Environmental Development 7 (2013) 72–79

Contents lists available at SciVerse ScienceDirect

Environmental Development

journal homepage: www.elsevier.com/locate/envdev

Towards a coastal condition assessment and monitoring of the Gulf of Mexico Large Marine Ecosystem (GoM LME): Terminos Lagoon pilot site

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ARTICLE INFO

Article history:
Received 1 February 2013
Accepted 18 April 2013

Keywords:
Monitoring
Terminos Lagoon
Coastal condition
Ecosystem health
Transboundry environmental problems
Gulf of Mexico Large Marine Ecosystem

ABSTRACT

The demonstration project on monitoring and environmental evaluation of the Gulf of Mexico Large Marine Ecosystem (GoM LME) aims to provide the basis for the joint monitoring of the Gulf of Mexico between the USA and Mexico. The project is roughly based on the National Coastal Condition (NCC) reported by the USEPA–NOAA–USGS and changes to the approach used in the USA have been adopted. It consists of five modules: Habitat degradation, water quality, sediment quality, fish, and benthic fauna. For each module different parameters are measured, and categorized as being in "good" (score of 5), "fair" (score of 3) or "poor" (score of 1) condition according to pre-determined criteria. The Coastal Condition Index is calculated as the mean of the scores for all modules. Results were presented to stakeholders and environmental managers as maps with color-coded "street lights" indicating the status of each sampling station and parameter. Terminos Lagoon in Mexico

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2211-4645/$ - see front matter
http://dx.doi.org/10.1016/j.envdev.2013.04.007

was exclusively used as a site for the demonstration study. We discuss the importance of adopting a bilateral (Mexico-US) transboundary monitoring strategy to assess the coastal condition of the GoM LME.

1. Introduction

1.1. Gulf of Mexico Large Marine Ecosystem (GoM LME)

The Gulf of Mexico is a deep marginal sea located at the southeastern corner of North America. It is the ninth largest body of water in the world with a surface area of 1.51×10^6 km^2 and a volume of 2.43×10^6 km^3, representing 0.4% and 0.2% of the surface area and volume of the world's oceans, respectively.

The Gulf is connected to the Caribbean Sea through the Yucatan channel and to the North Atlantic Ocean though the Straits of Florida. The basin is surrounded by three continental shelves: Florida, to the East; Texas-Louisiana, to the Northwest; and Campeche and Yucatan, to the South (Fig. 1).

The GoM LME is an important center of marine and estuarine biodiversity, with the presence of cosmopolitan and endemic species. The ecosystem is considered as reserve of high micro- and macro-biologic diversity with mangroves, coral reefs and marine grasses, possess high species richness, marine food production as well as oil and gas production.

1.2. Transboundary environmental problems

The Gulf of Mexico faces serious environmental problems. According to the Gulf of Mexico LME Transboundary Diagnostic Analysis (TDA), coastal degradation was identified as one of the main problems (Gulf of Mexico TDA, 2011) in the Gulf of Mexico.

Coastal degradation is caused by natural variations which are part of the ecosystems, but could be magnified by human activities. Thus an efficient integrated monitoring and assessment program in the adjacent countries could be helpful in the development of mitigation strategies and fiscal and environmental accountability. Monitoring is an essential part of adaptive management; it allows for

Fig. 1. Gulf of Mexico, and demonstration project pilot site (Terminos Lagoon) (INEGI, 2008).