill leaked about 4.9 million barrels of oil into the Gulf, causing widespread environmental and economic disaster.*


At almost 1,000,000 km<sup>2</sup> in size, the Gulf of Mexico Large Marine Ecosystem (GOM LME) — shared by Mexico, the United States and Cuba — is the world's ninth largest water body. In addition to being important for biodiversity, the GOM LME supports the livelihoods of about 55 million people. The Gulf contains large oil and gas deposits, and serves as a shipping hub for roughly two-thirds of all United States oil imports; in 2009, about half of all United States international trade passed through Gulf ports (NOAA, 2011). Its shores support a booming tourism industry, annually hosting 3.2 million recreational anglers. Commercial fishing is a prominent activity as well, with an annual catch of about 1 million tons (NMFS, 2012), representing 15% and 25% of national commercial

landings of the US and Mexico, respectively.

In 2009, the GEF, through the United Nations Industrial Development Organization (UNIDO), began its first investment in the region under the GEF/UNIDO Integrated Assessment and Management of the Gulf of Mexico Large Marine Ecosystem Project (GOM LME Project). This initiative provides a strong foundation for bilateral cooperation between the United States and Mexico and responds to multiple regional threats through an integrated ecosystem-based management framework that strengthens management of marine resources. Through this approach, the project ensures improved ecosystem health and services by addressing the threats of pollution, unsustainable fishing, and habitat degradation.

## ENHANCED KNOWLEDGE THROUGH BINATIONAL MONITORING

The GOM LME Project brings together the United States and Mexico to address knowledge gaps and improve scientific capacity for research and monitoring of conditions along the Gulf coast. Prior to the project, in Mexico there was a particularly strong need to establish comprehensive long-term monitoring programs. The GOM LME Project built upon the substantial knowledge and track record that

A blue-tinted photograph of a shrimp trawler in the Gulf of Mexico, with its complex rigging and masts visible against the sky and sea.

A shrimp trawler in the Gulf of Mexico  
(Robert K. Brigham, NOAA's Fisheries Collection)

“When there are low oxygen conditions, most shrimp move offshore and fishers must go further distances to catch shrimp, which can be expensive and increase prices. Hypoxia can have severe negative impacts mostly to commercial and recreational fisheries, but also to biodiversity. Monitoring and information exchange between the United States and Mexico is a good way to begin addressing the issue.”

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Dr. Nancy Rabalais, Louisiana Universities Marine Consortium.

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already existed in the United States portion of the Gulf to create a complementary ecological monitoring system for Mexican waters. Active participation of regional and local authorities, scientists, and other stakeholders in both countries led to the establishment of a Bi-national Coastal and Ocean Observing Network. This Network now serves as an early warning system by monitoring conditions that favor coastal hypoxia and the development of harmful algal blooms. Such blooms pose major threats to human health, biodiversity, and tourism. The project also set the stage for standardization of data collection and sharing of information, which enable both countries to make more informed decisions and coordinate management actions.

### ESTABLISHING AN ECOSYSTEM-BASED APPROACH TO FISHERIES MANAGEMENT

The GOM LME Project, in consultation with fisheries authorities, fisheries cooperatives, and other stakeholders, developed the first ecosystem-based fisheries model in Mexico. This model provides a framework for the sustainable use of fisheries resources, aids in stock assessment, and helps determine if a stock is being under-fished, over-fished, or maintained at sustainable levels. Scientists and fishery managers can then use this information to evaluate various strategies for regulating future harvest for each specific stock (e.g., gear restrictions, no-take reserves, and seasonal closures). While the model focuses on improved management of the highly valuable shrimp multispecies fishery, three regional fisheries research centers in Mexico have agreed to adopt the model and extend its application to other high-value species including snapper, grouper, and tuna.

### RESTORED MANGROVES THROUGH COMMUNITY-BASED EFFORTS

Region-wide action is a critical component of integrated management, however, the GOM LME Project also targets local-level interventions to facilitate direct engagement and trust building with local communities. As a demonstration for scaling-up more broadly, the project developed a

comprehensive strategy for mangrove conservation and restoration in Isla del Carmen, Campeche, Mexico.

Mangrove forests, an important ecosystem found along much of the Gulf of Mexico coastline, are under increasing threat from development, pollution, over exploitation, and climate change. Mangrove ecosystems are valuable both economically and ecologically, offering a considerable array of ecosystem goods and services, including the provision of timber and non-timber resources, water quality maintenance, support to fisheries, and carbon sequestration. Over the last decades the role of mangroves in providing a low-cost alternative to stabilizing shorelines and mitigating coastal erosion, minimizing erosive forces acting on the sediment, and preventing sediment from being carried away from the shore has become increasingly clear. Mangrove forests are situated along the edge of the land and sea and are ecologically linked to other marine, coastal, and terrestrial ecosystems. Consequently, the loss of mangrove forests not only has direct impacts on ecosystem services, but can compromise the functionality of adjacent ecosystems. In applying an EBM approach to the management of LMEs like the Gulf of Mexico, the GEF recognizes these connections,

“This project has given us opportunities to exchange experiences and create models that can benefit us. These activities have been important for universities, communities, local and federal governments, and are expected to begin showing results and achievements that will generate new opportunities.”

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Martha Merino Pérez, Subdirectora  
Capacitación Rural Cecadesu, Secretaría De  
Medio Ambiente Y Recursos Naturales



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the ecosystem value of mangroves, as well as many of the co-benefits they provide in terms of biodiversity protection and livelihood enhancement.

The GOM LME Project strategy for mangrove restoration followed an overall EBM approach, linking science with local communities and promoting inter-sectoral coordination. Coastal community members were trained in proper restoration techniques, which enabled them to restore more than 160 hectares of mangroves. Through the training they were also encouraged to promote a change of perception among fellow residents about the importance of preserving mangrove forests.

Project success often depends on a few key players engaged in implementation. Project champion Hermina del Carmén Rejón Salazar's dedication was fundamental to the mangrove restoration Campeche pilot project's success. On June 5th 2013, Mrs. Salazar won El Premio al Mérito Ecológico for her tireless efforts and promotion of the importance of conserving this ecosystem. She strongly encouraged local community involvement through the development of a restoration mangrove plan. Due to the achievements in Campeche, this strategy is now being replicated in three other natural protected areas in Mexico: Cozumel, Quintana Roo; Puerto Progreso, Yucatan; and Los Tuxtlas in Sontecomapan, Veracruz. Promoting replication through demonstration sites often forms a core aspect of GEF IW project design.

## COMMUNITY-LEVEL ENVIRONMENTAL AWARENESS

Education and outreach are key tools to raise awareness and change people's attitudes about environmental conservation. The GOM LME Project supported the development and implementation of environmental educational strategies, programs, and workshops. Between 2011 and 2013, the project conducted 51 environmental education workshops, targeting adults and children on topics such as ecotourism, responsible fisheries, mangrove restoration, and alternative economic activities. These workshops increased knowledge and awareness and fostered interest in communities about

the importance of protecting the Gulf of Mexico's natural resources.

An important strategic component of the GOM LME Project was the process of the United States and Mexico jointly examining the problems and issues related to ocean governance through a Transboundary Diagnostic Analysis and then developing a mutually agreed path forward for ocean governance laid out in the Strategic Action Programme. Through a new project with GEF support, GEF/UNIDO Implementation of the Strategic Action Program of the Gulf of Mexico Large Marine Ecosystem, the countries will implement the Strategic Action Programme, which will help support and sustain environmentally sound management of the natural resources of the Gulf of Mexico.

The GOM LME Project is a flagship example of how effective partnerships at both transboundary and local levels can be when properly nurtured. The establishment of an EBM approach has contributed to the protection of the Gulf of Mexico's abundant natural resources and has led to positive changes in local capacity, awareness, and ability to respond to threats.

Mangrove trees in the Gulf of Mexico (Hanneke van Lavieren)

“When we began this project, we did not understand the importance of mangroves. This has changed and we truly worry when there are plans to destroy mangrove habitat. However, through this project, we have acquired knowledge and skills to help us protect what belongs to us.”

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Hermina del Carmén Rejón Salazar, Mangrove Restoration Community Leader.



KEY ACHIEVEMENTS

- Helped close research and monitoring capacity gaps between the United States and Mexico;
- Created a bi-national Coastal and Ocean Observing Network, which monitors oceanic and coastal conditions;
- Developed the first ecosystem-based fisheries model in Mexico, which provides a framework for the sustainable use of fisheries resources;
- Increased local community education and awareness through the creation and implementation of environmental educational strategies, programs and workshops;
- Developed a comprehensive plan for mangrove conservation and restoration using an EBM approach that links science with local communities, and promotes inter-institutional coordination; and,
- Fostered bilateral cooperation through an ecosystem-based approach to managing natural resources in the Gulf of Mexico.

