

DECENTRALIZING COASTAL MANAGEMENT

Just in Time: Conservation and Development Strategy for Santa María Bay, Mexico



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The resource users of Santa María Bay in Sinaloa, Mexico, have embarked upon a path-breaking initiative to prepare a conservation and development plan which will weave together the sectoral policies and highly fragmented administration of bay uses into a coherent vision and integrative structure for bay decisionmaking. This project was not the brainchild of state or federal environmental officials, but of leaders from the coastal municipality of Angostura who, in 1998, requested help from the Autonomous University of Sinaloa (UAS). The UAS appealed in turn to Conservation International's (CIMEX) regional office based in Guaymas, Sonora. This request for help coincided with CIMEX's interest in carrying out practical projects to put Mexico's recent environmental laws into action. In 1978 all of the nearly 900 islands in the gulf were declared patrimony of the Mexican federation and included in the Gulf Islands Flora and Fauna Refuge. Santa María Bay, along with eight other areas in the gulf, has been identified as among the 32 wetland areas in the nation of highest conservation priority.

Santa María Bay is located on the southeastern coast of the Gulf of California. It is connected to the gulf by northern and southern entrances and has a surface area of almost 50,000 hectares. The bay has over 90 islands which are protected through the Gulf of California Island Park system. The three largest include Altamura (a 43-km long barrier island), the interior islands of Talchichitte, and Saliaca. The planning area for the management program for the conservation and development of Santa María Bay includes the political boundaries of the municipalities of Navolato and Angostura, which in turn are located within the coastal watersheds of the Mocorito and Culiacan rivers. Agriculture is the main economic activity and covers most of the valley's coastal plain. Two low mountain ranges (the Sierra de Allende and Sierra El Tecomate) have peaks of 350 to 400 meters and remain covered with native vegetation and trees. Shrimp fishing is the main source of income for the five communities located along the bay's shores. These are Dautillos, Yameto, La Reforma, Costa Azul, and Playa Colorada.

There are almost 7,000 hectares of shrimp farms in the tidal flats adjacent to the mangrove forest which borders much of the shore and islands. South of the fishing center of La Reforma, the tidal flats of Malacatay support duck hunting promoted by a private club and reserve called

Patolandia. At the southernmost part of the bay, a group of farmers from Montelargo are producing salt by evaporating seawater within the tidal flats.

During the late 1980s and early 1990s, Mexico made substantial progress in creating the legal and administrative basis for protecting its marine and coastal resources. This included adopting the General Law of Ecological Balance and Environmental Protection (1988, revised in 1996) and unifying federal agencies involved in natural resource conservation and economic development — Secretary for Environment and Natural Resources (SEMARNAT).

During the remainder of the 1990s, SEMARNAT and several conservation groups have focused on putting these general policies and initiatives into action, working both at the regional level and in site-specific conservation programs. At the regional (gulf-wide) level, the government has initiated the preparation of one of the county's first Marine Environmental Plans. This massive undertaking has advanced to the information gathering and characterization stage and was expected to take more than a decade to complete. However, efforts have been placed on a much faster track following the announcement of the Nautical Route tourism project in early 2001, which is a plan to build or upgrade 24 recreational marinas around the Gulf of California and Baja peninsula to jumpstart tourism development in the region.

Santa María Bay is typical of much of the gulf shore, where no single lead agency is taking responsibility for integrated planning and decisionmaking. In addition to the Gulf Islands program, several other federal programs hold a piece of the ecosystem management puzzle for the bay. Key among these include the program for environmental plans, which are usually prepared in conjunction with state authorities highlighting a key development sector, such as tourism or mariculture, as the unifying theme for the planning process. Decisions covered in these plans include allocation of uses for coastal and marine areas, as well as development guidelines and regulations. It is becoming more common for such plans to be prepared for special eco-regions of a state, such as a coastal zone in the case of Sinaloa.

In addition, several types of protection and conserva-

tion areas can be declared for marine and wetland areas under federal rules. For the immediate coastal strip, where the federal government has jurisdiction over the beach and bay zone, a program is in place to clearly identify the federal shore zone (ZMFT), identify uses that do not yet have legal concessions to occupy and use the area, and provide a portion of the revenues from the concessions directly to municipalities with the restriction that a portion of the revenues must be used for coastal zone management. Fisheries laws separate commercial open water fisheries from nearshore artisanal fisheries. In regions such as Santa María Bay, which have organized fisheries cooperatives, fishing grounds for certain species, mainly white shrimp, are allocated among cooperatives, while the federal authorities retain control over the timing of shrimp harvests and are responsible for enforcement.

Finally, municipalities can prepare and implement environmental plans and petition for delegation of certain decisionmaking authority on coastal development from the ZMFT. In fact, there is a strong movement toward decentralization to state and local authorities of federal responsibilities for day-to-day decisionmaking and management.

