



Mexico's ocean policy development and challenges

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Mexico is among the top ten megadiverse countries with around 10 per cent of the world's biological diversity

This document reviews current ocean policy development and challenges for long term sustainability of natural resources in maritime and coastal areas of Mexico. It also deals with scientific research institutional structure and its relationship with decision making processes in Mexico. It presents the ongoing ocean policy activities in Mexico and scientific research as a major action to support decision making processes.

Mexico has a great diversity of coastal and marine ecosystems, and numerous education and scientific structures with dissimilar development levels. There are also formal education and research institutions engaged at different levels in the chain of command and relationship with authorities that relates to the economic interests, and the wide variety of views and sectoral policies.

Background and overview of ocean policy context

Mexico's marine area is larger than its terrestrial area and comprises approximately 11,600 km of coastline, a continental shelf of 393,253 km², 1,567 thousand hectares of estuaries and an insular surface of 5,083 km². The territorial sea embraces nearly 291,585 km² and the exclusive economic zone extends to 2,997,679 km² (Contreras and Castañeda, 2004; Arriaga et al. 1998; De la Lanza, 2004; Earth trends, 2003; Burke, 2001). There are 17 coastal states divided into four regions as follows: Gulf of Mexico and Caribbean Sea on the Atlantic Ocean; the California Current Region; the Gulf of California; and the America's Central Pacific Coastal Zone (Sherman and Alexander, 1989).

The total population within a coastal strip of 100 km is estimated at 14,572,188 which is 14.9 per cent of the total national population. The coastal zone has the highest population growth rate at 2.8 per cent, and the migration trend to the coast is increasing annually. It is estimated that the coastal zone has 35,626 coastal settlements, 0.1 per cent of which host more than 50,000 inhabitants (Díaz de León and Alvarez, 2004).

Mexico is surrounded by four seas. The convergence of warm and cold ocean currents and rich nutrient blooms result in high biodiversity and endemism (Salazar Vallejo and González, 1993). The oceans within Mexican jurisdiction reach 4,000 m depth in the Sigsbee Trench in the Gulf of Mexico and more than 2,000m in the Guaymas Basin in the Pacific Ocean. Numerous volcanoes and hydrothermal vents embrace large colonies of benthic abyssal organisms with high rates of productivity in the Gulf of California.

Within the Mexican coastal region, there are outstanding ecosystems such as coastal lagoons, mangroves, wetlands, coral reefs, dunes and bays among others, with highly productive systems that support offshore trophic chains (INE, 1995).

Coastal ecosystems hold numerous endemic species. Of the 29 animal phyla recognised for the marine environment worldwide, 14 are endemic to Mexico. Mexico is among the top ten megadiverse countries with around 10 per cent of the world's biological diversity (Rodríguez et al. 2003). Mexico occupies: second place for reptile, mammal and ecosystem diversity; third place for endemism; fourth place for amphibians, vascular plants and total biodiversity; and 12th for bird diversity. Of the total of the world's endemic species, Mexico has 62 per cent of the amphibians, 56 per cent of the reptiles and 32 per cent of the mammals (Mittermeier, Robles Gil and Goettsch Mittermeier, 1997).

Identification of major coastal and oceanic economic activities

Mexico's coastal zone is crosscut by several economic activities: 1. Fisheries, aquaculture, and mariculture. 2. Tourism. 3. Industrial activities. 4. Energy production-related activities and 5. Ports and transportation.

Economic activities in oceans and coastal areas

There are numerous overlapping issues when economic activities and impacts take place in priority



coastal and marine regions. Economic activities compete for available natural resources and space inducing a permanent tension among uses, users and between environmental conservation and economic development objectives.

Major issues of concern in the ocean and coastal areas

Economic activities in several areas of the coastal zone include: a) Decreased fisheries catch; b) High levels of water pollution; c) Habitat deterioration and loss; d) Visual quality impact; e) Urban growth; and f) Loss of public recreation areas. Each one of these factors can be used as an indicator for identifying unsustainable natural resources use. The overlapping of economic activities and conservation areas, and the resultant consequences, highlights the need for a coordinated approach to management of the ocean and coastal zones in order to guarantee sustainable development of both realms.