Coastal tourism in Mexico  
(Hanneke Van Lavieren)



GEF INVESTMENTS

Integrated Assessment and Management of the Gulf of Mexico Large Marine Ecosystem Assessment and Strategic Action Program

DURATION OF GEF INVESTMENTS

2009-2021

RECIPIENT COUNTRIES

Mexico





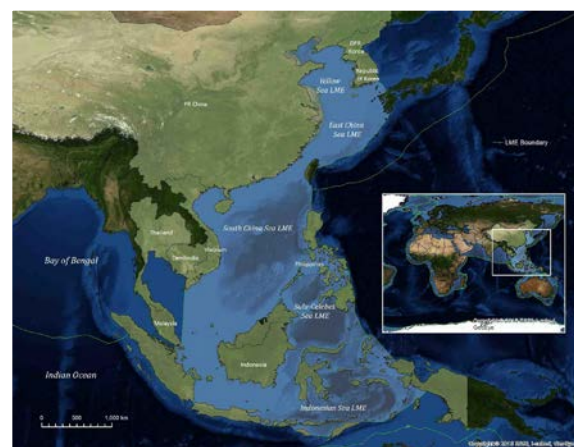
### LESSONS LEARNED

- Local champions can be catalytic for community based initiatives by gaining widespread support based on their relationships in the community;
- Trust building with government partners is necessary to encourage data and information sharing; and
- Ultimately successful ocean governance relies on complementary regional and local efforts.

GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
United Nations Industrial Development Organization	\$17.70M	\$223.76M	<a href="http://gomlme.iwlearn.org">http://gomlme.iwlearn.org</a>



Artisanal fish trap, Malaysia  
(Yvonne Sadovy, APEC)



## The Seas of East Asia

# Transforming Coastal Management in the Seas of East Asia

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*The marine resources of the East Asia seas region<sup>1</sup> are critically important for food, livelihoods, and economic development for over 1.9 billion people, 77% of whom live in coastal areas or within 100 km of the shore. In some countries, over 60% of the GDP is directly or indirectly related to marine resources (PEMSEA 2013). However, environmental degradation is a significant threat that will likely be further aggravated by increasing population pressure and economic development as well as predicted impacts from climate change.*

## PARTNERSHIPS IN ENVIRONMENTAL MANAGEMENT FOR THE SEAS OF EAST ASIA

The GEF/UNDP Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) Programme has been instrumental in implementing integrated coastal management (ICM) for the East Asian Sea region<sup>2</sup>. Beginning in 1993,

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1 The sub-regional seas of East Asia can be grouped into six Large Marine Ecosystems, the Yellow Sea, East China Sea, South China Sea, Gulf of Thailand, Sulu-Celebes Sea and the Indonesian Sea.

2 Chapter 2 describes PEMSEA's regional sustainable development strategy.

PEMSEA was the first GEF IW programme to build an ICM model and strong foundation of practical knowledge for its application based on the successes of a network of local demonstration sites (PEMSEA, 2013). Over a 20-year period, PEMSEA has generated a wealth of intellectual capital that has moved ICM beyond technical and scientific know-how, and contributed to the establishment of institutional frameworks, coastal and ocean governance, and mutual sharing of lessons learned.

Integrated Coastal Management (ICM) involves a systematic process for coordinated and holistic management of competing issues in marine and coastal areas, including diverse and multiple uses of natural resources. The ICM concept evolved from the need to plan and manage various economic activities that occur in coastal areas, to regulate different uses, coordinate policy and management interventions, and manage resources across geographical and political boundaries. ICM recognizes that human welfare and the health of the environment are tightly linked, and must be managed in a way that acknowledges the complexity of, and connections among, marine and coastal ecosystems, and how these ecosystems link to land and freshwater environments and respond to human interaction.



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## A MODEL FOR INTEGRATED COASTAL MANAGEMENT

One of PEMSEA's major achievements has been the creation of a framework for the application of ICM that can be replicated and applied under different political, ecological, and socioeconomic conditions. The model provides guidance on how to strengthen: (1) information management for the development of science-based, issue-focused action plans; (2) communication to keep the public informed; and (3) local institutional capacity for integrated and adaptive management. It consists of the following three components, which provide a conceptual map and analytical decision-making tool for systematic and process-oriented planning and implementation of the ICM approach.

1. The program management component addresses prioritized coastal management challenges, including those related to pollution, natural disasters, livelihoods, freshwater, biodiversity, overexploitation, and threats posed by temperature and sea level rise.
2. The governance component provides guidance to countries to enable them to work towards achieving a number of key actions and reforms necessary to implement ICM. It enables the development of appropriate local policies, legislation, and ordinances that complement or reinforce national coastal and/or ocean policy, or ICM legislation and further creates a mechanism for interagency and sector (e.g., tourism, industry) coordination in order to reduce potentially conflicting interests.
3. The ICM cycle links the management and governance components through a stepwise process: preparation; initiation; development; adoption; implementation; monitoring; evaluation and reporting. Each stage requires a series of strategies and action plans to be followed and completed before proceeding to the subsequent stage.



Public awareness raising event in Lao PDR  
(PEMSEA/Sedone, Lao PDR)

## IMPROVING CAPACITY FOR ICM IMPLEMENTATION

PEMSEA supports numerous activities targeted at strengthening the capacity of individuals, local and national institutions, and governments in ICM. Since 1994, nearly 4,000 individuals involved in coastal management have completed ICM training programs under PEMSEA. Over 30 training workshops were conducted between 2011 and 2013. Topics included ICM planning; State of the Coast reporting; management of habitat and fisheries zones; ecosystem approaches to managing coastal and marine resources; fisheries and protected area management; integration of land and sea use plans; and port safety and management and oil spills. PEMSEA also contributed to the development of a suite of manuals and efforts to certify ICM professionals and modify the curriculum of existing ICM-related courses. Eight ICM Learning Centers have been set up in six countries, and two Regional Centers of Excellence were established for Sustainable Development Strategy for the Seas of East Asia (SDS-SEA) implementation<sup>3</sup> (GEF/UNDP, 2013). In order to replicate and scale-up ICM implementation across the region, PEMSEA engaged more than 74 practitioners and Regional and National Task Force members from the ICM Learning Centers in various ICM activities.

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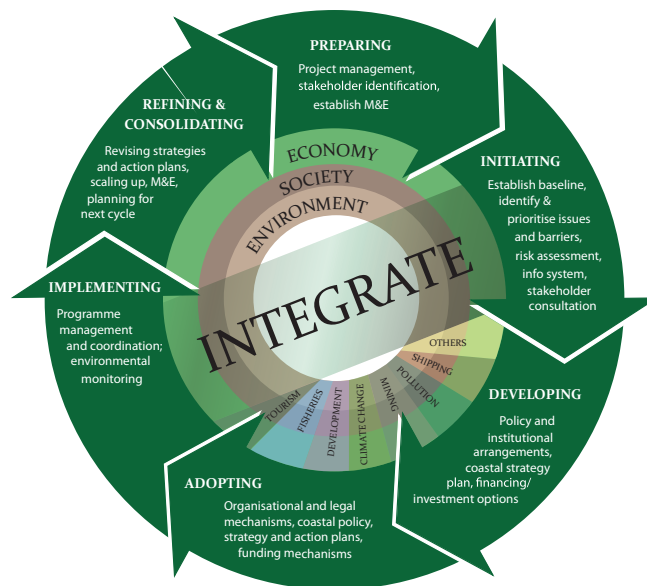
3 The SDS-SEA sets out a common vision and a series of action programs to address marine biodiversity, marine pollution, natural and man-made hazards, and freshwater resources in coastal areas, in addition to fisheries, aquaculture and other food security issues that affect human and ecosystem health, and lives and properties. SDS-SEA is described in further detail in Chapter 2.

## PRACTICAL APPLICATIONS OF ICM

To help set priorities, the ICM methodology was first piloted in 1994 at two national demonstration sites: Xiamen, China and Batangas, the Philippines. Both sites still implement ICM today and working models developed from these

demonstrations serve as guides for the preparation and implementation of various ICM activities in Bali, Indonesia; Chonburi, Thailand; Danang, Viet Nam; Nampho, DPR Korea; Port Klang, Malaysia; Shihwa, RO Korea; and Sihanoukville, Cambodia.

### INTEGRATED COASTAL MANAGEMENT PROCESS



# Fact Box: PEMSEA Demonstration Sites



## XIAMEN, CHINA

Under PEMSEA, Xiamen reformed its legal and institutional framework to integrate management and development plans with environmental and social goals, and strengthened its capacity to implement ICM. For example, in Yuandang Lagoon, the Xiamen government established a management team to prevent sewage discharge and other harmful activities. This effort led to increases in treatment of domestic sewage from 28% in 1995 to 85% in 2007, resulting in improved water quality and increased real estate value and interest in the area. Further, seeing the long-term benefits, local residents started becoming involved in ICM activities, such as beach cleanups, which provided a gateway to engage city officials to address specific environmental problems.

