

LME
LEARN

THE LARGE MARINE ECOSYSTEM APPROACH

An Engine for Achieving SDG 14



United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Oceanographic
Commission



Empowered lives.
Resilient nations.



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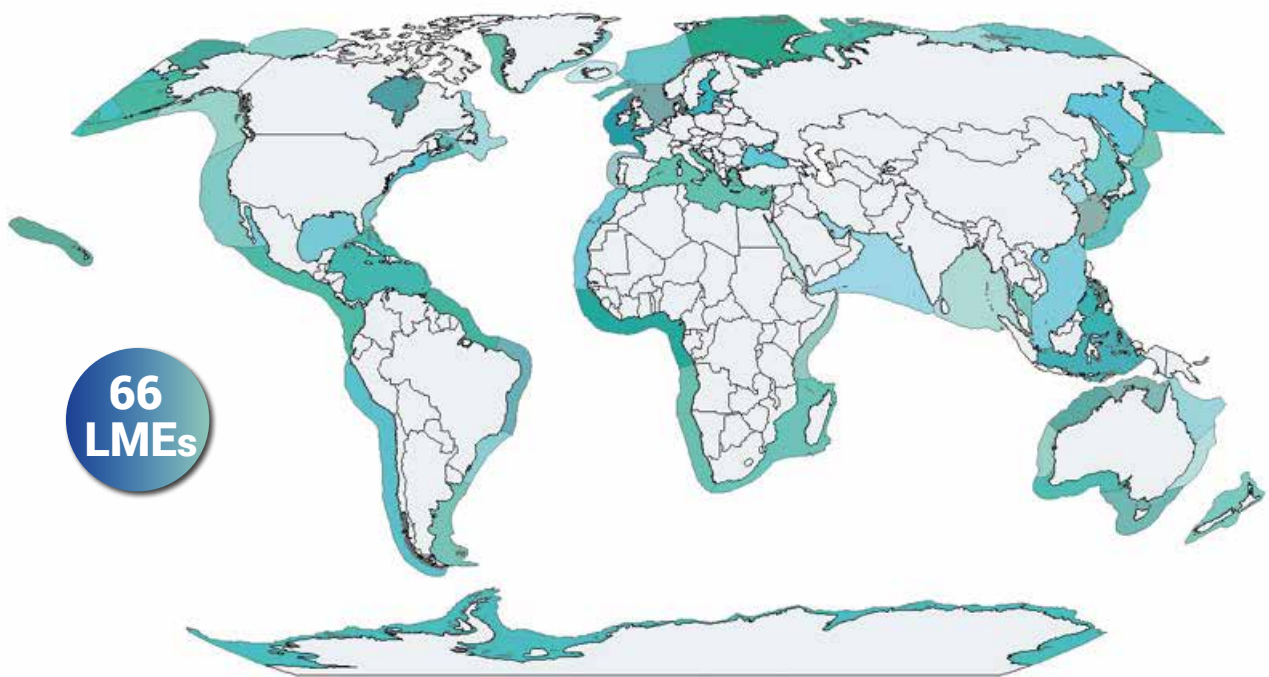
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What Are Large Marine Ecosystems (LMEs)?

Many are transboundary in nature by virtue of interconnected currents and movement and migration of marine resources.



Characterized by their unique undersea topography, current, marine productivity and food chain interactions.



Relatively large areas of ocean space of about 200,000 km² or more, adjacent to the continents and extending out to the break in a continental shelf or the seaward extent of a current system.



Harbor biodiversity and provide important ecosystem services and tangible benefits, including livelihoods, food security, carbon sequestration and storage, marine transport and recreational opportunities.



Taken together, provide direct services approaching US\$3 trillion annually, with a non-market value estimated at US\$22 trillion each year.

LME Pressures and Risks

A combination of anthropogenic and natural pressures is impacting the health and productivity of LMEs, compromising the sustainability of LME ecosystem services.



These pressures are accelerating, and without concerted action their impacts could become irreversible.



Nutrient Over-Enrichment and Hypoxia

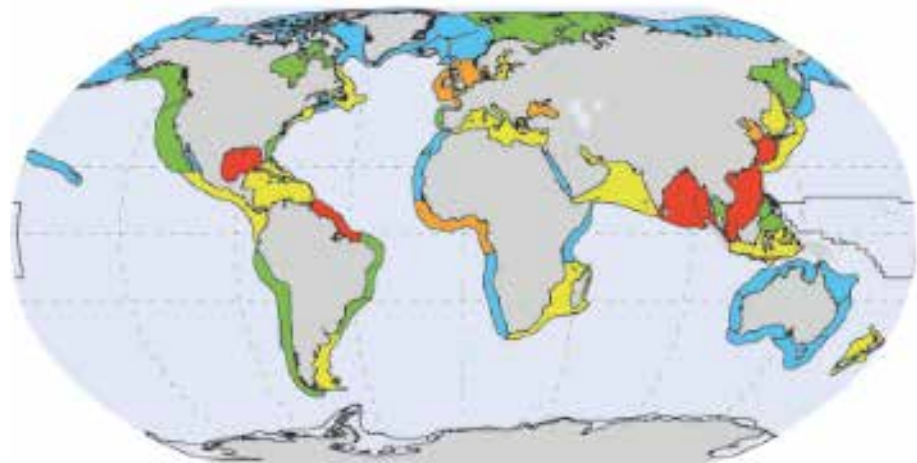


Excess nutrients—such as nitrogen, phosphorus and silica—entering coastal waters from land-based sources can lead to coastal hypoxia, or “dead zones”.

Nutrient enrichment stimulates excessive growth of algae and other plants. As algae dies, bacteria break it down and in the process consume all the dissolved oxygen in the area.

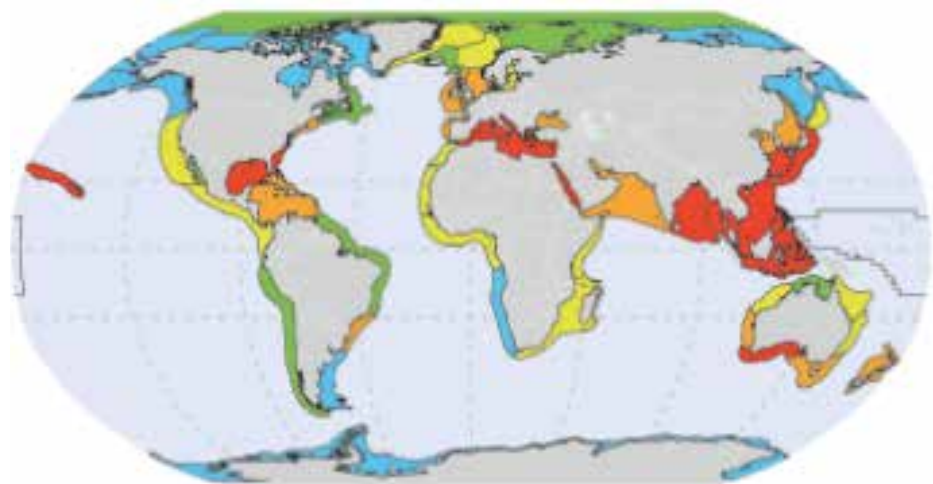
The lack of oxygen can impair or kill marine organisms, disrupt natural food chains and threaten human health and wellbeing.

The below map shows which LMEs are currently at risk of harmful algal blooms.



RISK CATEGORIES

Lowest Low Medium High Highest



Floating plastic is now ubiquitous in LMEs.

Plastics impact marine ecosystems from the largest macro (marine mammals and bird ingestion) to the micro (plankton ingestion).

Within 25 years, the ocean plastic load could grow to one ton of plastic for every three tons of fish.

Plastics can cause major economic loss and pose a threat to navigation and human safety. The annual economic damage of marine debris is estimated at US\$ 8 billion per year.

The above map shows current LME risk for plastic pieces of 5mm diameter and bigger.

Marine Debris/Pollution



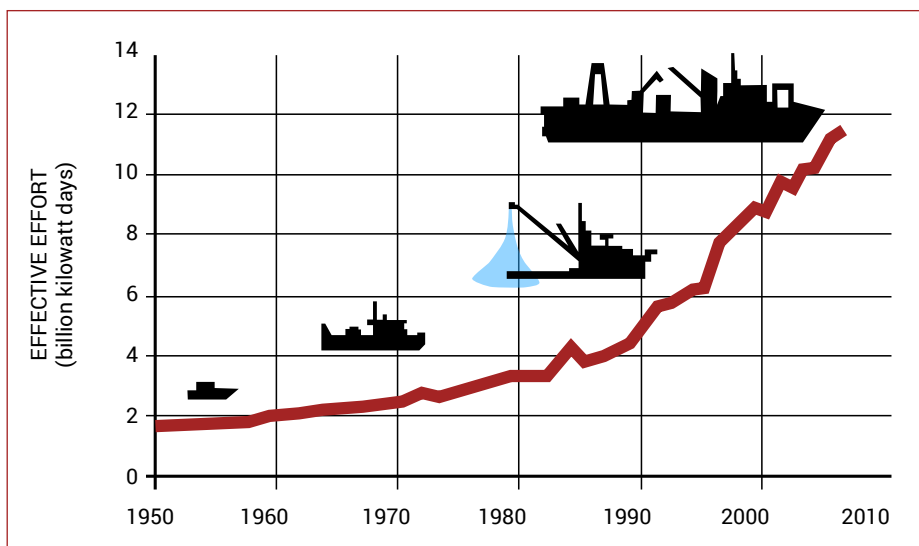
Unsustainable Fishing Practices



LMEs contribute 90-95 percent of global marine fisheries catches.

