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Sustainable development of Latin American and the Caribbean Large Marine Ecosystems



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ABSTRACT

This thematic issue on Latin American and Caribbean (LAC) Large Marine Ecosystems (LMEs) focuses attention on a major geographic area of the world, where the goods and services of 10 LMEs are serving the needs of a population of over 500 million people inhabiting the region. The stressors affecting the sustainable development of the LAC-LMEs are negatively impacting the economies of the bordering countries from overfishing, pollution, nutrient overenrichment, habitat degradation, biodiversity loss and climate change. The papers presented in this issue represent a cross-section of assessment studies underway by marine scientists, policy makers and resource managers in the region in a movement to introduce ecosystem based management (EBM) practices for stressed LMEs. This movement is supported in part by an independent international financial entity, the Global Environment Facility (GEF), which exists to help meet the objectives of the international environmental conventions and agreements. The movement has been organized to advance a United Nations effort to assist economically developing nations in the LAC region and in other regions around the globe towards sustainable development of the oceans.

1. The Large Marine Ecosystems approach to ecosystems based management and sustainable development of the oceans

Large Marine Ecosystems (LMEs) are relatively large areas of coastal ocean space of 200,000 km² or greater delineated on ecological criteria – bathymetry, hydrography, productivity and trophic linkages (Sherman and Alexander, 1986). Their ecologically defined boundaries generally transcend national political boundaries and encompass coastal ocean areas of two or more countries thereby fostering international cooperation among countries working towards implementation of ecosystem based management (EBM) of coastal ocean goods and services (Fig. 1). The LMEs' coastal ocean domains annually produce 80% of the world's marine fisheries catch (Pauly and Lamm, 2016) and contribute, in multisectoral goods and services, an estimated \$12.6 trillion annually to the global economy (Costanza et al., 1997). They serve as global centers for socioeconomic development of the oceans including marine sectors sustaining fisheries, tourism, shipping, mining and energy production. The socioeconomic benefits of LMEs across the globe and in Latin American and Caribbean (LAC) countries, can be further developed and sustained under governance frameworks that advance ecosystem based management practices (Sherman, 2014).

The LME approach to the assessment and management of coastal ocean marine resources is multidisciplinary and multisectoral, framed around the need to link natural sciences with social sciences as part of a global movement towards sustaining the world's LMEs (Sherman et al., 2005) and the United Nations' Millennium Goal 14 for sustainable development of the oceans (www.un.org/sustainabledevelopment/oceans/). The global EBM movement was energized by the commitment to sustaining the ocean's health and resilience made by world leaders during three global environment summits convened at 10-year intervals beginning with the 1992 United Nations Conference on the Environment and Development (UNCED, 1992), followed by the World Summit on Sustainable Development convened in 2002 (WSSD, 2002), and 10 years later in 2012 by the UNCED Rio +20 Summit (UNCED, 2012). The important statements from these summits for supporting sustainable development of the oceans are listed in Table 1. Most pertinent to this LAC issue on LMEs is the commitment made by world leaders at Rio +20 in 2012 to ...”protect and restore the health,

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Large Marine Ecosystems of the World and Linked Watersheds



Fig. 1. The 66 large marine ecosystems of the world (www.lme.noaa.gov/).

productivity and resilience of oceans and marine ecosystems and to maintain their biodiversity, enabling their conservation and sustainable use for present and future generations” (Table 1).

The concerns expressed by world leaders at the initial UNCED Summit in 1992 led to the establishment of a financial mechanism designated as the Global Environment Facility (GEF) located within the World Bank in Washington, DC, to provide financial support to economically developing countries seeking assistance for mitigating environmental degradation in several focal areas including international transboundary waters. In 1995, the GEF included LMEs in their operational guidelines as spatial domains for advancing the concept of ecosystem based assessment and management practices to recover and sustain coastal ocean goods and services (GEF, 1995).

Table 1

Agreed-upon goals for sustainable development of the oceans from three global environmental summits, 1992–2012.

United Nations Conference on Environment & Development, Rio de Janeiro, Brazil, 3–14 June 1992, AGENDA 21, Chapter 17, Protection of the oceans, seas, coastal areas and the protection, rational use and development of their living resources: Coastal States commit themselves to:

- 17.22 Prevent, reduce and control degradation of the marine environment so as to maintain and improve its life- support and productive capacities
- 17.46 Develop and increase the potential of marine living resources to meet human nutritional needs, as well as social, economic and development goals
- 17.5 Integrated management and sustainable development of coastal areas and the marine environment under their national jurisdiction

World Summit on Sustainable Development, Johannesburg, 26 August to 4 September 2002. Nations commit to:

- 30d Encourage the application by 2010 of the ecosystem approach, noting the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem and decision V/6 of the Conference of Parties to the Convention on Biological Diversity
- 33d Make every effort to achieve substantial progress by the next Global Programme of Action Conference in 2006 to protect the marine environment from land-based activities
- 32c Develop and facilitate the use of diverse approaches and tools, including the ecosystem approach, the elimination of destructive fishing practices, the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012
- 31a Maintain or restore [fisheries] stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015

United Nations Conference on Sustainable Development, Rio de Janeiro, 20–22 June 2012.

Paragraph 158 We therefore commit to protect and restore, the health, productivity and resilience of oceans and marine ecosystems, and to maintain their biodiversity, enabling their conservation and sustainable use for present and future generations
Effectively apply an ecosystem approach and the precautionary approach in the management, in accordance with international law, of activities having an impact on the marine environment.

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