Overall conditions improved transforming Xiamen into one of China's most environmentally-friendly cities. The successes of ICM application in Xiamen prompted Chinese authorities to develop national legislation requiring coastal zoning and management for the entire Chinese coastline.

## BATANGAS BAY, THE PHILIPPINES

More than 9,000 families depend on fisheries in the Batangas Bay region. The region needed to integrate the management of waste, water and air pollution, ecosystems, tourism, fisheries, and agriculture. A prerequisite to implementing an ICM system here was the establishment of an adequate legal and institutional framework. PEMSEA created a framework that harmonized policies and legislation among national, regional, provincial and local governments, leading to improved stakeholder coordination. Conflicts among fishing, diving, tourism, and navigation activities were resolved through a coastal-use zoning scheme that divided areas based on environmental and socioeconomic features (e.g., habitats and hotels). Water-based activities dominate the region's tourism industry, which depends on the quality of beaches, water, and coral reefs. By raising awareness and increasing stakeholder participation, citizens became more environmentally conscious. The frequency of destructive practices, such as dynamite fishing, were reduced, and citizens also became involved in monitoring and sampling at demonstration sites, helped replant mangroves and seeded giant clams, an important fishery resource. The rehabilitation of degraded ecosystems resulted in new employment opportunities for coastal communities and has increased the average annual household income in the region by 29%. (PEMSEA, 2006).





Public awareness raising, Sihanouk Province, Cambodia  
(PEMSEA/Preah Sihanouk Province)

## BALI, INDONESIA

Bali is a popular tourist destination, providing employment to many local communities. In 2000, PEMSEA selected the south eastern coast of Bali as an ICM demonstration site targeted at achieving sustainable use of ecosystems while promoting environmental investment. The project developed a legal and institutional framework prior to implementation to ensure that environmental resources and services would not be sacrificed for economic gain. This framework helped improve coordination among governing bodies by linking management and development plans with conservation efforts. For example, the coastal-use zoning plan resolved multiple-use conflicts by dividing marine and coastal regions based on environmental and socioeconomic needs. Following project implementation, stakeholders felt empowered and began promoting change (e.g., participating in reforestation and mangrove rehabilitation programs, which contributed to conservation efforts). Citizens also collected data used in decision-making and environmental management. The success of the ICM project in this region has inspired governing bodies to expand the ICM program to all of Bali's coastal areas.

## SIHANOUKVILLE, CAMBODIA

Sihanoukville, a pristine coastal area, is strategically important for international shipping, agriculture, forestry, fisheries, and mineral exploration. It is also a key area designated for tourism development. In 2000, PEMSEA, through the GEF/UNDP Small

Grants Programme, supported a community-based ICM project in the Stung Hav District, a village with 200-250 families. Local fishermen had been in conflict with neighboring fishing communities. The project provided start-up capital to families to develop alternative livelihoods (e.g., ecotourism), especially livelihoods that support women. Artificial reefs were constructed to serve as spawning grounds for fish and limit fishing to those using traditional methods (line and hook). The constructed reefs likely contributed to local fishermen reporting a 25-30% increase in daily fish catch. A Sihanoukville Coastal Management Committee made up of a range of stakeholders has also been established to serve as a permanent multi-sectoral body and provides a venue for discussion, policy direction, and monitoring of ICM activities.

## BATAAN PROVINCE, THE PHILIPPINES (PARALLEL SITE)

Micro-financing has helped fishers in Bataan province supplement their livelihoods and improve incomes. In November, 2002, fishers from nine fisher folk associations received financial assistance in the form of soft loans as start-up capital to establish mussel cultures. As early as the end of 2003, all partner associations reported profitable harvests, enabling the fishers to partially repay the soft loans. Fishers also gained as much as 30% more income from this new activity, enabling them to engage in entrepreneurial activities. Many fishers have now established their own mussel farms (PEMSEA, 2014).

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## REPLICATION AND UPSCALING

PEMSEA has pioneered the application of the ICM approach into successful, replicable, and highly-scalable methodologies. The experience and lessons learned from the demonstration sites inspired other governments in the region to replicate the approach elsewhere. During the second phase of PEMSEA (1997 to 2007), six other ICM demonstration sites were established in Cambodia, DP Korea, Indonesia, Malaysia, Thailand and Vietnam. Subsequently, 18 “ICM parallel sites” have been set up across the region, where governments, using their own resources, have applied best practices from the demonstration sites.

In 2006, 18 local governments from Cambodia, People's Republic of China, Indonesia, the Philippines, Thailand, RO Korea and Viet Nam showed greater commitment to the ICM approach when they signed the PEMSEA Regional Network of Local Governments Implementing ICM (PNLG) Charter. By 2013, 31 local governments and advocates of ICM joined the network to implement a five-year strategic action plan under the SDS-SEA, contribute to the scaling-up of ICM, implement the ICM Code and State of the Coasts reporting, and continually improve application of ICM across the region. Through the PNLG, members are able to exchange information and experiences on issues and good practices related to sustainable growth and development in coastal communities.

Finally, to enable scaling-up and replication of the ICM approach, the PEMSEA Resource Facility (PRF) developed the Integrated Coastal Management Code in 2007 (GEF/UNDP, 2013). This Code encapsulates decades of ICM practices and experiences, and provides a systematic approach to

integrated management of marine and coastal resources based on international standards for environmental and quality management at the local government level. The Code facilitates efficient and effective use of available resources through integrated planning, implementation, monitoring, and review processes, and can be employed to validate the operations of a local government conforming to international management standards. Today, the Code is recognized as an essential component of national ICM scaling-up programs in several countries and is seen as a potential source of revenue for the PRF operation.

PEMSEA's commitment to scale-up the use of ICM practices to at least 5% of the region's 234,000 km coastline by 2010, and 20% by 2015, was made through the 2006 Haikou Partnership Agreement.<sup>4</sup> So far, ICM initiatives cover about 12% of the coastline, benefiting more than 146 million people (PEMSEA, 2013). Through the development and implementation of the ICM approach, 26 local governments in 11 countries across the region are progressing toward their sustainable development objectives. To date, PEMSEA's ICM initiatives have catalyzed about \$9-11B in public and private sector financing for environmental investments (PEMSEA, 2013). This underscores the tremendous value and impact of ICM as a tool that can put an enabling environment in place and catalyze public and private sector investments to protect and restore coastal ecosystems and associated livelihoods. These efforts further verify the applicability of ICM and lay a strong foundation for scaling-up ICM practices across geographical and administrative boundaries.

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4 Signed on December 15, 2006. The Haikou Partnership Agreement recognized PEMSEA as the regional coordinating mechanism for the implementation of the SDS-SEA and resolved to transform PEMSEA from project-based arrangement to a self-sustained effective regional collaborative mechanism. On November 26, 2009, the 3rd Ministerial Forum adopted the Manila Declaration on Strengthening the Implementation of Integrated Coastal Management for Sustainable Development and Climate Change Adaptation in the Seas of East Asia Region.

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## LOOKING AHEAD

PEMSEA has provided a strategic approach to addressing multi-focal environmental concerns through a sustainable regional mechanism. It has tackled transboundary environmental issues arising from population pressure and economic development. With the signing of the Changwon Declaration in 2012, the region's countries have strengthened their resolve to align the implementation of the SDS-SEA<sup>5</sup> with the target of building an ocean-based blue economy (PEMSEA, 2013). This agreement underscores the region's commitment to sustainable progress and renews its commitment to previous Ministerial Declarations that emphasize the need for strengthened ICM implementation to address the growing challenges brought about by climate change and other emerging environmental concerns, and to achieve the 2015 SDS-SEA targets (GEF-UNDP, 2013).

PEMSEA is currently in the four-year operation period (2013-2017). During this period, the region's countries and their partners will take full responsibility for SDS-SEA implementation and the sustainability of the long-term, regional mechanism. SDS-SEA implementation at the national level is crucial to enhance the scaling-up of ICM practices. It reinforces national coastal and ocean policy and legislation, and thereby strengthens regional cooperation in addressing transboundary challenges. The recognition of PEMSEA's legal identity reflects regional ownership and member country commitment towards long-term implementation of the regional marine strategy. For the future, PEMSEA will continue to develop its intellectual capital to improve the integration of environment management and economic and social development through the expansion of local, national, and regional ICM and ocean governance initiatives.



Traditional fish drying for preservation  
(Sebastian Ferse/Marine Photobank)

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<sup>5</sup> The Haikou Declaration signed by participating countries in 2006, provides the mandate for PEMSEA to implement the SDS SEA Strategy.