Development of the national environmental policy for the sustainable development of oceans and coasts

In 2001, the Ministry of the Environment and Natural Resources (SEMARNAT) established the Sea and Coast Monitoring Group, and at the same time made it its task to devise a strategy for integrating the environmental management of the marine and coastal zones of the country. The progress made by the Group allowed it to identify the main agencies involved and the main line of action to be taken in dealing with the matter. It proved necessary, however, to make more of an institutional effort to develop and put into effect a national sea and coast policy.

In 2004, the Organisation for Economic Cooperation and Development (OECD), evaluating the environmental development of its member countries, observed that Mexico did not have a commission or administrative agency that ensured proper coordination of the marine activities of the departments responsible for the economic sectors. It also recommended that the government should make a serious effort in that regard, given the importance of integrated management of the coastal areas for the Mexican economy.

At the same time, the National Advisory Council for Sustainable Development, representing civil society, asked SEMARNAT to set up a policy framework for the coastal zone.

These actions and recommendations culminated in the formulation of the national environmental policy

for the sustainable development of oceans and coasts (NEPSDOC), which established a strategic framework for their conservation and sustainable use.

The national environmental policy sets environmental guidelines aimed at aligning and coordinating the government's public and sectoral policies, and proposes a management model that is holistic, flexible, multidisciplinary and participatory.

Integrating and coordinating ocean and coastal policy

On 8th June 2006, Mexico published an integrated policy for the environmental sector in regard to oceans and coasts entitled National Environmental Policy for the Sustainable Development of Oceans and Coasts: Strategies for its Conservation and Sustainable Use (NEPSDOC) (SEMARNAT, 2006).

The main reason for NEPSDOC was that each federal agency worked in isolation, giving consideration only to their duties and faculties under the Organic Law of Federal Public Administration, current sector plans and the National Constitution. This resulted in a lack of coordination with other agencies except for specific problems or cases that required such coordination.

Each economic and social sector promotes its own projects and activities. For example, the Ministry of Tourism (Secretaría de Turismo – SECTUR) promotes the development and implementation of tourism projects; the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación – SAGARPA) supports fishing and agricultural activities in coastal areas; and the Ministry of Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales – SEMARNAT) implements models for preservation and conservation of natural resources focusing on sustainable development actions.

In addition to the lack of coordination between federal agencies, there is poor communication among actors from the federal and local levels. This is mostly a result of differences of vision about the coastal region and the country as a whole. This lack of coordination increases when the different sectors can not reach a consensus on productive activities and conservation strategies, thereby risking the sustainability of efforts made in each region. Thus there is a need to establish a coordinated and integrated strategy to synchronise local and federal objectives concerning productive activities while considering sustainability criteria in

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Mayan ruins at Tulum on Mexico's Caribbean coast

order to ensure the adequate use of available natural resources and to preserve ocean and coastal ecosystems. Stakeholders have their own vision for the sustainable management of ocean and coastal zones as well as a direct competence for natural resources.

The main objectives of the National Environmental Policy for the Sustainable Development of Oceans and Coasts and its strategies are the following:

- Develop a strategy for the integrated management of oceans and coasts.
- Strengthen coordinated actions between and within coastal and marine-related institutions.
- Promote social and economic welfare through environmental and biodiversity conservation and the sustainable use of coastal and marine natural resources.
- Strengthen the legal, normative and administrative framework for management of oceans and coasts.
- Develop an information system specific for oceans and coastal issues.

In order to achieve these objectives, NEPSDOC embraces and promotes the following principles:

- Ecosystem-based management. An integrated oceans and coastal management strategy needs to

focus on the analysis of the ecosystem as a unit. This is the main principle of the environmental policy promoted by SEMARNAT.

- Multiple uses. Multiple economic activities should be developed and encouraged in the ocean and coastal zones.
- Sustainability. All activities in the oceans and coastal zones must be undertaken in a sustainable manner in order to maintain such activities and to ensure that future generations have use of marine natural resources.
- Participatory governance. Social participation is a basic element for a successful implementation of the ocean and coastal management strategy.
- Precautionary approach. Even if some zones require intensive restoration, it is important to impose the precautionary principle in order to promote the conservation of the well-preserved zones and to deter further environmental damage.
- Integrated approach. Successful implementation of the policy will require the participation of all relevant actors.
- Protection of biodiversity. This principle complements the ecosystem-based perspective.
- Adaptive management. This principle will be implemented to ensure consideration of both the local and temporal perspectives.