Unsustainable fishing practices have resulted in close to 30 percent of fish stocks within LMEs being overexploited or collapsed.

The greatest increase in global LME effective fishing effort has been in the last decade. This reflects a change in fishing technology as well as the increase in size and activity of fishing fleets.



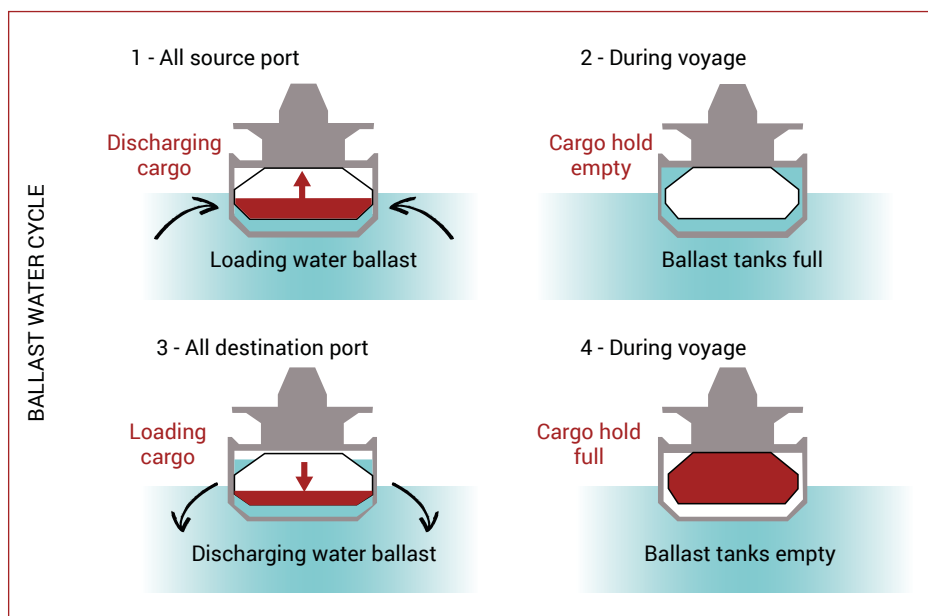
Invasive Species Introductions



Invasive aquatic species are organisms that cause ecological or economic harm in a new environment where they are not native. Once a given invasive species has established itself and disrupted the local marine or freshwater ecosystem, it is virtually impossible to eradicate.

They are capable of reducing biodiversity, competing with native organisms for limited resources, and altering habitats.

Invasive species are primarily transferred via ships' ballast water and hulls and mobile marine infrastructure.



Ocean Acidification

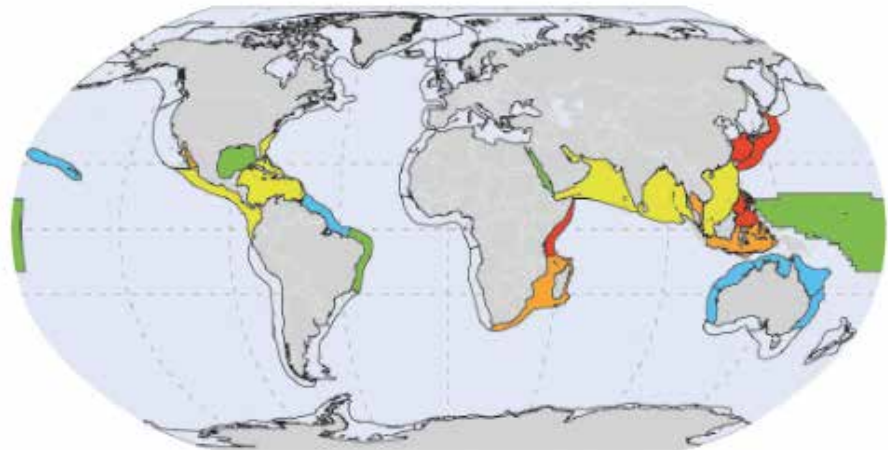


About 25 to 30 percent of anthropogenic carbon dioxide from the combustion of fossil fuels over the last 200 years have dissolved in the ocean as carbonic acid.

This has resulted in a change to ocean carbonate chemistry through lowering the average pH of the ocean, representing an increase in ocean acidity of about 30 percent.

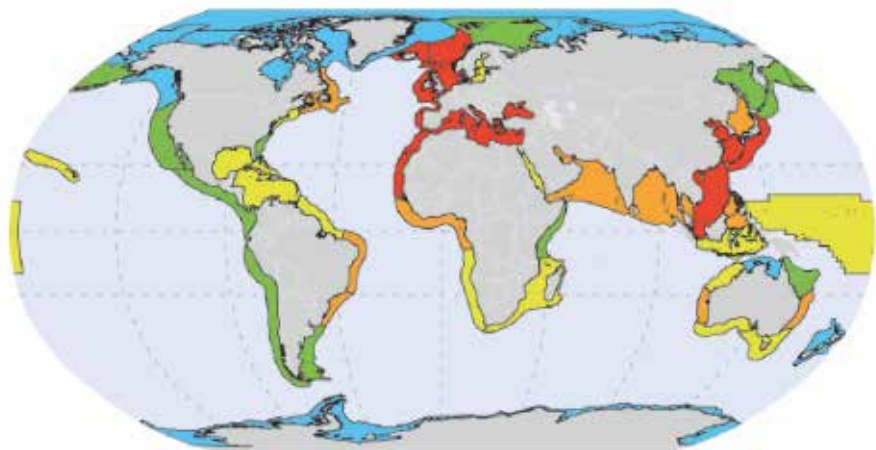
This increased acidity reduces the availability of carbonate ions needed by numerous marine organisms (including coral reefs but also many keystone plankton species) that fix calcium carbonate for their shells or skeletons.

The map below shows reefs currently at risk from local and global threats, including ocean acidification.



RISK CATEGORIES

Lowest Low Medium High Highest



Cumulative Human Impact



The GEF Transboundary Waters Assessment Programme's (TWAP) 2016 LME assessment is the first indicator-based global comparative baseline assessment of the 66 LMEs and the cumulative human impacts on these ecosystems (www.geftwap.org).

Human pressures affecting LMEs fall mainly into four categories: climate change; commercial fishing; land-based pollution; and commercial activity (such as shipping and tourism).

Pressures associated with climate change, most notably ocean acidification and sea surface temperature rise, are the top stressors for nearly every LME.

TWAP assigned one of five risk categories based on rank order of cumulative impact scores (based on the four categories) across all LMEs (map above).

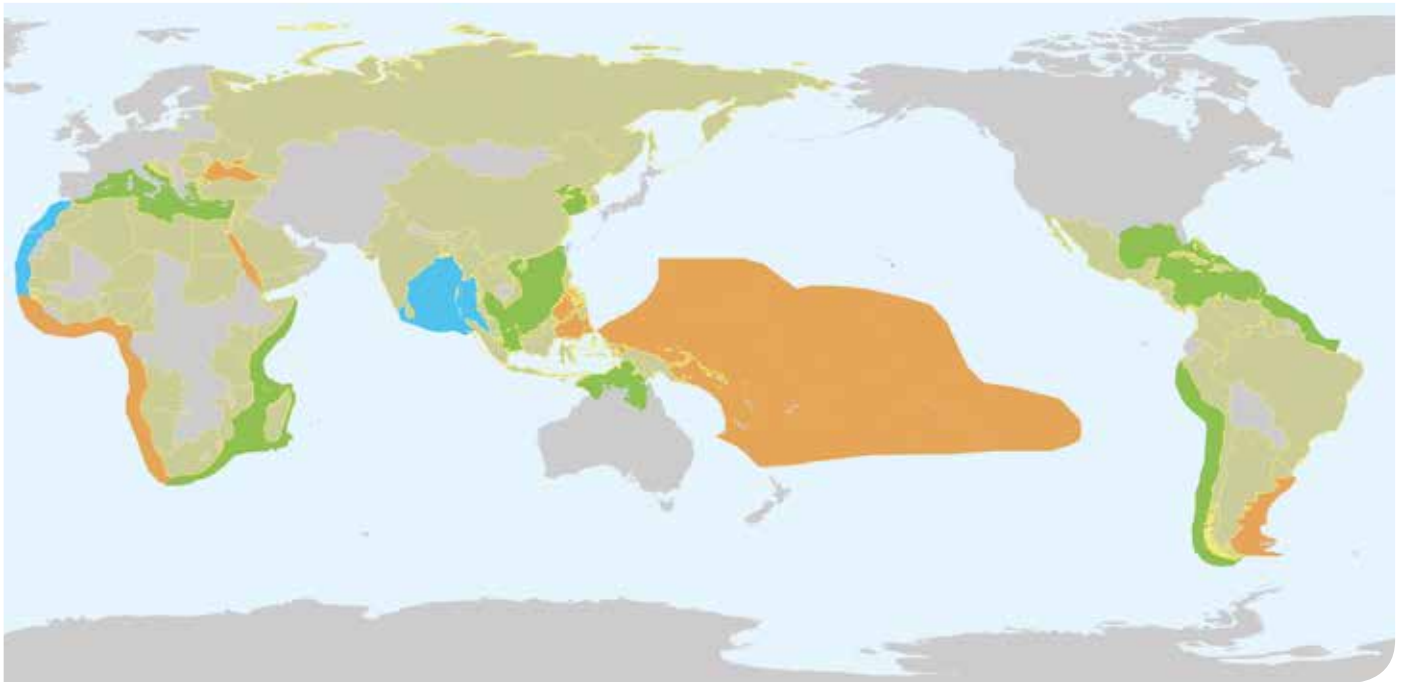
The LME Modular Approach

Prompt and large scale action is needed to overcome the downward trend of losses of LME goods and services; to mitigate the degradation of LMEs in the face of the accelerating effects of climate change; and to achieve integrated adaptive ecosystem-based management (EBM) of LMEs.