With all of these emerging possibilities for integrated planning and decisionmaking as yet unrealized, the stakeholders of Santa María Bay began a pioneering effort to work together (*Esfuerzos Conjuntos* in Spanish), to create a conservation and development program.

The catchphrase for this effort, repeated frequently in meetings and discussions, was the Spanish expression *estamos a tiempo*, meaning we are 'just in time.' Just in time to find a broad range of people concerned about the problems, and just in time to plan a course of action to avoid irreversible mistakes.

The year 2002 is proving to be a moment of convergence as newly installed municipal governments consider ratifying an innovative agreement to jointly manage the bay. The state of Sinaloa is reviewing a statewide coastal area use ordinance which could lead to legal recognition of the bay strategy which has just been published.

Objectives of the Bay Management Strategy

The overall objective is to carry out participatory, community-based management strategies that will preserve the different coastal environments of Santa María Bay. This means protecting the flora and fauna of the region, in particular endangered species. It also means promoting sustainable practices for current bay uses and pursuing promising alternative economic activities.

Specific bay program objectives include:

- Expand local capability to conserve critical zones in the bay
- Increase low-impact resource uses which reduce the pressure on overexploited or critical resources

- Incorporate environmentally-friendly management practices within ongoing economic activities
- Develop sustainable forms of economic development

Public Participation

Conservation is viewed by bay stakeholders as the way to support the development of present and future economic activities in the bay. The public involvement process has helped greatly to foster broader understanding of the importance of the management and preservation of the bay's environment and its natural resources.

Public involvement workshops have united communities and stakeholders in defining the main issues now facing Santa María Bay, given current uses as well as in identifying potential alternatives for the sustainable management. The result has been the formulation of a consensus-based Bay Management Program. Between 1999 and 2000, eight workshops were held in different communities around the bay. At these sessions, stakeholders developed a shared vision which requires that several specific conditions are achieved within the next 15 years:

- The hydrodynamic conditions of the bay are improved and maintained to 3- of 4-meters depth in the main basins
- Based upon the specific carrying capacity of the bay, the water quality is sufficient to support fishing activities and maintain shrimp farms
- The community is environmentally aware and actively participating in the bay program
- The communities around the bay are receiving economic and social benefits from the program's actions
- The invasion of cat tail grass vegetation into the bay is curtailed and controlled in strategic areas

A fundamental strategy for achieving this desired future is to integrate the program and policies into the government development and conservation plans for natural resources, pollution control, and land use.

Examples of Management Issues and Measures in the Bay Strategy

Improve Fisheries Productivity and Promote Low Impact Aquaculture

Many current fishing and shrimp farming practices are contrary to the goals for sustainable development. Key issues include an excessive increase in the shrimp fishing effort and fishing conflicts caused by the Official Mexican Regulation Pesca-002. This includes:

- Short-sighted fishing and aquaculture practices have damaged the nursery grounds of various marine species of commercial importance
- Inadequate technical studies, as well as incomplete legislation, do not provide for managing important bay fisheries resources other than shrimp
- Expansion of shrimp farms around the bay without proper controls

The strategies proposed in the Bay Management Program focus on increasing public knowledge of the principal valuable fish species and building awareness and support for management measures. In addition, the program promotes public discussions on the merits of present fisheries legislation and, where possible, advocates changing fishing and shrimp farming techniques toward those that are environmentally friendlier. Finally, the program recognizes the importance of building local management capacity and locally relevant decisionmaking criteria in order to make real progress on these proposals. Specific management objectives are to maintain or recover harvest levels of fishing resources and develop good management practices for shrimp farming.

Two important initiatives to implement these objectives are already underway. An innovative self-management experiment for the blue crab fishery involves the fishers, authorities, buyers, and experts from the University of Sinaloa. The goals include setting harvest targets and having fishers acting as enforcement offices. A second major project will be to expand work with shrimp aquaculture installations to expand the adoption of good practices and reduce impacts.

Water Quality and Bay Hydrodynamics

Excellent water quality in Santa María Bay is a necessary condition for sustaining fisheries production and developing shrimp farms and other forms of aquaculture. It is also a requirement to support low-impact alternative economic activities such as controlled beach tourism and eco-tourism that have the potential for generating employment in the region.