## KEY ACHIEVEMENTS

- Launched the ICM working model, the 'ICM system', which provides a standard framework and process for developing and implementing ICM programs;
- Developed a more conducive policy environment for coastal and ocean management in the Seas of East Asia to enact national coastal and ocean policy and legislation;
- Introduced ICM to 26 local governments in 11 countries across the region;
- Implemented ICM initiatives over 12 % of the 234,000-km coastline benefiting more than 146 million people;
- Catalyzed about US\$11B in public and private sector finance for environmental investments;
- Developed the Integrated Coastal Management (ICM) Code in 2007 and Port Safety, Health and Environmental Management Code in 2012;
- Developed PEMSEA Regional Network of Local Governments Implementing ICM (PNLG) charter in 2006, which currently has 31 members;
- Introduced a State of the Coasts reporting system in various ICM sites to monitor progress of ICM



### GEF INVESTMENTS

Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)

### DURATION OF GEF INVESTMENTS

1994-2018

### RECIPIENT COUNTRIES

Cambodia, Democratic People's Republic of Korea, Indonesia, Malaysia, People's Republic of China, Philippines, Republic of Korea, Singapore, Thailand, Vietnam, Lao Peoples Democratic Republic, Timor Leste  
(Other countries have participated, or are currently participating, on a cost sharing basis.)



implementation and provide information to policymakers and other stakeholders;

- Built capacity at provincial and local levels and served as an effective link between locally driven efforts and policy level personnel in central governments; and,
- Set the stage for ICM scale up: local governments have started incorporating issues such as climate change adaptation, disaster management, water supply and use management, land and sea-use planning, and integrated river basin and coastal area management, into their ICM programs.

### LESSONS LEARNED

- A strong legal and institutional framework that harmonizes politics and legislation across all levels of government can help ensure that development plans are coordinated with conservation priorities;
- Community engagement can catalyze local political support and ultimately national level government action;
- Coastal zone schemes that divide uses geographically can help resolve conflicts among stakeholders; and,
- ICM demonstration sites have tangible impacts that can inspire other governments to take action.

#### GEF AGENCIES

United Nations  
Development Program

#### GEF GRANTS

\$46.46M

#### CO-FINANCING

\$206.35M

#### WEBSITES

<http://www.pemsea.org>

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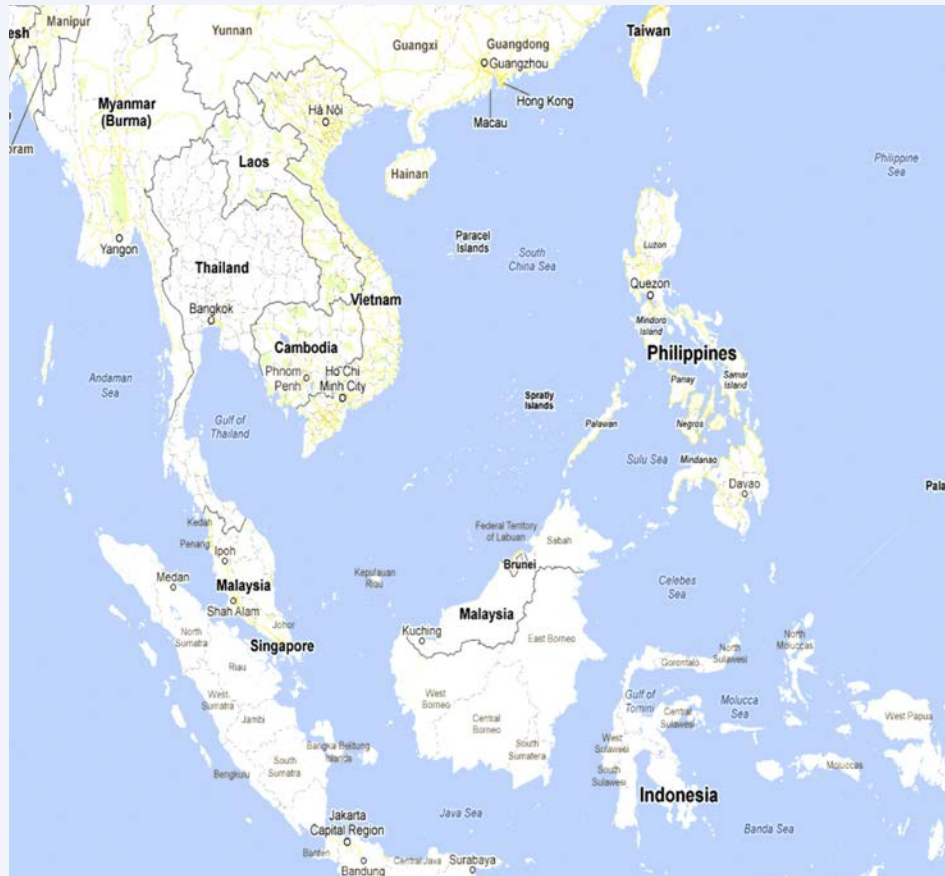
## Case Study: Addressing Multiple Threats in the South China Sea and Gulf of Thailand

The South China Sea and Gulf of Thailand Large Marine Ecosystems are two of the richest shallow-water marine biodiversity hotspots in the world. These LMEs contain over 300 hard coral species, 3365 fish species, 45 mangrove species, and nearly two million hectares of mangrove forest — 12% of the world's total (GEF, 2010). Nearly one-third of the approximately 350 million inhabitants living in the region are dependent on fisheries or marine-related services. Fishermen in the LMEs harvest nearly five million tons of fish annually, equivalent to approx. 10% of the world's annual fish catch (Khemakorn, 2006). The People's Republic of China is the largest marine aquaculture producer, accounting for 62% of global production (FAO, 2010). Much of the region's coastal environment has been severely degraded or lost due to development triggered by rapidly growing regional populations and economies. For example, from 1980 to 2005, the area experienced a 28% reduction in mangrove cover, mostly attributable to harvesting mangroves for timber or converting them to rice farms (FAO, 2007). Fisheries in the area are characterized by high levels of small-scale fishing and unsustainable illegal fishing practices (poison and dynamite). Finally, increasing fishing pressure, coupled with a continued decline in the expanse and quality of coastal habitats critical to the life-cycle of many marine species, have been growing causes of concern.

In 2002, the GEF through UNEP launched the five-year Reversing Environmental Degradation Trends in the South China Sea and the Gulf of Thailand Project (referred to as the South China Seas, or SCS Project). The Project was implemented in the seven countries sharing the LMEs: Cambodia, the People's Republic of China, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam. This effort addressed priority environmental concerns through the development and testing of a suite of management approaches and tools, including ICM, fisheries refugia, habitat rehabilitation, and wastewater treatment systems.

An important outcome of the SCS Project has been the development of a fisheries refugia system. This innovative approach integrates fisheries with habitat management and offers an alternative to no-take reserves (NTRs), a type of marine protected area that is closed to all fishing activities. Fisheries refugia are a system of geographically defined marine or coastal areas, such as mangroves, seagrass beds, coral reefs, and wetlands, in which specific management measures protect species during critical stages of their life-cycle. This system focuses on sustainable use of fisheries resources, and can involve the application of management measures such as seasonal closures and prohibition of specific fishing methods. Once sites are identified and a management strategy





developed, the implementation of a refugia system can be done independently if there is coordinated planning, sharing of information, and commitment. Under the SCS Project, Thailand has successfully established a fisheries refugia system through a 50,000 km<sup>2</sup> network of critical habitats along the western coast of the Gulf of Thailand. Vietnam has included a 10,000 hectare seagrass area on the east coast of Phu Quoc. Over a five-year period, coral cover was found

to have increased, or at least been maintained, within refugia at five sites. Complementary efforts included the development of ecotourism and fisheries-related alternative livelihoods, which reduced fishing pressure and provided incentives to local fishers to protect reefs.

Seagrass beds serve as an important spawning and nursery grounds for fish and other marine organisms. However, many of the South China



Mangrove restoration team (Javier Acevedo García)

Sea and Gulf of Thailand LME’s original seagrass beds have either been lost or degraded due to dredging, trawling, water pollution, and fish farming. The SCS Project supported efforts among local stakeholders to raise awareness of the importance of seagrass conservation. This encouraged local authorities and community members to establish and enforce protective regulations, e.g., patrolling, tracking and warning violators. The SCS Project contributed to the

establishment of a transboundary management agreement for seagrass beds along the border of Cambodia and Vietnam and increased seagrass coverage in East Bintan, Indonesia, from 2586 hectares in 2006 to 2595 hectares in 2009. A small but important increase, directly linkable to the increase in fish density in the seagrass area.