NEPSDOC is divided into five main subjects that assemble the most relevant topics for the Ministry. For the purpose of facilitating the organisation and integration of the information, every section has the following order: The five relevant subjects are:

1. Legal framework and economic instruments. This subject is divided into two main topics: (a) the legal framework examination; and (b) an exhaustive review of the economic instruments implemented to achieve environmental policies.
2. Ecosystems and biodiversity. This subject includes the information about species (both endangered and protected), ecosystems diversity, and relevant conservation areas, as well as natural protected areas and priority marine regions.
3. Economic activities and their environmental impact. This section is divided into the most important activities undertaken in the coastal and marine zones in terms of their production as well as environmental impact.
4. Enforcement mechanisms and stakeholder participation. This subject contains the main elements to strengthen the enforcement system and deals with all aspects where civil participation is essential.
5. Research agenda, education and public outreach. This





section was created with the aim of setting an agenda for further research in accordance with identified needs in the other subjects. A second objective of this section is to gather and integrate available information within the Ministry and other agencies about ocean and coastal issues.

Science-based and informed decision-making process (information systems, scientific research, and education)

Mexico's ocean policy is focused on efforts made to promote the development of an inclusive, accessible information system for guiding, communicating and coordinating scientific and technological research. Its aim is to foster the generation and exchange of knowledge, in order to support decision-making, environmental management and spatial planning, implement sustainable production systems and support the evaluation and monitoring of the environmental situation of oceans and coasts.

Enhanced training of human resources and enhanced institutional development and consolidation will be the key elements in the generation of national and regional scientific research, as will development of decision-making capacities.

Greater institutional efforts have been made to promote environmental education and public awareness between the production sectors and society in general, to raise awareness and encourage informed participation in environmental management and to generate behaviour conducive to sustainability of the coastal zone.

Difficulties and recommendations for science-based informed decision making

Given the scope of ocean issues and multi-sectoral participation, it is highly recommended that decision making should be based in science and technological development. That will certainly help to solve problems during the design and implementation of any decision-making processes. Some of the main aspects related to information systems, scientific research and education to enhance decision-making process are the following:

- Implementation of a national programme of scientific research for coasts and oceans.
- Creation of a national system for environmental information on coasts and oceans.
- Promotion of scientific knowledge of coastal and marine environments, focused on the ecosystem.

- Promotion of scientific research and technological development as an instrument of environment policy.
- Promotion of human resource development.
- Fostering of integration of institutional networks at both national and regional level.
- Elaboration of a programme for monitoring environmental quality, quality of life and economic development in coastal regions.
- Promotion of awareness and a deeper understanding of environmental matters among coastal inhabitants.

National strategy for the land use planning in oceans and coasts

As part of the current government's priority actions proposed by President of Mexico Felipe Calderón, the need for carrying out a territorial land and sea use planning in oceans and coasts was proposed in the subject of Competitive and Employment-oriented Economy. The objective of this action is to ensure that the country's oceans and coasts rely on planning programmes that determine potential and suitable zones for the development of industrial, tourism, agricultural, aquacultural, fishing and other productive activities.

Part of the current government's priority actions proposed the need for territorial land and sea use planning

Whale watching at Cabo San Lucas on Mexico's Pacific coast





This variety of perceptions, interests, attributes and competencies ends up providing a fragmented approach to the coastal and marine territory

In order to achieve this proposal and make it consistent with Environmental Policy instruments and coordinate it with other Municipal and State instruments as well as with Sector Programmes of the Federal Public Administration, SEMARNAT proposed broadening its scope and prepared an integrated project called “National Strategy for the Land Use Planning in Oceans and Coasts”.

In accordance with the NEPSDOC, this Strategy includes an action component involving instruments at the federal, state, and municipal level, as well as an action component by zones, as follows:

- Gulf of California
- Gulf of Mexico and the Caribbean Sea
- North Pacific
- South Pacific
- States and municipalities with high tourism, industrial, agricultural, aquacultural, and fishing potential or development.

The Ministry of Environment and Natural Resources (SEMARNAT) has promoted the linkage between the three government levels in the local land use planning processes of coastal municipalities, as it is up to this finer resolution scale of regulatory enforcement where the Federal Government can directly participate in the establishment of grounds for the sustainability of the coastal zone. In this context, the work of municipalities with a high economic growth potential has been a priority.

The Land and Sea Use Planning (LSUP) is a vital instrument to advance sustainable development, as it fosters structural changes that may have an effect on economic and social behaviour and in the maintenance of goods and services obtained from those natural assets.