EBM involves a paradigm shift from single species or single sector management to entire ecosystem management, and integrates a science to policy process. Operationalizing the EBM concept is the aim of the LME Approach. The LME Approach provides a five-module strategy for assessing and monitoring LMEs and for taking remedial actions toward the recovery and sustainability of degraded goods and services in LMEs. The modules are focused on the application of suites of indicators for measuring LME socioeconomics, productivity, governance, pollution & ecosystem health, and fish & fisheries, which are incorporated into a multi-country LME strategic planning process through development of a Transboundary Diagnostic Analysis (TDA) and a Strategic Action Programme (SAP).




Large Marine Ecosystem Strategic Action Programmes Status



STRATEGIC ACTION PROGRAMMES
(SAP) STATUS

 Funded SAP
implementation project

 SAP Prepared
for Endorsement

 Additional SAP
signed

TDA Participating countries first prepare a formal TDA through a consultative process in which they determine and prioritize, through the module indicators, environmental problems, their root causes and impacts, and priority actions.

SAP The SAP then translates shared commitments and vision into policy actions to resolve priority threats—including actions for the national benefit of each country, and actions addressing transboundary issues—and institutional mechanisms at the national, regional and international level for implementation of those actions.

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 EBM practices. The Productivity, Socioeconomics, Fish & Fisheries, and Pollution & Ecosystem Health modules support the TDA process, while the Governance module is associated with development or update of the SAP.



The LME Approach: An Engine for **Achieving** **SDG 14**

The LME Approach has provided a rallying point for countries to cooperate in dealing with problems relating to the utilization of transboundary marine resources.

As a regional framework and science-informed process, it can be an engine for achieving the 2030 Agenda for Sustainable Development, especially Sustainable Development Goal 14—*Conserve and Sustainably Use the Oceans, Seas and Marine Resources for Sustainable Development*.



US\$285 million

Cumulative LME
GEF Grants



GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

The adoption and long-term commitment of the Global Environment Facility (GEF) to LME-based programming has in several cases been transformational in supporting efforts of countries sharing LMEs to move them toward sustainable use, and highly catalytic in terms of leveraging both public and private financial resources for LME restoration and protection.

Over the course of more than 25 years, the GEF has invested in 124 countries through projects in 23 LMEs. These projects, implemented through strategic partnerships with national, regional and international entities, have encouraged governmental and non-governmental stakeholders around the world to embrace the LME Approach as a mechanism to address issues in relation to overfishing, habitat degradation and loss, and pollution, among other serious threats.



Invested in

124 Countries



Through
Projects in

23 LMEs

The following pages demonstrate how GEF programming through the LME Approach is already contributing to achieving the ten SDG 14 targets, and how country-endorsed SAPs under implementation in the SDG period can contribute to achieving the targets.

INDICATOR 14.1.1

Index of coastal eutrophication and floating plastic debris density.

14.1

By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

Progress Through the LME Approach

Reducing Coastal Pollution from Land-Based Sources in the East Asian LMEs

Cambodia, People's Republic of China, Indonesia, Lao PDR, Malaysia, Philippines, Thailand, Vietnam

► THREATS

Almost 90 percent of the region's municipal wastewater is released into the marine environment untreated, and large quantities of industrial wastes are directly discharged.

Seventy percent of the original coral reefs bordering the South China Sea have been destroyed.

Loss of biodiversity and ecological goods and services, including fish habitat and wave attenuation.

► INTERVENTION

In 2007, the GEF and the World Bank initiated the US\$80 million Partnership Investment Fund for Pollution Reduction in LMEs in East Asia (The Partnership Fund) to replicate cost-effective pollution reduction technologies and techniques while promoting private investment and public-private partnerships, and streamlining investments and activities designed to reduce land-based sources of pollution throughout the seas of East Asia.

The Partnership Fund's investments, through seven national-level projects, were aimed at reducing nutrient inputs to these seas by an estimated 25,000 tons of nitrogen and 7,500 tons of phosphorus per year.

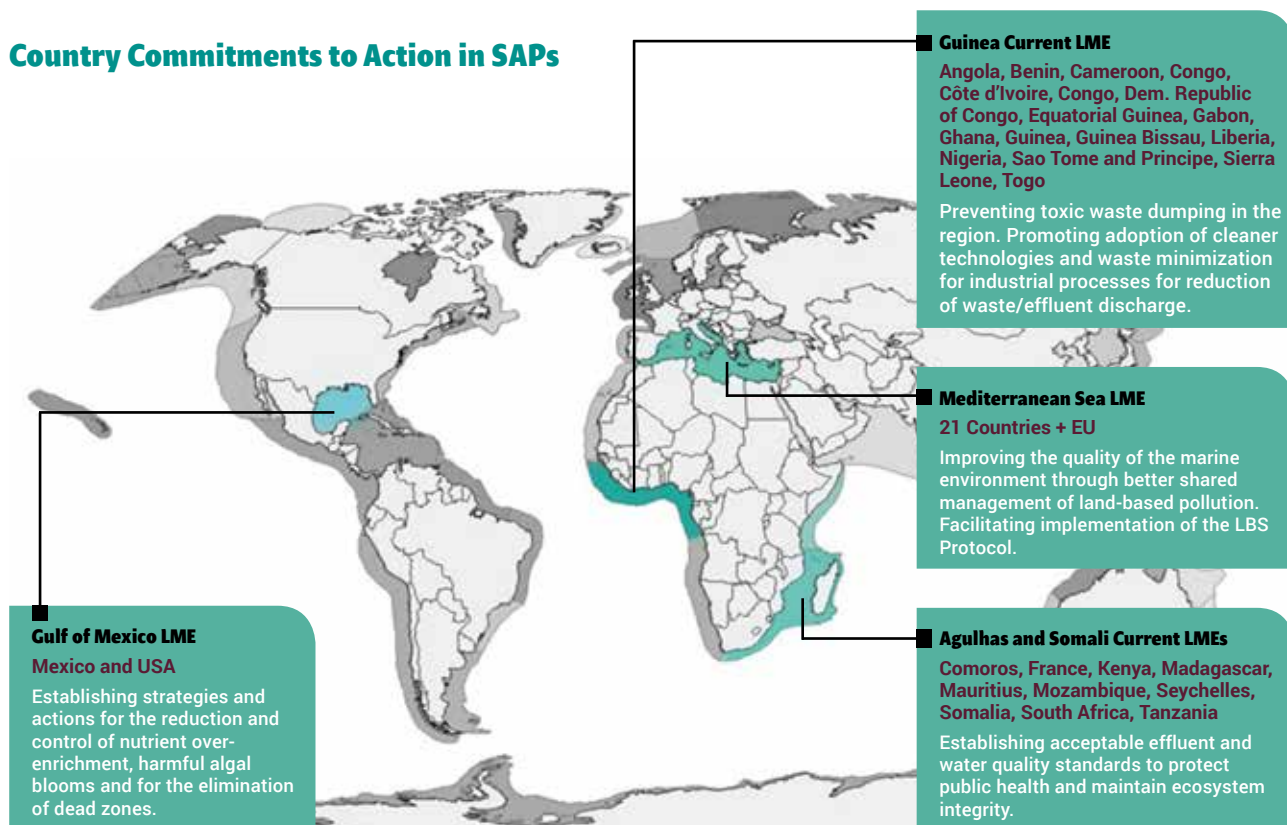
► PROGRESS

Partnership Fund seed financing and the goal of achieving significant reductions in pollution loads from land-based sources encouraged project authorities to contribute nearly US\$1 billion of co-financing.

For example, the Manila Third Sewerage Project assisted the Government of the Philippines by identifying reforms to attract private investments in the wastewater sector, increasing the effectiveness of the agencies responsible for water pollution control, and promoting innovative and effective wastewater treatment techniques.

By 2013, the project had provided sewage services to 20 percent of the 12 million residents of the Metropolitan Manila Area, which covers 640 km². The project provided sanitation services to 57 percent of the population, and contributed to the reduction of biochemical oxygen demand load in Manila Bay by 9000 tons per year.

Country Commitments to Action in SAPs



14.2

By 2025, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.

INDICATOR 14.2.1

Proportion of national exclusive economic zones managed using ecosystem-based approaches.

Progress Through the LME Approach

Revitalizing the Gulf of Mexico LME Through Ecosystem-Based Management

Mexico and United States of America

► THREATS

Each spring, a hypoxic dead zone covering more than 18,000 km² -largely caused by high nutrient agricultural runoff-forms near the mouth of the Mississippi River.

Risk from economic activity is high. In 2010, the Deepwater Horizon spill leaked about 4.9 million barrels of oil into the Gulf, causing widespread environmental and economic damage.

Major threats are floating marine debris, especially plastics; habitat loss; and unsustainable exploitation of marine and coastal natural resources.

► INTERVENTION

In 2009, a GEF and UNIDO project (US\$12.9 million GEF grant; US\$124.2 million co-financing) was initiated to respond to multiple regional threats through an integrated ecosystem-based management framework to provide a strong foundation for bilateral cooperation between the countries.

The project targeted (1) policy, legal and institutional reforms related to habitat loss; management of living resources; and land-based sources of pollution; (2) on-the-ground area-specific demonstrations related to these priority problems; and (3) establishing an institutional arrangement for cooperation among the countries sharing the LME.