Mangroves serve as an important nursery habitat for many marine species. The SCS Project supported a

GEF INVESTMENTS	DURATION OF GEF INVESTMENTS	RECIPIENT COUNTRIES
South China Sea and Gulf of Thailand SAP Development and Implementation & Establishment and Operation of a Regional System of Fisheries Refugia	2000-	Cambodia, People's Republic of China, Indonesia, Malaysia, Philippines, Thailand & Vietnam

number of mangrove rehabilitation and protection efforts focused on encouraging local participation in management, and promotion of eco-friendly activities. In Fangchenggang, China, mangrove cover increased by 150 hectares from 2003 to 2011 (70% of the increase was due to natural regeneration from better protection, and 30% was a result of replanting). In Chonburi, Thailand, mangrove cover increased by 4 hectares from 1999-2009, even though a large portion of the replanted area had died off. The successful rehabilitation of mangroves increased mangrove-related ecotourism and fisheries productivity in these ecosystems, giving incentive to communities to strengthen mangrove protection.

The SCS Project supported a number of initiatives to generate alternative livelihoods for communities. These initiatives provided incentives to community members to better protect their reefs and mangroves, and also helped foster positive attitudes about conservation. In one initiative, a community began using coconut shells for charcoal, a more sustainable alternative to mangrove timber. Another initiative created income-generating opportunities in tourism for residents through becoming guides and homestay hosts. Awareness-raising campaigns were also a crucial component of the SCS Project. In Vietnam, increased awareness regarding the importance of coastal conservation and the effects of unsustainable fishing activities resulted in a reduction in destructive fishing methods.

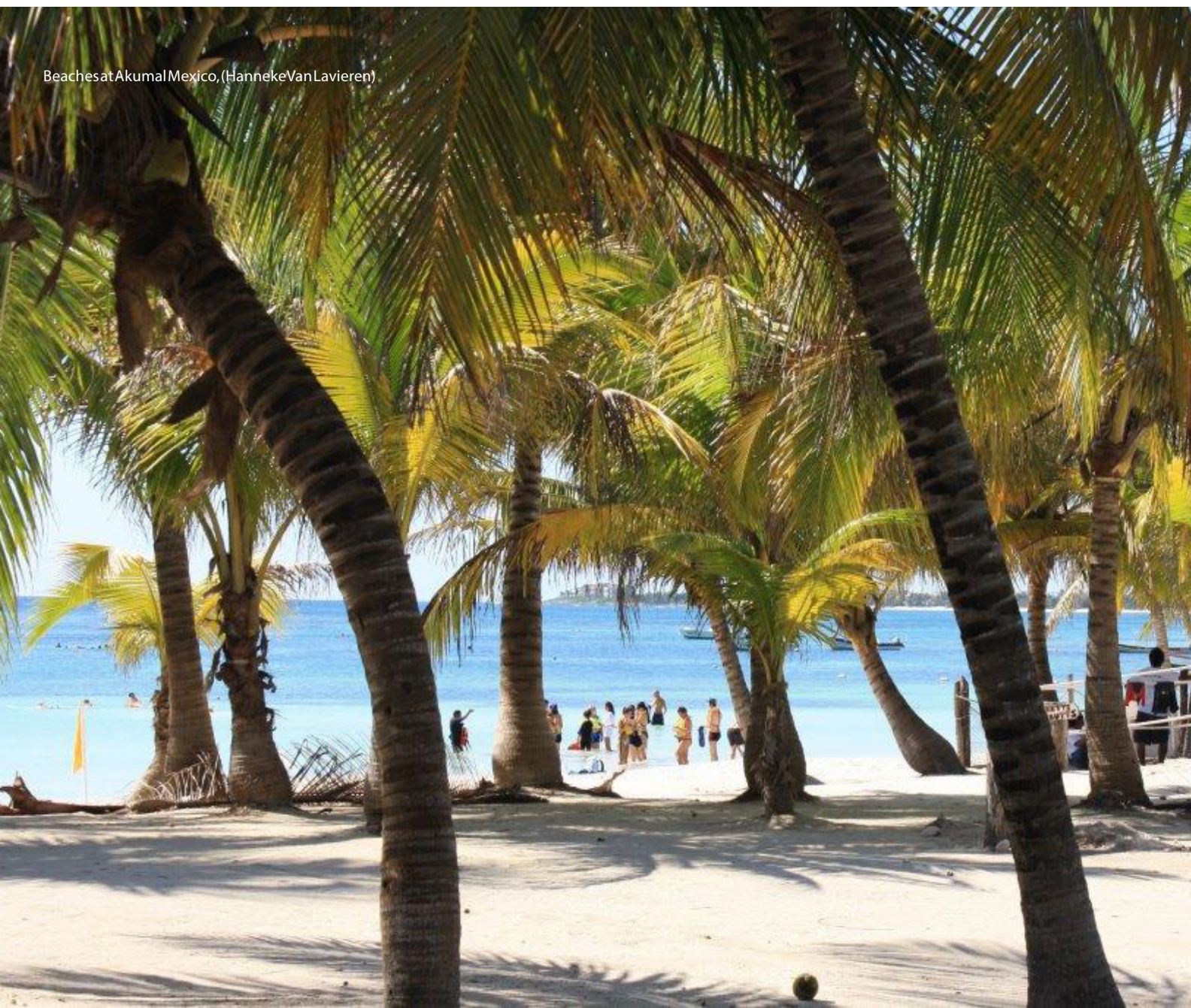
Another key factor in the overall success of the SCS Project was a process of bringing together the countries to examine the issues and problems for ocean governance through a Transboundary Diagnostic Analysis and then development of a Strategic Action Programme paving a way forward. This TDA-SAP process is to be followed up by a SAP implementation project, sustaining, continuing, and up-scaling the regional, national, and local achievements and accomplishments by addressing the commonly agreed priorities of the Strategic Action Programme.

Overall, the SCS Project fostered the establishment of mechanisms for national and regional coordination, and led to the development of a regional program of action to support national plans aimed at reversing the degradation and loss of habitats. As a result, there has been increased participation from local communities and improved compliance with environmental regulations. Importantly, there is a more general recognition that natural marine resources are a commodity worth preserving and that there is a need to adopt more eco-friendly practices. The project succeeded in reducing a number of environmental stresses to the LME, and has helped foster cooperative relationships, improve livelihoods, and diversify sources of income.

GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
United Nations Environment Programme (UNEP)	\$34.41M	\$84.46M	<a href="http://www.unepscs.org">http://www.unepscs.org</a>



Beaches at Akumal Mexico, (Hanneke Van Lavieren)



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Chinese cargo ship (International Labour  
Organization, Flickr Commons)





# Safely Navigating our Oceans

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*The bulk of world trade, 90% by volume, is transported by ship (MKC, 2012). Shipping is perhaps the most global of all the world's industries and is an essential component of our modern way of life.*

Seaborne trade makes a significant contribution to the global well-being and prosperity of both the poor and the rich, as well as developed and developing countries alike. The amount of goods loaded aboard ships worldwide has been increasing since the 1970s, reaching an enormous 8.4 billion tons in 2010 (MKC, 2012). Developing countries account for the largest share (60% of all goods loaded and 56% of all goods unloaded), demonstrating their leading role in driving global seaborne trade (MKC, 2012).

Seaborne shipping is crucial for the distribution of goods around the world. With the significant rise in shipping traffic over the past decades, a number of pressing global environmental, economic and public health challenges have arisen from the introduction of invasive alien species (IAS) and ship related accidents. In response, nations across

the world have recognized the need for concerted global action and have been developing a number of regulatory instruments to address these issues. The International Maritime Organization (IMO), which is a specialized agency of the United Nations, has been spearheading these regulatory developments. The implementation of such instruments in developing countries faces significant challenges, but considering the potential significant global benefits, the GEF has given much financial support.<sup>1</sup> These contributions have led to wide scale efforts which have reduced the frequency and harmful impact of invasive species, improvements in the management of ports and related facilities, ship waste reduction, oil spill prevention, and support of contingency planning for important navigation routes in places like the Mediterranean, the Caribbean and especially Southeast Asia

Over the last several decades, GEF investments have not only accelerated the development of international regulations that promote environmental conservation and marine safety and security, they have also led to the creation of important tools that support the legal, policy and institutional reforms

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<sup>1</sup> It is difficult to quantify the 'true' GEF spending to date on shipping issues as many LME projects address this through specific components versus entire projects.

that facilitate adoption of these regulations. This chapter highlights the achievements of two major GEF initiatives, the Global Ballast Water Programme — GloBallast and the Marine Electronic Highway projects. They showcase the crucial role that the GEF has played in:

- Building consensus and cooperation among relevant stakeholders at local, national and regional levels;
- Enabling countries to support, sign and ratify important global conventions such as the IMO International Convention for the Prevention of Pollution from Ships (MARPOL) and the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention); and,
- Catalyzing the transformation of major global industries through unique and innovative public-private sector partnership models.

Each of these initiatives has embraced the concept of international waters being shared and managed in a cooperative fashion. They illustrate how proactive action can benefit the global community in multiple ways be it environmental, economic, or with respect to improving maritime safety.



