

## Old Providence Biosphere Reserve, Old Providence Island, Western Caribbean

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### ABSTRACT

Old Providence is an atoll that belongs to the Archipelago of San Andres and Providencia, Colombia. A total of 21 km<sup>2</sup> are emerged, and reef extends along 255 km<sup>2</sup>. The fishery is important for local communities. The Law 99 of 1993 recognized a national biosphere reserve and a group of natives had been working in association with Coralina, the local environmental authority, in order to manage that area. A combination of strategies are being used to implement this process:

**Establishing a marine reserve:** In 1996, the first underwater national park on the Islands was created. The park encompasses emerged land, mangroves and reef complex. This area will be considered as a part of the core zone. Fishing activities will be prohibited. Complementary activities involving tourism and environmental education must respond to a management plan.

**Formulating an environmental plan:** An environmental plan was

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social-economical aspects using situational planning methodology. As a result, buffer and cooperative zones are being defined.

**Producing regulations:** Some regulations are being created with community help. These documents will be adopted as a local law.

**Educational programs:** Additional educational activities were developed to increase local participation. The community will be the guardians of the reserve.

These experiences represent four years of work. The strong expressions of concern by the people have led to interesting, positive results, however more work is required. The cumulated knowledge and awareness of the people aided the authorities in obtaining the main objectives of the reserve.

**KEY WORDS:** Biosphere, marine reserves, Old Providence Island

## INTRODUCTION

The term biosphere reserve is an international designation created and awarded by UNESCO to an area, which has met their solution criteria. Such a designation reflects a local and international commitment to the management of natural resources for the benefit of people and their environment. Each biosphere reserve is intended to combine three complementary functions: conservation, development and logistic support. The process of developing a biosphere reserve is a voluntary one on the part of the local community and involves a long-term commitment to a cooperative work. UNESCO defines three interrelated zones within the reserve, the core, the buffer and the cooperative zone. The core zone consists of a minimally, disturbed ecosystem. Characteristics of the region are often selected to conserve the natural habitat of species which have economic importance. The core zone must have secure legal protection. For this reason national parks and nature reserves often serve as core zones. The buffer zone is a special area that surrounds and helps to protect the core. Its uses include environmental education, recreation, ecotourism, and research to provide economic and social benefits.

The cooperative zone is a flexible area where conservation knowledge and management skills are applied because economic and social activities are allowed in harmony with the objectives of the biosphere reserve. The Old Providence Biosphere Reserve, within the Archipelago of San Andres and Providence, is as an example of a participate process.

## THE NATURAL RESOURCES

The islands of Old Providence and Santa Catalina are part of an isolated atoll located in the southwest Caribbean (13°N and 80°W). Although geographically closer to Central America they have belonged to Colombia since 1822. The Island has a volcanic origin formed by lava flux dated in early Miocene (Geister, 1986). The actual mountainous relief has abrupt slopes and is strongly associated with the direction and composition of those lava fluxes. The geomorphology is characterized by three different entities. The mountains (highest altitude 360 m.a.s.l.), the hills formed by erosion of the mountains and the flat areas characterized by beaches and/or alluvial planes. The coastal zone is influenced by the barrier reef which offers a wide protected insular shelf. The submarine topography is characterized by several shallow basins, which constitute the depositional areas. There are some submerged terraces on the reef complex showing changes in sea level during Pleistocene (Restrepo 1997).

The air temperature varies between 22 to 28°C and the rainfall is 16,00 mm (63 inch) annually. The dry season is January - June, followed by the wet season July - December. The sea surface temperature averages 27.5°C and surface salinity

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fluctuates between 34.0‰ to 36.3‰ (Geister & Diaz, 1997). In Old Providence there are five permanent gullies with a mean length of 2 km long. In 1995, the local administration built a dam to store fresh water. Since the Archipelago lies in the belt of the NE trade winds, wind directions are predominantly E-NE with mean monthly velocities of 4 m/s (May, Sep-Oct) and 7 m/s (Dec-Jan). The prevailing current pattern is the Caribbean current from east to the west. It forms a large counterclockwise eddy in the Southwest crossing the Nicaraguan rise towards the west and south. Sporadic storms with winds over 20 m/s also occur in September to November (Geister and Diaz 1997). Four hurricanes have passed during last 40 years.