The LSUP is a legal instrument stemming from the General Law for Ecological Equilibrium and Environmental Protection (GLEEEP). This law establishes four categories of land and sea use planning programmes: General Territory, Marine, Regional, and Local. Both, the General Use Planning of the Territory (GUPT), and the Sea Use Planning are of Federal competence exclusively. Regional Use Planning may be given in two variations: 1. The ones that comprise part of or the whole federal entity's territory, which are of state competence and are prepared as outlined by the corresponding local laws; and 2. The ones that include ecological zones of two or more federal entities which are formulated jointly among the

three government levels. Local Land Use Planning Programmes are issued by the municipal authorities according to local laws pertaining to the environment. Local land use planning that comprise part of or the whole municipality's territory within a Natural Protected Area must be prepared jointly between the three government levels. Additionally, and through the submission of Coordination Agreements, the three government levels may participate in the Regional, Local, and Sea Use Planning.

Generally speaking, the planning process in the past towards development of coastal areas in Mexico has not considered the suitability of the territory, the carrying capacity and restoration ability of ecosystems, or the socio-environmental conflicts among sectors. This scheme is repeated in the planning conducted by the different government levels whose programmes show striking incompatibilities among them, resulting in conflicts regarding land use.

In addition, the different attributions and competencies at each decision level result in the problematic fact that one single activity may be regulated by different laws, regulations, and norms, which are enforced by various authorities who generally lack standardised enforcement criteria.

This variety of perceptions, interests, attributions and competencies ends up providing a fragmented approach to the coastal and marine territory, which hardly contributes towards constructing a shared vision of sustainable development of oceans and coasts in Mexico.

Facing this reality, the National Strategy for the Land and Sea Use Planning of the Territory in Oceans and Coasts offers a broad potential in fostering sustainable development since during its preparation, not only do Land and Sea Use Planning Programmes consider the inclusion of strictly natural resources or environmental aspects, but they also incorporate the characteristics of productive sectors, the territory's suitability, and the attributions and competencies of government levels to help build synergies amongst government and society.

Land and Sea Use Planning Programmes do not render new attributions or differentiate between the distribution of competencies and the one established in the diverse legal regulations, but simply align them as a shared and informed vision on the way sectors may use them. Additionally this provides certainty to investments through establishing the rules of the game



and the guidelines and regulations to which activities developed within the territory shall be subject to.

Inter-ministerial Commission for the Sustainable Management of Oceans and Coasts of Mexico (CIMARES) towards the development of a common vision for oceans and coasts of Mexico

Mexican President Felipe Calderón, instructed the creation of the Inter-ministerial Commission for the Sustainable Development of Oceans and Coasts (CIMARES) to aid the multi-sectoral development and concrete actions in oceans and coastal areas under the paradigm of environmental sustainability and based on a robust science-based decision making (Alvarez, 2008).

This approach represents a positive change with a new paradigm to follow, leaving behind old fashioned perspectives that gained only in the short term, and moving towards an integrated ecosystem approach, science based, common multi-sectoral scope for oceans and coastal areas of Mexico, recognising the connectivity of social and economic systems as part of the ecosystem approach required for the long-term sustainable management of oceans.

CIMARES provides a new governance framework that engages with a wider stakeholder community and is co-responsible for conducting this new effort to develop a new administration scope for oceans and coastal areas linked to the different government structures to generate integrated and coordinated management actions.

CIMARES is the reference point and the catalyst component to align federal government policies towards coastal and ocean areas. Each Secretariat of the State is proposing their priority actions under a common crosscutting vision to help the decision-making process in ocean affairs, thus enhancing sectoral socio-economic development and environmental sustainability.

CIMARES is guiding the design, development of decision making and actions among government levels, based on a long-term planning process that will support the public at large, coastal communities and economic constituencies in coastal areas.

In regard to science-based processes and information provided to CIMARES to discuss and promote science there are at least three main functions, among others that CIMARES is responsible for:

1. Updating the national legal framework relating to territorial planning, zoning, integrated sustainable

management of oceans and coasts.