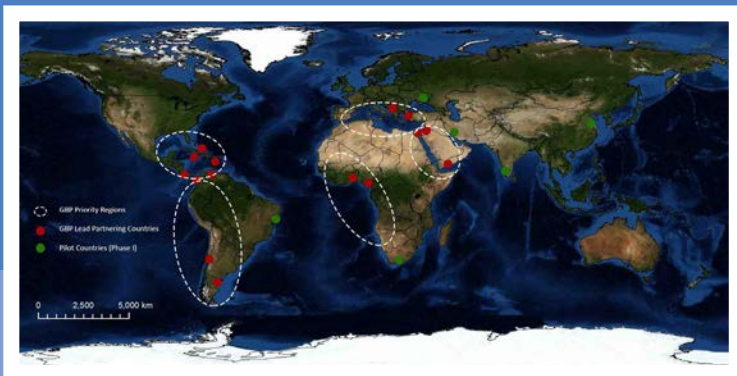




Container ship, Halong Bay, Vietnam (Cycling man, Flickr Commons)



Tanker releasing ballast water (Edwin Grandcourt)



## Global Ballast Water Participating Countries

# Creating a Global Alliance Against Ballast Water Invaders

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*Cases of exotic species being introduced into new areas by humans, either intentionally or unintentionally, date as far back as the 13<sup>th</sup> Century. Over time, increasing ease of ship travel has allowed more aquatic exotics to move across geographical boundaries with a high risk of becoming invasive. The economic cost from such introductions is huge, currently estimated at \$100B per year, and is only expected to increase in the coming decades (UNDP, 2012).*

Globally, an incredible three to five billion tonnes of ballast water are transferred by ship each year (IMO, 2014). Ballast water can carry thousands of different species of marine plants, microbes and animals at any given time, and when discharged into new environments, some of these exotic species quickly establish and multiply in number. The introduction of invasive alien species is a serious global environmental challenge as they can disrupt the natural ecology of an ecosystem, threaten local economies and livelihoods, and cause disease and even loss of human life. Most importantly, once introduced and established, they are virtually impossible to eradicate, thus underscoring the critical importance of preventing the invasion of alien species from ballast water releases in the first place.

## FROM LOCAL TO GLOBAL ACTION

Since 2000, UNDP, the GEF, and the IMO have been working together under the GloBallast Programme to foster an unprecedented international and public-private cooperation in the arena of ballast water management. One of the most significant outcomes has been the adoption of the IMO International Convention for the Control and Management of Ships' Ballast Water and Sediments, or simply, the Ballast Water Management (BWM) Convention in 2004. The BWM Convention serves as a global legal instrument that helps address the challenge of the transfer of invasive species discharged by ships' ballast water and sediments by offering a standardized regime for controlling and managing such transfer of species. As of July 2015, 44 member States have ratified this convention representing about 32.86% of the world's tonnage by ship; 35% is necessary for the entry into force of the BWM.

Ballast water is fresh or saltwater carried by ships to keep them stable and maneuverable during voyage when they are not carrying enough cargo or when more stability is required in rough seas. Ballast water may also be added to ships so that they sink low enough in water to pass under bridges and other structures.

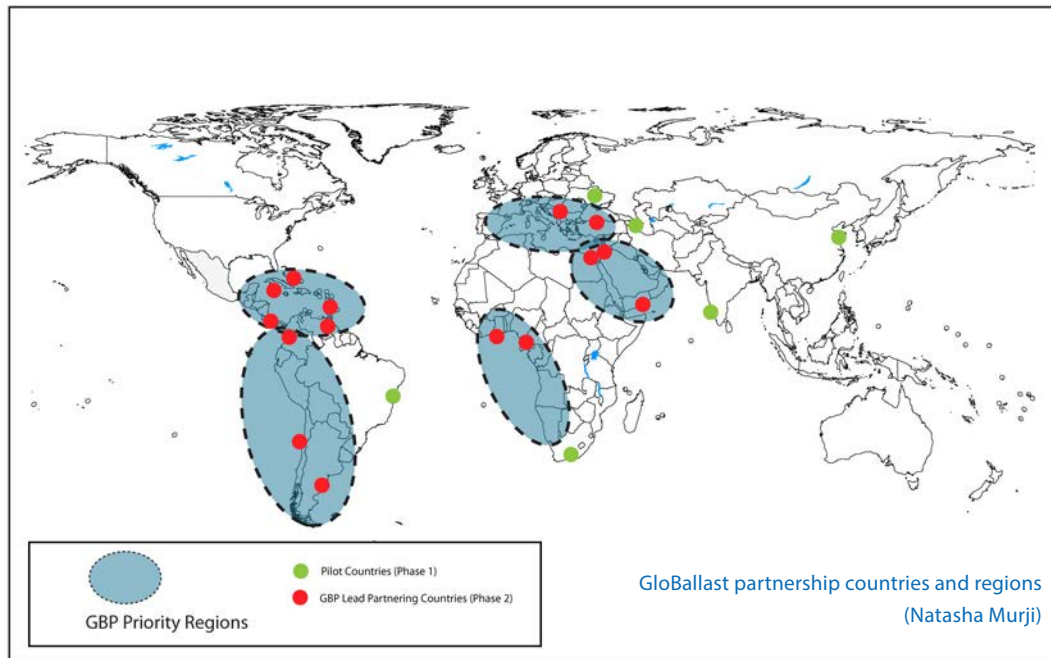




## Famous Bio-invasions

Some well-known destructive bio-invaders include the comb jellyfish (*Mnemiopsis leidy*) and the Asian golden mussel (*Limnoperna fortunei*). The comb jellyfish was accidentally introduced into Europe, where it is considered a voracious predator that both consumes and steals prey from native fish. For example, comb jellyfish contributed to the collapse of the Black Sea fisheries. The Asian golden mussel has invaded the inland waterways of Argentina, Brazil, Paraguay, and Uruguay. It quickly forms extensive dense colonies which continuously obstruct pipes and filters of drinking water purification plants, irrigation channels, industrial and electric plants, and causes other problems. The current total global economic cost of such bio-invasions has been estimated at \$10B per year, and is expected to grow with the three-fold increase in shipping activity predicted over the next decade (UNCTAD, 2012).





To tackle a global environmental issue such as aquatic invasives was particularly challenging due to the cross-boundary character of shipping, the insufficient institutional and legal frameworks which existed at national levels, lack of available cost effective ballast water treatment technologies, lack of awareness, limited financial resources, and poor and inconsistent regional cooperation. In the face of these challenges, the GEF, UNDP and IMO first joined forces with member governments and the shipping industry in 2000, and piloted the project: Removal of Barriers to the Effective Implementation of Ballast Water Control and Management Measures in Developing Countries, or simply, the GloBallast Programme. This effort laid a strong foundation for the establishment of cooperative regional arrangements, capacity building, strengthening of institutional frameworks and provisioning of technical assistance in six pilot countries: Brazil, China, India, Islamic Republic of Iran, Ukraine and South Africa. These countries represent six major developing regions

(see Figure 1 above). These pilot countries not only played an instrumental role in accelerating the development of the BWM Convention, but have also transformed themselves into centres of excellence; the expertise and capacity built in these countries were subsequently drawn on for global scale-up efforts.

Motivated and building on the successes of the pilot phase (the GloBallast Programme from 2000 to 2004), GEF, UNDP and IMO joined forces again in 2008 for a scaled-up follow-up project: Building Partnerships to Assist Developing Countries to Reduce the Transfer of Harmful Aquatic Organisms in Ships' Ballast Water, or simply, the GloBallast Partnerships Programme (this is the second phase of the GloBallast Project, running until September 2016). This project is helping developing countries and their maritime industries to further reduce the risk of ballast water mediated invasions and prepare for implementation of the 2004 BWM Convention. Today,

“The GloBallast Partnerships Project has undoubtedly greatly contributed to raising awareness on the issue of invasive aquatic species in the Mediterranean region and on the importance of managing ballast water from ships with a view to preventing the transfer of invasive species. The measures and actions taken at the regional level would not have been possible without the support of the Project and teaming up with the Regional Seas Programmes was an optimum way to effectively implement the Project region wide.”

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Mr. Jonathan Pace, Former Senior Programme Officer,  
Regional Marine Pollution Emergency Response  
Centre for the Mediterranean Sea

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85 Partnering Countries are participating and benefiting, with co-financing and lead implementation occurring in 15 countries; Argentina, Bahamas, Chile, Colombia, Croatia, Egypt, Ghana, Jamaica, Jordan, Nigeria, Panama, Trinidad & Tobago, Turkey, Venezuela and Yemen. GloBallast has also pointed the way for collective action. The partnerships have resulted in the formation of regional task forces, and the development of regional strategies and action plans on ballast water control and management in all five focus regions (i.e., South-East Pacific and Argentina, Mediterranean, West and Central Africa, Red Sea and Gulf of Aden, and Wider Caribbean).