Specific bay program objectives include:

- Maintain or increase the bay's water quality
- Improve agriculture and mariculture practices in order to reduce demand for water, fertilizers, and pesticides
- Build upon existing state and municipal programs that promote good agriculture practices and apply these throughout the bay watershed
- Build the capacity to enforce Mexican regulations to control wastewater discharges from shrimp farms
- Monitor key indicators of bay water quality to serve as a baseline for assessing likely impacts of new developments and economic activities
- Reduce the sedimentation rate in the bay
- Maintain the bay's present water exchange rate with the open sea
- Restore areas of ecological importance, such as strategic fishing and mariculture sites
- Rehabilitate dredged channels
- Identify the best zones for discharging of domestic, agricultural, urban, and industrial waters
- Reduce the larvae lost in shrimp farms' pumping systems

Understanding the circulation of water in the bay is of vital importance in making good decisions on future development and correcting problems caused by existing

bay and watershed economic activities.

Discharge of residual waters from aquaculture, agriculture, industrial, and domestic activities have been mistakenly allowed in sections of the bay which have low circulation and high residence times. This has led to a decline in water quality and accelerated the sedimentation process in the bay. New sand banks obstruct navigational channels and fishing boat movement. Fishing grounds have also been lost, along with nursery areas for commercially-important marine species.

The overall management strategy is based on carrying out technical studies to develop a hydrodynamic model of the bay. This computer model can be used as a tool to plan and make better decisions on the infrastructure needed to support economic activities in the bay, such as dredged channels, shrimp farm water intakes and discharges, and agricultural drainage canals.

The program has successfully obtained funding to carry out field work leading to creating and calibrating a model of the bay that will help the Conservation and Development Committee address several of its key objectives.

Mangrove Forests, the Malacataya Tidal Flat, and the El Tecomate and Allende Mountains

Conservation of wetland and forest areas around the bay is key for achieving three aspects of the vision for Santa María Bay shared future for year 2020:

- Preserve mature protected areas
- Maintain the bay as a natural laboratory that increases interest in scientific research and environmental education
- Support alternative sources of employment in low-impact businesses

The bay's 18,700 hectares of mangrove forest are important as breeding and feeding areas for many aquatic species that are the basis of the bay and offshore fisheries. Nevertheless, shrimp farms and local neighbors continue to extract lumber from these forests. The larvae of aquatic species are also being taken out of the bay by pumps used to bring seawater into shrimp farms. The tidal flat of Malacataya is of international importance because it is part of the route for the migratory birds of North America. Unfortunately, the excessive growth of cat tail grass, caused in part by changing salinity regimes, is endangering this habitat. There are also incompatible activities taking place in wetland areas including hunting, shrimp farming, and salt mining, which in turn causes conflict among land owners and bay users.

The mountains within the bay watershed are also 'islands' of native vegetation surrounded and isolated by the agriculture development of the coastal plain. A number of plant species of ecological and economic importance are found there. The main issue facing the mountain region is the continuing expansion of agriculture to the point of reducing the native vegetation on the mountain sides.

Specific bay program objectives include:

- Increase surveillance capacity
- Enforce current environmental laws
- Reach agreements among bay users and the government to control further change in sensitive areas
- Conduct research and environment education programs
- Promote low-impact economic activities which will add incentives for sustained local stewardship

The program is updating a dormant proposal that will lead to obtaining state-level protected area status for the Malacataya area.

Innovations in the Santa María Bay Program

Management Strategy for an Ecosystem and Watershed

The program is one of the first initiatives in Mexico to address multiple issues outside of an officially declared protected area, and which builds upon existing laws, rules, and policies in an integrated way.

Collaboration and Consensus Building at Every Step

The program unites the three levels of government, as well as civic and resource user groups and citizens, both in implementing the overall project and in designing the strategy. From the outset, international, national, and local institutions and groups joined together to provide funding and in-kind contributions, including the initial grant from the North American Wetlands Council, Conservation International, and the University of Sinaloa.

The Conservation and Development Commission

A voluntary committee was formed once the project started to guide public meetings and prepare plan ele-

ments. The commission has formed a subcommittee that is now assisting the municipalities of Navolato and Angostura to form a joint management entity to permanently guide and carry out a long term program, as well as a trust fund to administer funds and other tangible assets needed to carry the program forward.

Extending the Bay Management Concept Throughout the State of Sinaloa and the Gulf of California

In May 2001, a regional meeting, attracting 150 scientific experts, public officials, and conservationists, was held in Mazatlan to set conservation priorities for the gulf. One of the outputs of the meeting was a unified map of areas of high ecological importance that were also facing intense threats and social conflict. Santa María Bay was right in the center of the corridor of coastal lagoons and estuaries of concern (including Sonora, Sinaloa, and Nayarit states). The newly published National Fisheries Map identifies a total of 20 such ecosystems within the gulf. In 2002, Sinaloa state officials began reviewing a draft coastal environmental ordinance that encompasses all of the other lagoon and bay ecosystems in the state. The hope is that success in Santa María Bay will help inform and guide efforts to address the needs and concerns of other similar sites, and that these efforts will also be 'just in time.'

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