

Conservation of Critical Coastal Ecosystems in Mexico:

Santa Maria Bay



A Management Program for the Conservation and Development of Santa María Bay, Navolato and Angostura Municipalities, State of Sinaloa, México

Santa María Bay is located on the south-eastern coast of the Gulf of California. It is connected to the Gulf by northern and southern entrances and has a water surface of almost 50,000 hectares. The Bay has 94 islands, which are protected through the Gulf of California Island Park system. The three largest include Altamura, a 43 km long barrier island, and the interior islands of Talchichilte, 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. Irrigated agriculture is the main economic activity and covers most of the valley's coastal plain. Two low mountain ranges called 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 7000 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 Malacatayá 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.

OBJECTIVES OF THE BAY MANAGEMENT PROGRAM

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.

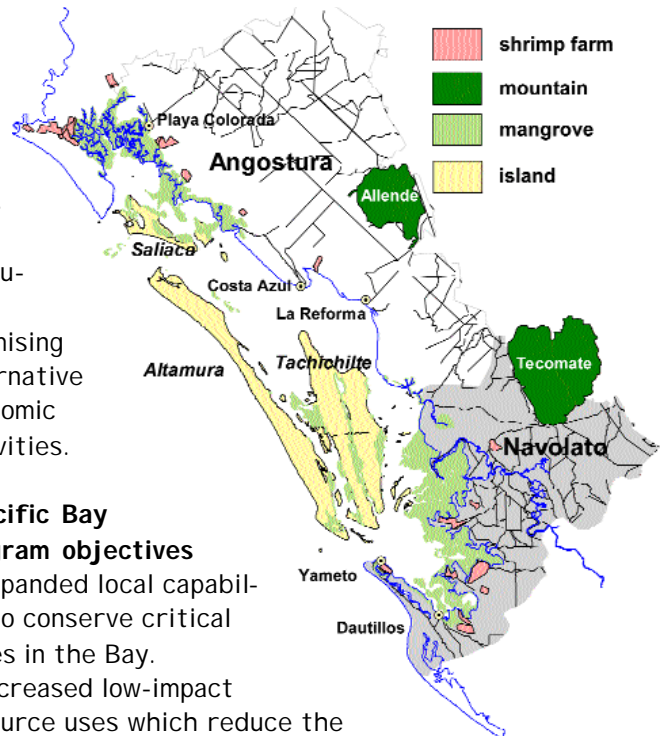
Specific Bay Program objectives

- * Expanded local capability to conserve critical zones in the Bay.
- * Increased low-impact resource uses which reduce the pressure on overexploited or critical resources.
- * Environmentally friendly management practices incorporated within ongoing economic activities.
- * Sustainable forms of economic development for the Bay.

PUBLIC PARTICIPATION

Conservation is viewed by 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:

- * Identified the bay region's main issues.
- * Discussed conservation and development needs from the stakeholders points of view.
- * Analyzed other experiences in co-management.
- * Examined the overall changes that have occurred in recent decades, and assessed both what values have been lost and what is at risk in the near future.

The process for preparing the Management Program for Santa Maria Bay has been dynamic, continuous and highly participatory. The implementation phase now underway will extend this further as a broader range of groups begin to take on projects that will lead toward the vision.

A SHARED VISION FOR BAHÍA SANTA MARÍA

The vision developed by stakeholders requires that several conditions are achieved within the next fifteen years:

- * The hydrodynamic conditions of the Bay are improved and maintained to 3 of 4 meters of depth in the main basins.
- * The water quality required for supporting fishing activities and the shrimp farms is maintained, based upon the specific carrying capacity of the Bay.
- * 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 Bay Program and policies into the different government development and conservation plans for natural resources, pollution control and land use.

MANAGEMENT ISSUES AND MEASURES

IMPROVE FISHERIES PRODUCTIVITY AND PROMOTE LOW IMPACT AQUACULTURE

Many current fishing and shrimp farming practices are contrary to the goals sustainable development.

Key issues include an excessive increase in the shrimp fishing effort, and the fishing conflicts caused by the Official Mexican Regulation Pesca-002:

- * 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; and
- * Shrimp farms have expanded 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 advocates changing fishing and shrimp farming techniques where possible toward those which are friendlier to the environment. Finally, the Program recognizes the importance of building local management capacity and locally relevant decision making criteria in order to make real progress on these proposals.

Specific management objectives

- * Maintain or recover harvest levels of fishing resources.
- * Develop good management practices for shrimp farming.

WATER QUALITY

Excellent water quality in Santa Maria Bay is a necessary condition for sustaining fisheries production, and developing shrimp farms and other forms of aquaculture. It is also a requirement in order 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 management objectives

* Maintain or increase the Bay's water quality in order to support fishing activity and shrimp farms as well as to protect the environmental basis for the development of new low impact economic activities.

* Improve agriculture and mariculture practices in order to reduce demand for water, fertilizers and pesticides. Build upon existing State and Municipal programs which promote good agriculture practices so they can be applied throughout the Bay watershed.

* Build the capacity to enforce Official Mexican Regulation NOM-001-ECOL-1996 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.

BAY HYDRODYNAMICS

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 in turn 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. Fisheries 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.

Specific management objectives

* Reduce the sedimentation rate of 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 the discharge of domestic, agricultural, urban and industrial waters.
- * Reduce the quantity of larvae of aquatic species lost to the pumping systems of the shrimp farms.

SANTA MARÍA BAY ISLANDS

The vision for the Bay in 2015 calls for sound management of the Santa Maria Bay Islands. These Natural Protected Areas must be maintained in good condition in order to attract increased interest in research, science education, as well as to promote activities such as eco-tourism and low impact beach recreation.

Specific management objectives

* Preserve the islands' natural resources, especially endemic, rare, threatened and endangered species, as well as those with present or potential economic importance.

* Protect the biological communities and ecosystems that are part of the unique ecological and evolutionary processes of the islands.

* Maintain and protect the genetic diversity of wild flora and fauna.

* Protect the breeding, feeding and resting habitats of sea and shore birds, both migrating and resident stocks as well as the ones important to hunting activities.

* Encourage low impact economic activities that promote the conservation of the islands, such as eco-tourism.

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 Maria Bay shared future for year 2015:

* Preserve Natural Protected Areas;

* Maintain the Bay as a 'natural laboratory' that increases interest in scientific

research and environmental education, and

* 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 which are the basis of the bay and offshore fisheries. Nevertheless, shrimp farms and local neighbors continue to extract lumber from these forests. The eggs and 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 here. The main issue facing the mountain region is the continuing expansion of agriculture to the point of reducing the native vegetation in the mountain sides.

Specific management objectives

- * 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.

INNOVATIONS IN THE BAHÍA SANTA MARÍA PROGRAM

A Management Program for an ecosystem and watershed

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

Collaboration and consensus-building at every step

The Program unites all three levels of government, civic and resource user groups and citizens both in implementing the overall project and in designing the plan. 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, the University of Sinaloa and many others.

The Conservation and Development Commission

A voluntary committee was formed once the project started to guide public meetings and prepare plan elements. The program is now looking toward the municipalities of Navolato and Angostura to form a joint entity to permanently guide and carry out a permanent Bay Program.



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