#### MOBILIZING INVESTMENTS

The strong commitment and ownership by all countries and partners involved in GloBallast is clear when considering that it secured an impressive 1:3.6 cash co-financing ratio.<sup>2</sup> This project has also initiated a major transformation in the area of ballast water treatment technologies, a market now projected to grow to over \$35B over the next 10 to 15 years. Overall, from a GEF perspective, this \$14M GEF investment over a period of 13 years represents a record catalytic finance ratio of 2,500:1 'return' on the GEF grant (UNDP, 2012).

Early on, it was recognized that the environmental problems that arise from shipping, such as marine invasives, can only be addressed with participation from the private sector. This involvement was encouraged by GloBallast through the creation of the Global Industry Alliance (GIA) in 2009, a unique alliance and pioneering partnership between the IMO and major private shipping corporations. This led to the formation of the GIA Fund with generous contributions from industry players (shipping and ship-building companies), which support project related activities. This innovative public-private sector partnership model is the first of its

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<sup>2</sup> When non-cash contributions are included, the ratio increases to an impressive 1:9.5.

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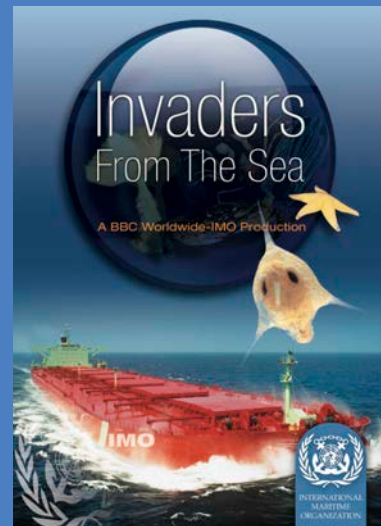
“Recognizing the need for continual development of the ballast water treatment technologies and ensuring that system improvements are relayed in a cross flow of experiences and knowledge, GloBallast performs a critical role in bringing together the scientific community, manufacturers, regulatory bodies and ship owners promoting government-industry dialogues and facilitating innovative partnerships such as the Global TestNet and GIA.”



# Fact Box: GloBallast — A Multi-Award Winning Project

The success of the GloBallast Project was recognized by the international community through several international awards for its achievements. The Project won the IMarEST Queen's Golden Jubilee Marine Environment Award in 2003. In 2007, the documentary film "Invaders from the Sea", produced by the project in association with the BBC, won the gold award for the Best United Nations Feature Film at the third annual United Nations Documentary Film Festival. Recently, in 2013, it won the Marine BizTV International Maritime Award for "Best Innovative Project".

"These prestigious international awards are a true recognition of the innovative and championing efforts of our lead partnering countries, regional coordination partners, global strategic partners, including GEF and UNDP and members of the Programme Co-ordination Unit at IMO, who all played a key role in making this global project a true success story." Dr. Jose Matheickal, Chief Technical Adviser of the Project at IMO.



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kind in the area of ballast water management, with a goal to provide guidance in finding solutions for addressing ballast water issues, including the development of new technologies, and capacity-building activities.

The GEF and its partners are aware that ballast water is only one of the major vectors for the transfer of invasive species. Another common vector is hull fouling, whereby harmful organisms attach themselves to the outer hulls of ships and boats and are carried and released into new environments. Because of these parallels, a strategy which tackles threats posed by ballast water and hull fouling would certainly minimize the future risk of marine invasions and subsequent impacts on natural ecosystems and local economies across the globe.

Through the pioneering work of the GEF, UNDP and IMO, and the exemplary efforts of governments and industry stakeholders, the GloBallast Pilot Project and GloBallast Partnerships Programme have seen many successes. These projects have facilitated global, regional and national governance reforms and an industry transformation, and have created substantial economic benefits by promoting the creation of a sizeable ballast water treatment industry valued at over \$35B and spurring the rapid development of innovative technological solutions for the management of ships ballast water. The threat of invasive species will continue to pose a global environmental challenge; however, there are many positive signs that the occurrence of invasive alien species transfers will start to dramatically decrease in the coming years.



KEY ACHIEVEMENTS

- Ratification by 44 countries (as of July 2015) of the 2004 IMO International Convention for the Control and Management of Ships’ Ballast Water and Sediments, or simply, the Ballast Water Management Convention;
- Capacity improved in more than 70 developing countries through support to reform of national ballast water management policies, legislation and institutions, global advocacy and awareness raising, and ballast water risk assessment and training;
- Countries prepared, and in many cases adopted and implemented, national legal, policy and institutional reforms;
- New ballast water treatment industry created, not only protecting the marine environment from IAS, but creating a new employment sector; ultimately expected to grow into a \$35B market globally and already exceeding \$100M in private sector spending on ballast water treatment research and development;
- Major market transformation catalysed in the shipping industry including through the establishment of strategic alliances (e.g., the Global Industry Alliance and Ballast Water R&D Symposia) with shipping industries;



GloBallast Ship (Edwin Grandcourt)

GEF INVESTMENT

DURATION OF GEF INVESTMENTS

Removal of Barriers to the Effective Implementation of Ballast Water Control and Management Measures in Developing Countries

2000-2005

Building Partnerships to Assist Developing Countries to Reduce the Transfer of Harmful Aquatic Organisms in Ships’ Ballast Water (GloBallast Partnerships)

2007-2016





- Regional Task Forces established (resulting in the development of Regional Strategies and Action Plans on ballast water control and management) in all five focus regions; and,
- Tool developed for conducting Port Biological Baseline Surveys, which aid in detecting possible invasions at early stages so that adaptation strategies can be implemented quickly.

### LESSONS LEARNED

- Environmental protection efforts can be greatly enhanced when all relevant government agencies are directly involved;
- Countries involved in pilot efforts can be instrumental with respect to scaling up to regional or global concerted action;
- All key stakeholders must be involved in discussions when a major convention is under debate; and,
- GEF interventions aimed at future environmental conventions should follow the two-phase model used under the GloBallast Partnerships Project: (1) a pre-convention intervention to get the buy-in and ownership by the countries who are developing the convention, and, (2) a post-adoption intervention to accelerate and support the convention's ratification, coming into force, and implementation.

RECIPIENT COUNTRIES	GEF AGENCIES	GEF GRANTS	CO-FINANCING	WEBSITES
Brazil, People's Republic of China, India, Islamic Republic of Iran, South Africa, Ukraine	United Nations Development Program	\$7.60M	\$3.83M	<a href="http://globallast.imo.org">http://globallast.imo.org</a>
Global (Argentina, Bahamas, Colombia, Chile, Croatia, Egypt, Ghana, Jamaica, Jordan, Nigeria, Panama, Trinidad and Tobago, Turkey, Venezuela, Yemen)	United Nations Development Program	\$5.69M	\$17.7M	<a href="http://globallast.imo.org">http://globallast.imo.org</a>

Ships at anchor in the Straits of Singapore  
(Holiday Point, Flickr Commons)



## The Marine Electronic Highway

# Improving Navigational Safety and Cooperation with the Marine Electronic Highway

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*More than 90,000 vessels, including cross-Straits traffic, traverse the Straits of Malacca and Singapore (SOMS) each year. These straits are particularly high risk to navigation of ships due to its shallow and narrow channels, irregular tides, and shifting bottom topography. In 2010, a collision between the MT Bunga Kelana 3 tanker with the MV Waily bulk carrier led to a spillage of 2000 tonnes of light crude oil, highlighting the risk that ships face in this region. Such collisions, and also groundings, are a global issue with significant economic and environmental implications. This increasingly crowded passageway serves as an ideal place to pilot efforts at improving the navigational safety of vessels in major waterways.*

Indonesia, Malaysia and Singapore border the Straits of Malacca and Singapore, the shortest and most travelled shipping route between the Indian Ocean and the South China Sea, especially for oil tankers trading between the Persian Gulf and the economically fast-growing countries of East Asia. Nearly 33% of globally exported crude oil moves by ship through this important channel, making it almost six times busier than the Suez Canal. Although major spills are rare, between 1978 and 2003, nearly 900 ship-related accidents were reported. Transiting ships have also been estimated to contribute 20% of the known marine pollution to

the region. This evidence clearly shows a need for improved navigation of vessels using these waters.

## A MAINSTREAM DECISION SUPPORT SYSTEM

In 2006, through an innovative regional collaborative initiative to improve navigational safety in the Straits, the Marine Electronic Highway (MEH) Demonstration Project was born. It was a joint effort between the GEF, World Bank, IMO, and Indonesia, Malaysia and Singapore, in partnership with the International Hydrographic Organization, Republic of Korea, International Chamber of Shipping and the International Association of Tanker Owners. The ultimate aim was to create and establish an effective decision support system that would enhance navigational and traffic safety across the Straits for all of its users and stakeholders, and in turn protect the marine environment.