2. Enhance the development of research projects of national interest on issues that would support CIMARES' main goals.

3. Promote the compilation and organisation of data bases of national and international relevant information needed for CIMARES' functionality and all interested parties according to legal applicable instruments. ■

References:

- Alvarez-Torres, Porfirio. 2008. *La Comisión Intersecretarial para el Manejo Sustentable de Mares y Costas (CIMARES): Impulso a la competitividad económica con sustentabilidad ambiental*. Director de Integración Regional, Dirección General de Política Ambiental Integración Regional y Sectorial, SEMARNAT, Mexico. (documento interno).
- Arriaga Cabrera, L., E. Vázquez Domínguez, J. González Cano, R. Jiménez Rosenberg, E. Muñoz López, and V. Aguilar Sierra (eds). 1998. *Regiones Prioritarias Marinas de México*. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad, México.
- Burke, L., Y. Kura, K. Kassem, C. Revenga, M. Spalding, and D. McAllister. 2001. "Coastal zone: extent and change" in *Pilot Analysis of Global Ecosystems: Coastal Ecosystems*, 11-24. Washington, DC: World Resources Institute. http://pdf.wri.org/page_coast_005_extent.pdf (accessed 27 November 2006).
- Contreras E., F. and O. Castañeda L. 2004. "La biodiversidad de las Lagunas Costeras," *Ciencias* 76 (October-December): 46-56.
- De la Lanza E., G. 2004. "Gran escenario de la zona costera y oceánica de México," *Ciencias* 76 (October-December): 4-13.
- Díaz-de-León-Corral, A. and P. Álvarez. 2004. "Océanos, costas y gestión de recursos marinos," In: *Los retos del medio ambiente*. Facultad de Economía UNAM. *Economía Informa* 328: 36-45.
- Earthtrends, 2003. *Coastal and Marine Ecosystems-Mexico*. <http://earthtrends.wri.org> (accessed 27 November 2006).
- Instituto Nacional de Ecología (INE). 1995. *Áreas Naturales Protegidas: Economía e Instituciones*. México.
- Mittermeier, R.A., P. Robles Gil and C. Goettsch Mittermeier. 1997. *Megadiversidad. Los países biológicamente más ricos del mundo*. Cemex, S.A. de C.V. México. pp. 503.
- Rodríguez P., J. Soberón and H.T. Arita. 2003. "El componente beta de la diversidad de mamíferos de México," *Acta Zoológica Mexicana (n.s.)* (89): 241-259.
- Salazar Vallejo, S.I. and N.E. González. 1993. *Panorama y fundamentos para un programa nacional*. In *Biodiversidad marina y costera de México*, eds., S.I. Salazar Vallejo and N.E. González, 6-38. CONABIO - CIQRO, México.
- Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT). 2006a. *Política Ambiental Nacional para el Desarrollo Sustentable de Océanos y Costas: Estrategias para su Conservación y Uso Sustentable*. Subsecretaría de Planeación y Política Ambiental, Dirección General de Política Ambiental, Integración Regional y Sectorial and Dirección de Integración Regional, Mexico, D.F. <http://www.semarnat.gob.mx> (accessed 27 November 2006).
- Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT). 2006b. *Programa de Ordenamiento Ecológico Marino del Golfo de California*. Subsecretaría de Planeación y Política Ambiental, Dirección General de Política Ambiental, Integración Regional y Sectorial, Mexico, D.F. <http://www.semarnat.gob.mx> (accessed 27 July 2007).
- Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT). 2006c. *Ordenamiento Ecológico Marino y Regional del Golfo de México y Mar Caribe*. Subsecretaría de Planeación y Política Ambiental, Dirección General de Política Ambiental, Integración Regional y Sectorial, Mexico, D.F. <http://www.semarnat.gob.mx> (accessed 27 July 2007).
- Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT). 2006d. *Programa de Acción Regional para el Control de las Fuentes Terrestres de Contaminación Marina en la Península de Yucatán (PAR-Yucatán)*. Subsecretaría de Planeación y Política Ambiental, Dirección General de Política Ambiental, Integración Regional y Sectorial and Dirección de Integración Regional, Mexico, D.F. <http://www.semarnat.gob.mx> (accessed 27 July 2007).
- Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT). 2007. *Estrategia Nacional para el Ordenamiento Ecológico del Territorio en Mares y Costas*. Subsecretaría de Planeación y Política Ambiental, Dirección General de Política Ambiental, Integración Regional y Sectorial, Mexico, D.F. <http://www.semarnat.gob.mx> (accessed 27 July 2007).
- Sherman, K. and L.M. Alexander (eds.). 1989. *Biomass, Yields and Geography of Large Marine Ecosystems*. Boulder, CO: Westview Press.

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