The project aimed to bring the two countries together to address knowledge gaps and improve scientific capacity for research and monitoring of conditions along the Gulf coast. In Mexico, there was a particularly strong need to establish comprehensive long-term monitoring programs.

► PROGRESS

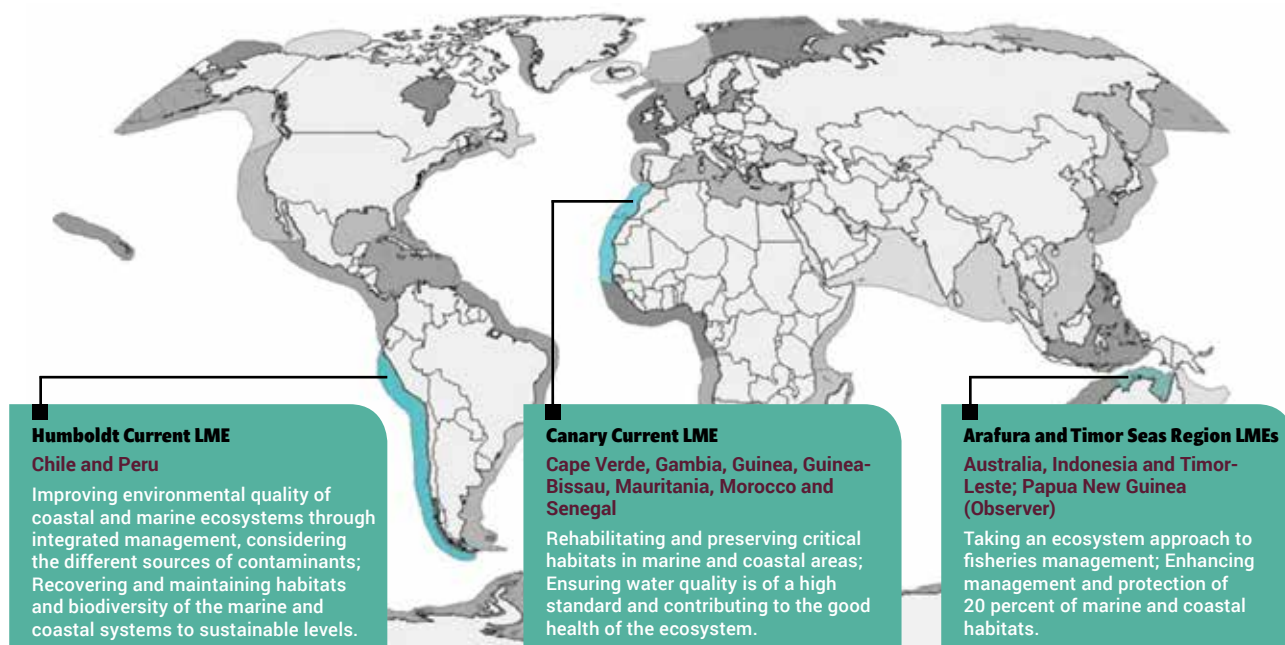
Active stakeholder participation helped establish the Bi-national Coastal and Ocean Observatory Network, which now serves as an early warning system by monitoring conditions that favor coastal hypoxia and the development of harmful algal blooms.

In consultation with fisheries authorities and cooperatives and other stakeholders, the first ecosystem-based fisheries model in Mexico was developed. Scientists and managers can use this model to evaluate various strategies for regulating future harvest for specific stocks.

As a demonstration for scaling up more broadly, a comprehensive strategy for mangrove conservation and restoration was developed for a site in Mexico. Community members were trained in proper restoration techniques, which enabled them to restore more than 160 hectares of mangroves. This strategy is being replicated in three other locations.

The SAP was endorsed by Mexico and the USA in 2014.

Country Commitments to Action in SAPs



INDICATOR 14.3.1

Average marine acidity (pH) measured at agreed suite of representative sampling stations.

14.3

Minimize and address the impacts of ocean acidification, including through scientific cooperation at all levels.

Progress Through the LME Approach

Transforming the Global Maritime Industry Toward a Low Carbon Future

Global

► THREATS

International shipping emitted 796 million tons of carbon dioxide in 2012, which accounts for about 2.2 percent of global greenhouse gas emissions volume that year.

Business as usual scenarios forecast a growth in CO₂ emissions for international maritime transport at 50 percent to 250 percent in the period to 2050.

Emissions from ships to the atmosphere not only impact local port or coastal air quality but also have implications for global warming, climate change and ocean acidification.

► INTERVENTION

The new GEF/UNDP/IMO GloMEEP project (US\$2 million GEF grant; US\$11.8 million co-financing) is designed to contribute to a significant reduction in GHG emissions from international shipping by supporting ten pilot countries to take a lead in their respective developing regions to pursue relevant Legal, Policy and Institutional Reforms and capacity building, and to enhance public-private partnerships for innovation and technology deployment.

The project aims to act as a catalyst that will develop a global partnership that spurs government action and industry innovation to accelerate and support an effective implementation of the IMO Maritime Energy Efficiency Framework (MEEF), particularly in the developing countries where shipping is increasingly concentrated.

► PROGRESS

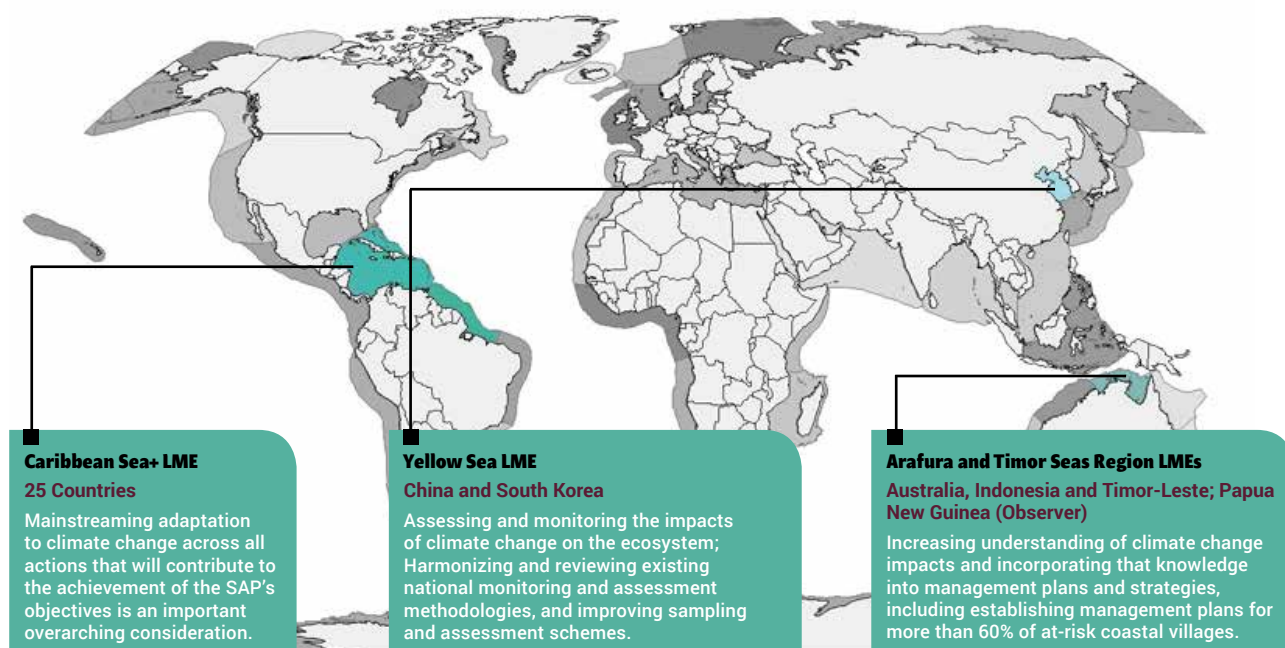
As a result of this project, long-term significant global environmental benefits will be achieved due to enhanced global capacity in, and

accelerated uptake of, technical and operational measures for a far more energy efficient shipping sector and associated reductions in the sector's GHG emissions.

These include global environmental benefits associated with significantly reduced CO₂ emission and fuel use reductions by shipping, including reduced impact on climate change, reduced ocean acidification, and improved port and coastal air quality due to reduced particulate matter, sulphur and nitrogen oxide emissions.



Country Commitments to Action in SAPs



14.4

By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics.

INDICATOR 14.4.1

Proportion of fish stocks within biologically sustainable levels.

Progress Through the LME Approach

Restoring Fisheries Through Refugia Systems in the South China Sea and Gulf of Thailand

Cambodia, China, Indonesia, Malaysia, the Philippines, Thailand, Vietnam

► THREATS

Seagrass beds serve as important spawning and nursery grounds for fish and other marine organisms. Many of the South China Sea and Gulf of Thailand LMEs' original seagrass beds have either been lost or degraded due to dredging, trawling, water pollution, and fish farming.

Fishermen harvest nearly five million tons of fish annually, equivalent to about six percent of the world's annual fish catch.

Fisheries in the region are characterized by high levels of small-scale fishing and unsustainable illegal fishing practices (poison and dynamite).

► INTERVENTION

In 2002, the GEF and UN Environment launched a five-year project to address priority environmental concerns through the development and testing of a suite of management approaches and tools, including integrated coastal management, habitat rehabilitation, and wastewater treatment systems. (US\$34.41 million GEF grant; US\$84.46 million co-financing over multiple phases).

The project targeted the development of a framework regional system of fisheries refugia in the South China Sea and Gulf of Thailand (currently under implementation through a US\$3 million GEF grant with the SEAFDEC).

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.