Based on the commitment of all partners, the first major milestone has been reached; a pilot MEH System has been created and is now established in Batam, Indonesia, operated by the country's Directorate General of Sea Transportation. This tool is an advanced and innovative marine information technology which operates via an electronic navigational chart platform. The system is capable of displaying and



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“The MEH project is very relevant to the long term development plan of Indonesia. It has fostered sustainable dialogue and cooperation among the three littoral states and different agencies in Indonesia. It has contributed to the development of the marine environmental and safety sector within the Straits which in turn has positively contributed to the economic and social development of the entire region.”

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A. Aldian, Task Team Leader, World Bank, Jakarta

analyzing navigational and marine environmental spatial data. It aids in improving safety through navigational functions based on the use of Global Positioning Systems and other technology which processes real-time navigational information on tidal and current patterns, and meteorological and other oceanographic conditions. Its overall design is aimed at assisting vessels to navigate the Straits safely by quickly communicating important information to ships and shipmasters as well as shore-based users.

#### A MULTI-PRONGED APPROACH

The MEH Demonstration Project takes a multi-pronged approach which focuses on:

1. Fostering and supporting a cooperative mechanism to jointly engage and strengthen coordination among the three littoral states;
2. Supporting and improving technical and institutional capacity to generate real time navigational and environmental information;
3. Demonstrating and promoting the deployment of pioneering information and communications technology and marine geospatial technologies for delivering critical navigation and environmental information in real time to ship;
4. Putting in place requisite information necessary to support regulatory mechanisms which aim to reduce the risk of ship collisions, groundings and pollution incidents; and,
5. Establishing a regional MEH network to support the navigational safety and marine environment protection infrastructure and mechanisms.

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Human error will continue to pose a challenge even with these technological improvements. It would be beneficial to expand and establish the MEH technology in all three littoral states so that it encompasses the entire region not only because of its potential to improve vessel safety, but also because it offers users immediate access to environmental information such as on spill characteristics, including direction and speed. This could aid in spill response and help lessen or minimize the impact of future accidents. Another benefit is that the technology can be used to aid in identifying and tracking ships which illegally discharge their bilges or dump other wastes. Thus again, offering potential to protect against pollution and thus protecting the SOMS biodiversity, resources and ecosystems, and activities such as fishing, aquaculture and coastal tourism, which are all important income sources for the millions of people living along its coast.

#### A WIN-WIN EFFORT

Though this GEF initiative, the ultimate success of the MEH demonstration project was achieved because of the consensus that was reached among relevant stakeholders at local, national and regional levels. This project has demonstrated to users of the Straits of Malacca and Singapore that MEH is an effective tool that could be used to further reduce the risk of ship accidents and marine environmental damage. Reducing the rate of ship collisions and groundings will not only benefit the marine environment, but also prevent economic losses for the shipping industry, which makes commitment to the MEH a commercial and environmental win-win effort. The successes that have been seen so far have convinced stakeholders that it should be sustained and that a scale up project is economically justified. An exciting next step for a full scale MEH Development Program will involve the creation of a regional network across the entire straits of Malacca and Singapore, called the MEH System, by establishing similar MEH Data Centres in Malaysia and Singapore. Once established, it will serve as an effective model that can be replicated across the globe.

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“The MEH project is proof that the e-Navigation strategy of the IMO works and is beneficial not only for improved navigation by mariners but also for the marine environment. Although there is more work to be done, what has been achieved so far has provided a strong platform for new technologies to be developed and tested for enhanced safety of navigation in the SOMS and around the world. It is firmly believed that the MEH is the future reality for maritime safety.”

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Working Group of the Tripartite  
Technical Experts Group on Safety of Navigation

## KEY ACHIEVEMENTS

- Enhanced environmental protection: improved marine pollution response through MEH's functionalities for oil spill trajectory and fate and the ability to identify and track ships which illegally discharge wastes;
- Improvement of technical and institutional capacity; provision of real time observation and visualization of traffic, weather data and other environmental conditions across the SOMS that could be accessed through an Internet-connectivity by ships that regularly navigate the Straits; creation and establishment of an operational pilot MEH system in Batam, Indonesia, in one of the largest scale efforts of data integration of shore base station information in one of the world's busiest waterways; and,
- Critical starting point and fostering of a cooperative mechanism that strengthened coordination and allowed for an open three-state dialogue for marine environmental and safety issues across the SOMS.



Malacca Strait (Jimmy G, Flickr Commons)

### GEF INVESTMENT

Marine Electronic Highway Demonstration

### DURATION OF GEF INVESTMENTS

2006-2013

### RECIPIENT COUNTRIES

Indonesia, Malaysia





## LESSONS LEARNED

- Project success is only possible when consensus is reached among all relevant stakeholders at local, national and regional levels;
- Regional initiatives require public-private engagement, cooperation and commitment;
- When multiple institutions are involved, it is fundamental that institutional arrangements are in place prior to project implementation to ease project coordination and strengthen cooperation and commitment;
- Assessment of capacity, organisational structure, and budget cycle of the implementing agency is necessary prior to the project implementation to ensure an effective project planning;
- Regular communication between all three littoral states and users of the MEH is necessary to ensure adaptive management and that challenges are addressed as they arise;
- Marine information must be easily accessible to all users of the MEH to ensure improved monitoring and response times for shipping incidents, lower response and clean-up costs, and better quantification of damages; and,
- To ensure that the MEH technology remains effective and sustainable into the future, there must be a strong commitment towards regular maintenance and upgrading of equipment.

### GEF AGENCIES

International Bank for  
Reconstruction and  
Development

### GEF GRANTS

\$8.30M

### CO-FINANCING

\$7.50M

### WEBSITES

<http://www.mehsoms.com>

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Koh Phi Phi Don, between Phuket and western Strait  
of Malacca (Benjamin Cohen, Flickr Commons)



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Mediterranean Coast (Yves de Soye)

# A Roadmap Forward

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Since its inception, the GEF has recognized the tremendous need to tackle ocean issues in order to ensure the sustainability of resources critical to human wellbeing. This publication has highlighted key GEF International Waters interventions in coastal and marine environments that, through regional processes and national investments, have had a transformational impact on ocean governance in a critical time when coastal areas attract an increasing portion of the world population. The constant pressure from a changing climate is being coupled with overfishing, habitat destruction and pollution, resulting in significant degradation to the marine ecosystems across the globe impacting national economies and basic water, food and energy security for communities. Furthermore, efforts to mitigate and manage these threats are compounded by the complex international financial landscape, fragmentation among institutions, insufficient knowledge of the real (ecological, social and economic) value of ecosystems and their resources, lack of cooperation among nations sharing marine ecosystems, and weak policies, legislation, and enforcement.

While the task is daunting, the GEF International Waters focal area is well positioned to address this challenge building on the breadth of experience and key lessons that has formed from the last two decades of work. GEF IW investments have proved that;

- Long term sustainability is best secured by engaging stakeholders early in the process allowing them to see net benefits of engagement and to become the champions for enhanced global environmental benefits;
- The private sector is an important stakeholder potentially contributing significantly towards meeting environmental, social and economic goals;
- Success and broad impact can be achieved by engaging the various institutions, including government, non-governmental organizations, academia and private sector and by securing engagement across all relevant sectors, including fisheries, waste water management, tourism, shipping, planning; and,
- Buy in from key political decision makers towards transboundary agreements and an increased focus on economic valuation of marine ecosystems can facilitate co-financing, institutional reforms, investments and long-term institutional sustainability.

Stepping up actions on the ground and aiming at increased impact at scale, the GEF will increasingly catalyze synergies between its funding streams towards more integrated solutions, which mirrors the reality that countries are facing. This



approach follows the GEF 2020 vision and more specifically the GEF-6 Strategy, which focuses on the importance of catalyzing global and regional partnerships while ensuring benefits accrue to ecosystems and their services.

Emerging transboundary issues identified by the scientific community will inform future project planning, including, but not limited to ocean acidification, high seas exploration, blue carbon restoration, deep-sea fishing and seamount habitat conservation. At the same time, increasing emphasis on private sector engagement and sustainable development will ensure strong governance regimes.

We hope that this publication will provide the reader with a better understanding of the complexity of the GEFs marine and coastal investments and their key achievements towards addressing current and emerging challenges. As we look to the future of ocean governance, we will build on these critical lessons to ensure strong transboundary initiatives that build global and regional partnerships while improving ecosystem health and services.









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#### Partner Websites

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The Global Environment Facility (GEF) is an international partnership of 183 countries, international institutions, civil society organizations, and private sector to address global environmental issues.

Serving as financial mechanism for several international environmental conventions, since 1991, the GEF has as provided over \$14 billion in grants and mobilized in excess of \$70 billion in additional financing for more than 4,000 projects in more than 165 developing countries. For 24 years, developed and developing countries alike have funded development projects and programs on biodiversity, climate change, international waters, land degradation, and chemicals and waste. Through its Small Grants Programme (SGP), the GEF has given over 20,000 grants to civil society and community based organizations totaling \$1 billion.

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