► PROGRESS

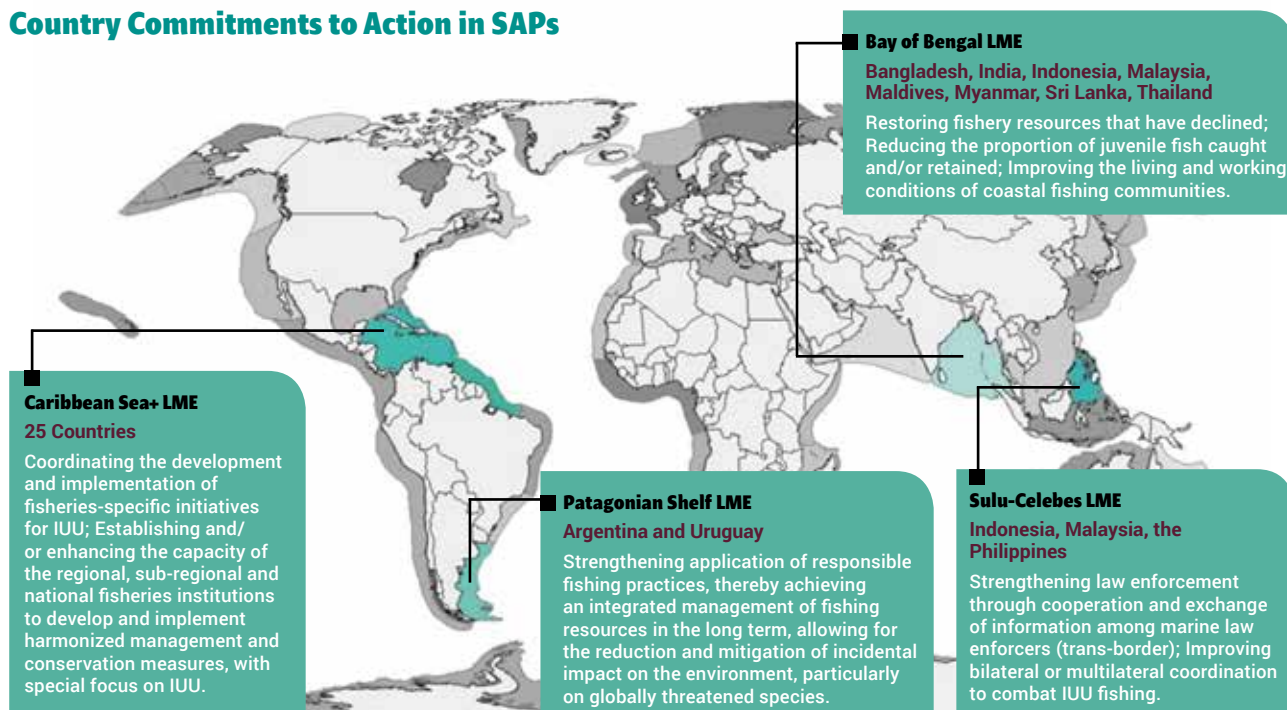
Under the first phase, Thailand established a fisheries refugia system through a 50,000 km² network of critical habitats along the western coast of the Gulf of Thailand. Vietnam has included a 10,000-hectare seagrass area on the east coast of Phu Quoc. Over a five-year period, coral cover was found to have increased, or at least been maintained, within refugia at five sites.

The 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 project supported a 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).

The ongoing project is promoting the management of fisheries and critical habitat, and establishment of 14 fish refugia sites in the South China Sea and Gulf of Thailand.

Country Commitments to Action in SAPs



INDICATOR 14.5.1

Coverage of protected areas in relation to marine areas.

14.5

By 2020, conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on the best scientific information.

Progress Through the LME Approach

Designating Marine Protected Areas in the Humboldt Current LME

Chile and Peru

► THREATS

The anchovy fisheries of the Humboldt Current LME 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.

A range of anthropogenic activities, including overfishing, pollution, and coastal development, exert continuous pressure on the LME.

Fish catch trends over the last two decades show a steady decline down from 26.5 million mt in 1994 to 5.7 mt in 2014.

In the southern area six fisheries are collapsed, eight are overexploited and a further eight are fully exploited.

► INTERVENTION

In 2010, the GEF and the UNDP initiated the Humboldt Current Large Marine Ecosystem Project (US\$7 million GEF Grant; US\$24.62 million co-financing) to establish a holistic ecosystem-based approach for managing fish and other marine resources in the LME based on the LME Approach modules: (1) ocean productivity; (2) fish and fisheries; (3) ecosystem health; (4) socioeconomics; and (5) governance.

Much of the project's work was 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.

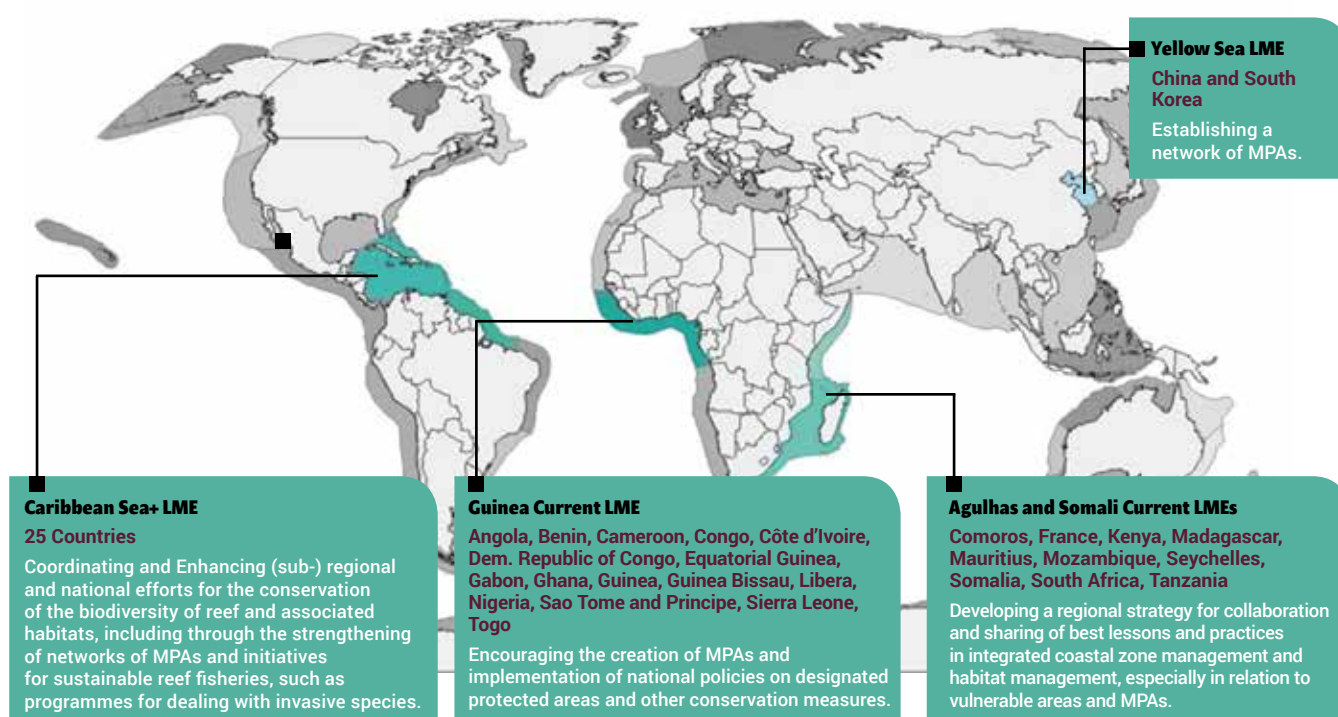
A key element in the application of the ecosystem-based approach to managing this LME has been the creation of a network of Marine Protected Areas (MPAs) to protect important and vulnerable habitats, including submerged seamounts and canyons, as well as to conserve vulnerable marine biodiversity.

► PROGRESS

The project has helped create more than 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 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.

In 2016, the countries signed a SAP to promote a multi-sectoral approach to the management of the area. It aims to reduce marine pollution, overfishing and illegal fishing, and ocean acidification; and increase resilience, MPAs, economic benefits via value addition, fisheries eco-certification, and scientific information and sharing.

Country Commitments to Action in SAPs



14.6

By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the WTO fisheries subsidies negotiation.

► THREATS

The fishing sector along the coast of West Africa contributes about US\$1.5 billion per year to national GDPs. It is the single largest contributor to rural income and employment, and is vital to food security.

Both local and foreign fishing fleets have been fishing in de facto open-access conditions.

IUU fishing occurs frequently, and is estimated to be worth about one third of the total value of fish catches in the region.



INDICATOR 14.6.1

Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing.

Progress Through the LME Approach

Combating IUU Through the West African Regional Fisheries Program

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

► INTERVENTION

In 2010, recognizing that sustainable management of fisheries resources would contribute to economic growth and poverty alleviation in the region, eight West African countries teamed up with the World Bank and the GEF to create the West Africa Regional Fisheries Program (WARFP) (US\$31.6 million GEF grant; US\$80.45 million co-financing).

The WARFP aims to (1) improve fisheries governance by strengthening each country's capacity to sustainably govern and manage their own fisheries; (2) reduce illegal fishing; and (3) increase the profitability generated by fisheries and the proportion of that value captured by the targeted countries.

► PROGRESS

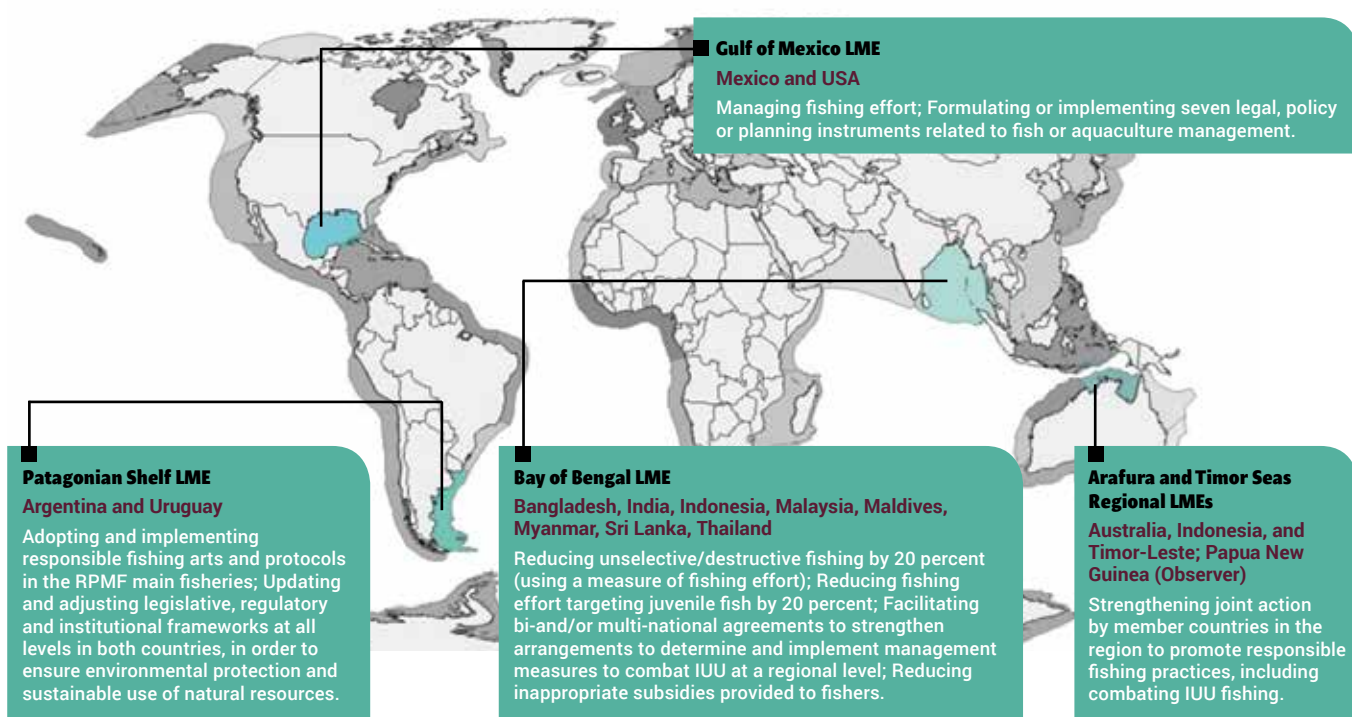
Established registries for fishing vessels in Cabo Verde, Liberia, Sierra Leone and Senegal.

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.

In Cabo Verde, Liberia, and Sierra Leone, more than 110 inspectors received training in how to enforce anti-IUU measures.

Reduced illegal fishing in Cabo Verde, Liberia, Sierra Leone and Senegal through improved capacity, surveillance and enforcement.

Country Commitments to Action in SAPs



INDICATOR 14.7.1

Sustainable fisheries as a percentage of GDP in Small Island Developing States, least developed countries and all countries.

14.7

By 2030, increase the economic benefits to Small Island Developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.

Progress Through the LME Approach

Improving the Understanding of Transboundary Oceanic Fish Resources in the Western Pacific Warm Pool

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

► THREATS

The waters of the Western and Central Pacific (WCP) region cover about 10 percent of 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 highly migratory stocks because of the great distances they can swim—often across national maritime boundaries and the high seas.

The health of the WCP waters is critical to the communities and economies of the Pacific Islands. Almost all of the land area of the Pacific SIDS is coastal in character and almost all of the people of the region live and work in ways that are dependent on healthy waters.

The lack of a legally binding framework governing cooperation between countries with a real interest in the resource had created management gaps across the range of the tuna stock.

► INTERVENTION

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. (US\$24.1 million GEF grant; US\$87.15 million co-financing.)

The project's principal objectives 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.

► PROGRESS

Negotiated and helped bring into force the Western and Central Pacific Fisheries Convention (WCPFC). 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.

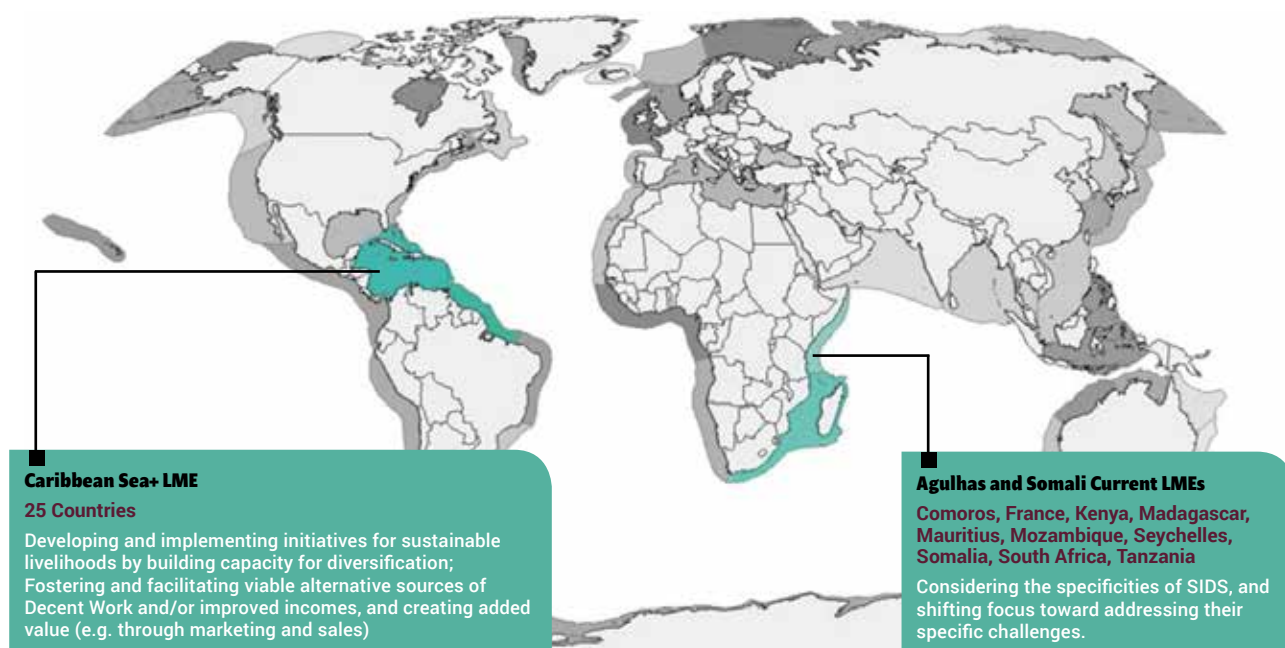
Fully involved all Pacific SIDS in the work of the WCPFC, along with environmental NGOs and industry stakeholders.

Strengthened Pacific Island countries' capacities to apply conservation and management measures at the 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.

Country Commitments to Action in SAPs



14.A

Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular SIDS and least developed countries.

► INTERVENTION

Recognizing the value of LMEs and other transboundary water systems, their continued degradation, the fragmented approach to their management, and the need for better prioritization of interventions, GEF embarked on the TWAP from 2009 to 2015.

TWAP objectives were to undertake global assessments of the five transboundary water systems to assist GEF and other international organizations set priorities for interventions; and develop formal institutional partnerships for periodic assessments of these systems. TWAP was implemented by UN Environment, with UNESCO-IOC leading the LME assessment component.

The TWAP LME assessment is the first indicator-based global, comparative, baseline assessment of the 66 LMEs.



INDICATOR 14.a.1

Proportion of total research budget allocated to research in the field of marine technology.

Progress Through the LME Approach

Transboundary Waters Assessment Programme (TWAP)

Global

► METHODOLOGY

The assessment is based on the five LME Approach modules (Socioeconomics, Governance, Productivity, Fish and Fisheries, and Pollution and Ecosystem Health); each with a set of indicators.

Based on the values of indicators with clear relationship to 'good' or 'bad' states, LMEs were grouped into five colour-coded categories of relative risk, from lowest to highest. Time trends and projections to 2030, 2050, and 2100 are presented for some indicators, to provide insight into effects of future climate change and increasing human population and activities.

► FINDINGS

Sources of pressure and degree of risk from fisheries vary among LMEs, pointing to the need for individually tailored solutions.

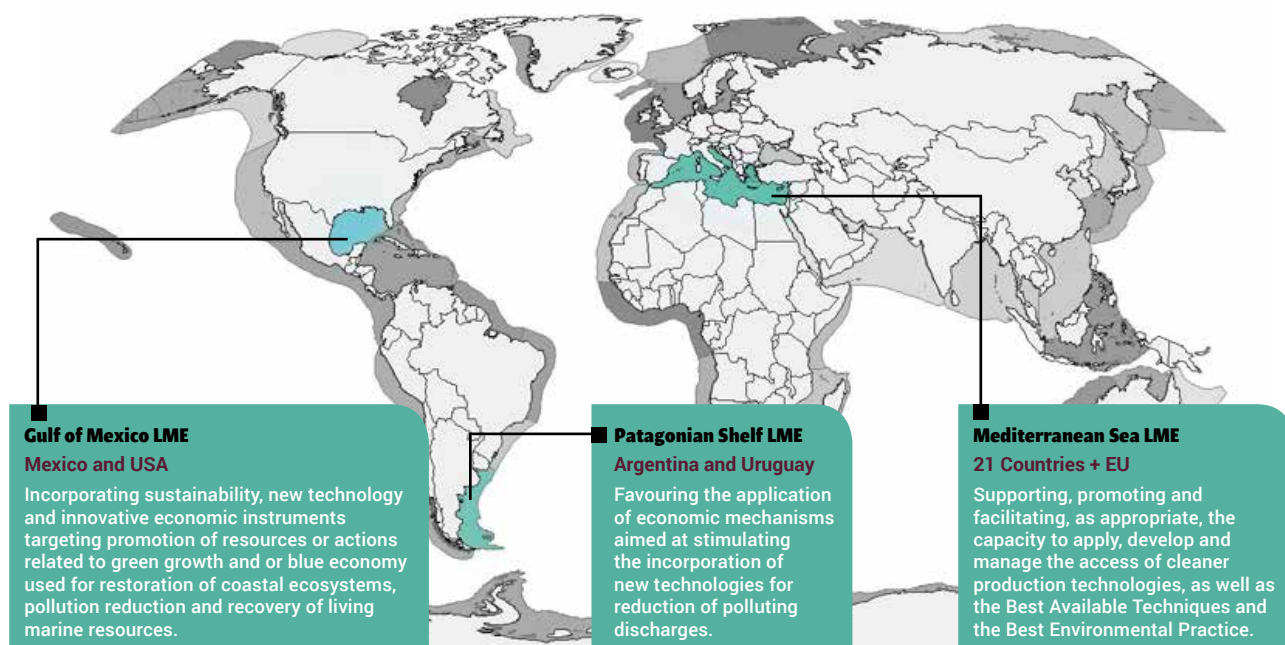
Many of the LMEs with high relative abundances of floating plastics are located in East-Southeast Asia.

Sixteen percent of LMEs are at high risk from nutrients from sewage and agriculture, which flow to the sea in rivers and can lead to harmful algal blooms.

Sea surface temperatures have increased in all but two LMEs since 1957.

Degradation and loss of habitat is of major concern in LMEs. Twenty percent of global mangrove area was lost from 1980 to 2005. Loss continues at about one percent per year.

Country Commitments to Action in SAPs



INDICATOR 14.b.1

Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries.

Progress Through the LME Approach

Supporting Environmentally, Economically and Socially Sustainable Use and Management of Coastal Fisheries

Global

► THREATS

Marine fisheries are estimated to employ more than 260 million people, including both fishers and post-harvest jobs. Some 85 percent are small-scale fishers and fish workers primarily operating in coastal waters in developing countries.

Small-scale fishers contribute about half of the roughly 80 million tonnes/year produced by marine capture fisheries.

Despite the importance of coastal artisanal fisheries globally, there are no mechanisms for worldwide coordination.

► INTERVENTION

In response to this need, a new project, the Coastal Fisheries Initiative (CFI), was developed to foster cooperation and promote more holistic processes and integrated approaches. It aims to support environmentally, economically and socially sustainable use and management of coastal fisheries, complementing the GEF multi-country LME Approach. (US\$34.1 million GEF grant; US\$211.6 million co-financing).

The initiative will focus on (1) strengthening the fisheries sector's policy, legal and regulatory frameworks to incorporate environmental, social and economic sustainability considerations; (2) improving the capacity and capability of fishing nations and regional management bodies, and empowering communities in sustainable management of fisheries and the components of the ecosystem these fisheries rely on; and (3) promoting public-private partnerships that enable responsible investment along the supply chain, fostering sustainable fisheries and sustainable development.

► PROGRESS

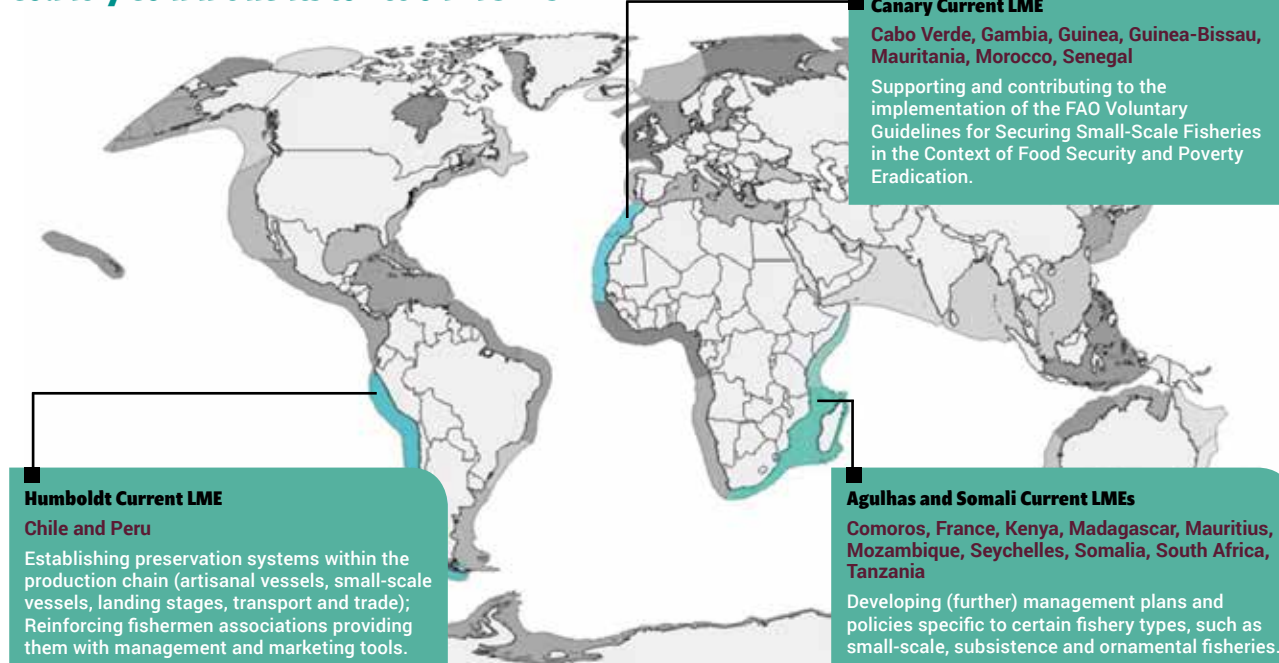
The CFI will focus on six countries in three regions, representing various dimensions of the challenges facing coastal fisheries of global importance: Indonesia; Latin America (Ecuador and Peru); and West Africa (Cabo Verde, Côte d'Ivoire and Senegal).

The CFI will support innovative market incentive systems to manage the level of fish catches; put in place decision-making processes involving people employed in fisheries and other relevant stakeholders; and provide governments with robust fisheries performance indicators for sustainable management decisions.

The project plans to address the need for strengthened access and user rights, co-management, and improved conflict resolution mechanisms for small and large-scale fisheries. The project will also support fishers and post-harvest operators to improve work conditions, and product quality and market access along the value chain through traceability and certification.



Country Commitments to Action in SAPs



14.C

Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources.

INDICATOR 14.c.1

Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nations Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources.

Progress Through the LME Approach

Integrating Watershed and Coastal Area Management in the Caribbean SIDS

Antigua and 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

► THREATS

High population densities, combined with population growth, urbanization and increased development, particularly residential and tourist resort development, has led to the contamination of underlying aquifers and surface water, and deterioration of coastal water quality.

Inadequately treated sewage waste contributes to health-related problems, both through contamination of drinking water supplies, and through the presence of pathogens in the watershed and coastal water environment as a whole. It also represents a hazard with respect to eutrophication, causing coastal algal blooms, and changes to biological community structure throughout the overall watershed-coastal zone continuum.

► INTERVENTION

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 UN Environment and UNDP from 2006 to 2011 (US\$13.78 million GEF grant; US\$98.27 million co-financing).

The project placed a high priority on helping participating countries meet commitments required to ratify the Cartagena Convention and its protocols; in particular, the LBS Protocol. 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 assists UN Member States to meet the goals and obligations of UNCLOS. UNCLOS calls upon States to adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources.

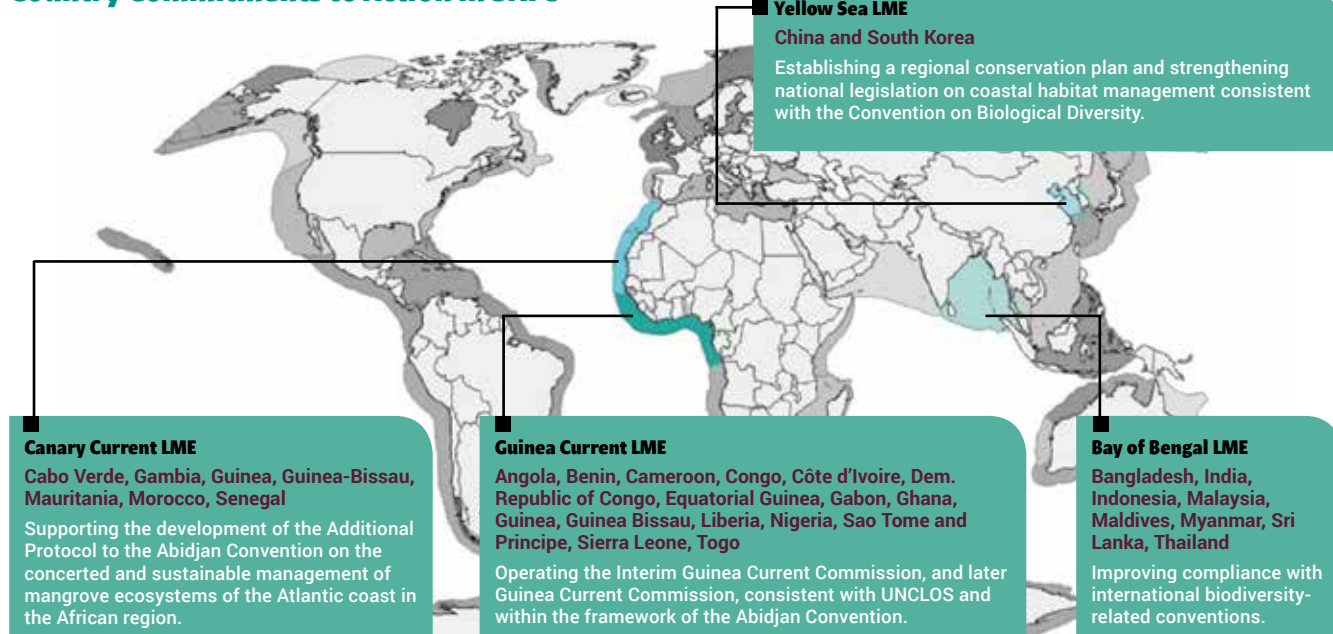
► PROGRESS

The project supported the creation of a toolkit 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.

Six of the SIDS that participated in the IWCAM project ratified the LBS Protocol: Antigua and Barbuda, the Bahamas, the Dominican Republic, Grenada, Saint Lucia, and Trinidad and Tobago. Signing onto the LBS Protocol committed these countries 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/UN Environment Caribbean Regional Fund for Wastewater Management (CRew) Project and the UN Environment/UNDP Integrating Water, Land, and Ecosystems Management in Caribbean Small Island Developing States (IWECS) project.

Country Commitments to Action in SAPs

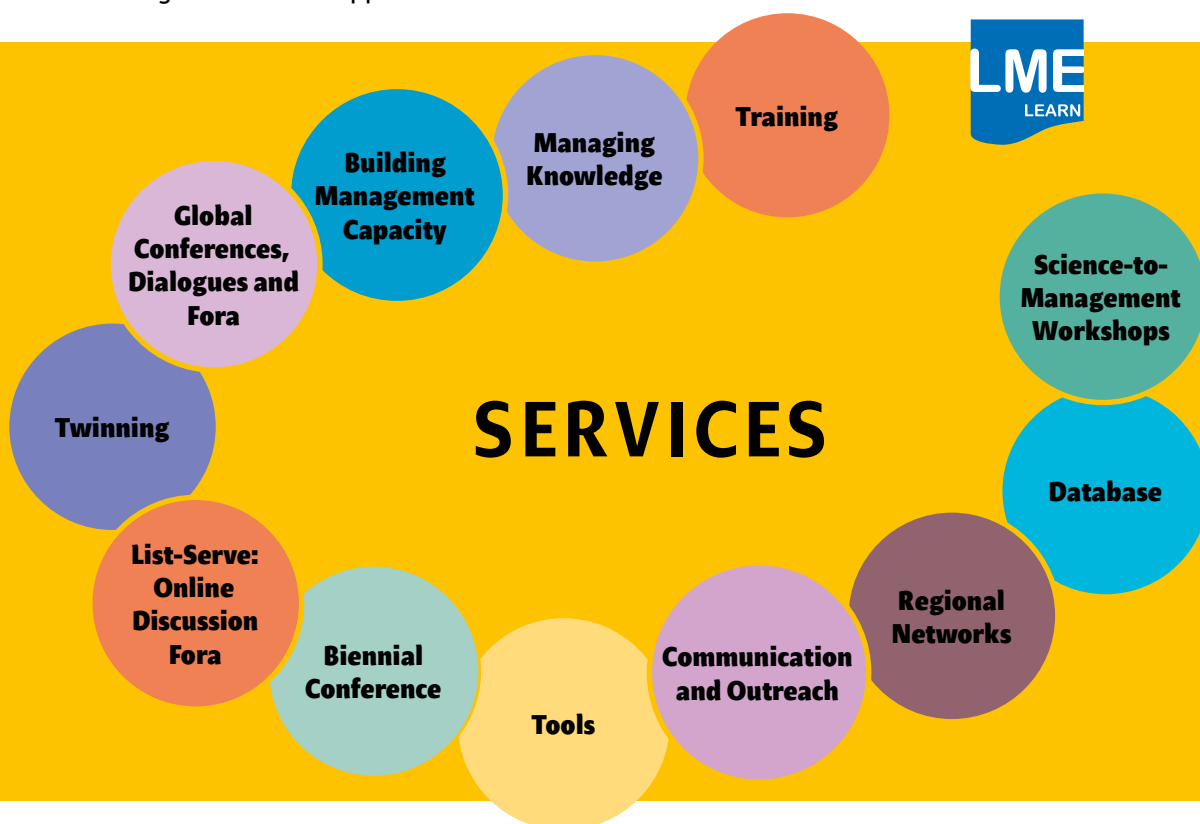


GEF LME:LEARN

The GEF LME:LEARN project provides a sustainable global home for LME activities in the early years of the SDG period. It is designed to improve global ecosystem-based governance of LMEs and their coasts by generating knowledge, building capacity, harnessing public and private partnerships, and supporting south-to-south learning and north-to-north learning.

Project Components

- 1 Global and regional network of partners to enhance ecosystem-based management and to provide support for the GEF LME/ICM/MPA projects to address their needs and incorporate climate variability and change considerations.
- 2 Synthesis and incorporation of knowledge into policymaking; capture of best LME governance practices; and development of new methods and tools to enhance the management effectiveness of LMEs and to incorporate ICM, MPAs and climate variability and change, including the five LME Approach modules.
- 3 Capacity and partnership building through twinning and learning exchanges, workshops, and training among LMEs and similar initiatives.
- 4 Communication, dissemination and outreach of GEF LME/ICM/MPA project achievements and lessons learned.



GEF LME:LEARN is a project funded by the Global Environment Facility, implemented by the United Nations Development Programme and managed by the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization.



The **Global Environment Facility (GEF)**, was established on the eve of the 1992 Rio Earth Summit as a catalyst for action on the environment. Through its strategic investments, the GEF works with partners to tackle the planet's biggest environmental issues. The funding it offers helps reduce poverty, strengthen governance and achieve greater equality between women and men. Through the International Waters (IW) focal area, the GEF helps countries jointly manage their transboundary surface water basins, groundwater basins, and coastal and marine systems.



The **United Nations Development Program (UNDP)** is helping countries to achieve the eradication of poverty, and the reduction of inequalities and exclusion, and to develop policies, leadership skills, partnering abilities, institutional capabilities and build resilience in order to sustain development results. It is working in cooperation with other UN agencies, the Global Environment Facility, international financial institutions, regional organizations, NGOs, the private sector and others to improve water and ocean management and sustain livelihoods at local, national, regional and global scales through effective water and ocean governance.



The **Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO)**, established in 1960 as a body with functional autonomy within UNESCO, promotes international cooperation and coordinates programmes in marine research, services, observation systems, hazard mitigation, and capacity development in order to understand and effectively manage the resources of the ocean and coastal areas. By applying this knowledge, the Commission aims to improve the governance, management, institutional capacity, and decision-making processes of its Member States with respect to marine resources and climate variability and to foster sustainable development of the marine environment, in particular in developing countries.



UN Environment is the leading global voice on the environment. It provides leadership and encourages partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations. UN Environment works with governments, the private sector, the civil society and with other UN entities and international organisations across the world. **GRID-Arendal** was established in 1989 to support environmentally sustainable development by working with UN Environment and other partners. Its aim is to communicate environmental knowledge that strengthens management capacity and motivates decision-makers to act. UN Environment is supporting LME:LEARN as partner in the IW:LEARN project.



The **National Oceanic and Atmospheric Administration (NOAA)** is an agency of the U.S. Department of Commerce that enriches life through science. Its mission is to understand and predict changes in climate, weather, oceans, and coasts, to share that knowledge and information with others, and to conserve and manage coastal and marine ecosystems and resources. NOAA developed the Large Marine Ecosystem (LME) concept over 30 years ago as a model to implement an ecosystem approach to assessing, managing, recovering, and sustaining living marine resources and their environments.



The **International Council for the Exploration of the Sea (ICES)** is a global organization that develops science and advice to support the sustainable use of the oceans. ICES is committed to building a foundation of science around integrated ecosystem understanding of marine ecosystems. Its goal is to provide the best available science for decision-makers to make informed choices on the sustainable use of the marine environment and ecosystems.



The **International Union for Conservation of Nature (IUCN)** is composed of both government and civil society organisations. It provides public, private and non-governmental organisations with the knowledge and tools that enable human progress, economic development and nature conservation to take place together. The IUCN Global Marine and Polar Programme (GMPP) is addressing key global challenges in the marine and polar environment. GMPP cooperates with other IUCN thematic and regional programmes and with the IUCN Commissions to ensure that marine and polar ecosystems are maintained and restored in their biodiversity and productivity, and that any use of the resources is sustainable and equitable.



Conservation International (CI) is a non-profit organization which celebrated its 30th birthday this year. Building upon a strong foundation of science, partnership and field demonstration, CI empowers societies to responsibly and sustainably care for nature, our global biodiversity, for the well-being of humanity. The Center for Oceans makes oceans healthy by connecting local action and global impact through sound strategies, strategic alliances, learning communities and proven tools, because people need oceans to thrive. CI has more than a decade of experience working with businesses, governments and communities to sustainably and equitably manage oceans, islands and coasts.

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Maps and Graphics

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