A well-developed forest growing in the transition zone of dry and wet, covers 65% of the Island. On top of the mountains, trees 30-40 m tall represent a forest with tree diameters between 30-80 cm. Sixty-four families, with 233 species have been reported. This is considered high flora diversity for an oceanic island (Coralina 1997). There is a local nature reserve, "The Peak", declared to protect the most developed forest on the Island. This area is important because it overlies the crater of the volcano which created the Island. Coming down in altitude, the forest is less structured but the species composition is very similar. Some grass patches (21%) are now present in areas closer to the small villages. Those areas are used for extensive poultry activity. Agricultural products such as plantain, cassava, corn and some fruits are grown at subsistence levels. Sometimes the farms are abandoned and erosion processes begin due to the lack of vegetation coverage. However the predominate cause of erosion is the extensive cow activity.

Old Providence and Santa Catalina today are surrounded by an extensive Holocene barrier reef with 32 km long windward, one of the largest in the Western Hemisphere (Geister and Diaz 1997). Three major segments of the barrier are discontinually formed pinnacles with vertical walls are up to 8 - 10 m, most of them built by *Millepora*, *A. palmata* and *Montastrea annularis*. The majority of reef builders are covered by soft algae. The lagoon is 20 m deep, completely closed towards the East (windward) and open in the West where large coral patches can be found. These patches formed by *Acropora palmata* were destroyed in 1988 by Hurricane Joan. A wide sea grass belt is present in this lagoon environment. The mangroves are present in small patches where the coastline corresponds to the basin planes. The major mangrove patch is called McBean and was declared as a National Park in 1996. This park extends along 995 ha, and includes three keys, a reef lagoon and a barrier reef. Almost 10% of the total extension correspond to the emerging land including the mangroves and an isolated hill called Iron Wood. The park is being proposed as one of the core zones for the Biosphere Reserve.

The fisheries resources are composed of reef organisms. Red snapper, barracudas, groupers, and jacks are the main fish catches. Spiny lobster and Queen

conch are also an important part of the landings. Currently, there no marine reserves declared around the Island.

#### THE PEOPLE

The Islanders in Old Providence are mixed between African and Europeans who have been living in the islands for many generations. They speak English and traditionally are farmers or fishermen. The family nucleus is very important. The fishermen represent around 2.5% of the total population of 4.000 habitants. There are six major fishing communities named: Santa Catalina, Rocky Point, Fresh Water, South-west, Mountain and Lazy Hill. The fishermen generally work in small groups of two or three people in daily fishing trips. Occasionally there are trips up to five days long to the more productive areas offshore keys (10 –12 km away). The fishing areas are located along the barrier reef as well as in the reef lagoon. Fishing activities had been developed mainly as artesanal, limited by the small boat size (20 - 30 ft long),. The gear consists of free diving equipment, a single line, traps, and sometimes scuba tanks.

“Copropesca” is the unique fishing cooperative that groups a large portion of the North and East fishermen. The cooperative built local processing facilities in order to increase the aggregate value of the catch. However, the fishermen on the Island do not like to participate in the cooperative for a long time. The fishermen are receptive to the Biosphere Reserve plan which includes a fishery reserve around the National Marine Park.

#### THE PROCESS

According to the environmental law in Colombia (99/93), the Islands were declared as a National Biosphere Reserve. The law also gave Coralina, the local environmental authority, the responsibility to implement the reserve. At the same time the community expressed their opinion against the construction of big hotels or similar development projects, using the participation rights also stated in the law. Coralina started implementation using different strategies, which targeted the community members and authorities. For example, with the situational strategic planning methodology, six major environmental problems were identified and discussed. Several workshops representing a week of work joined different sectors to analyze and prioritize each problem and its appropriate actions in the short (3 years) and mid (10 years) terms.

Coralina organized several cartography workshops using basic maps (1:1000). The local people defined individual landowners and located sites of natural resources, tourism development, administrative development and ocean use. The information was integrated into GIS using ILWIS. Technical studies were made on geology, geomorphology, climatology, forestry and marine resources, which

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were also introduced into GIS. Coralina received financial support from the local administration and the national government through the environmental minister and their associate agencies.

With help from Coralina leadership, conversational groups were implemented. Conversational groups were an important factor in this process. Several sectors of the society (e.g. fishermen, farmers, hoteliers, families etc), convened to discuss the present situation and the future alternatives. Topics included sustainable development, restoration actions and new regulations. The social unity is the Island's key to success.

From this process a detailed land use plan was developed. The Biosphere Reserve technical report is being written. The process is continuous and the report is being shown to proper authorities and community members for approval. Coralina is also working to obtain recognition from UNESCO as an International Biosphere Reserve.

### THE RESULTS

Detailed information on climatic, geological, biological and social aspects are in digital format for different management purposes. Initially, the core zone will consist of McBean National Park, the nature reserve of The Peak and the 20 m width along the gullies. The buffer zone will correspond to the area around the core zone and include areas where soil recuperation is needed. The rest of the Island will be the cooperative zone, including emerged land and the reef complex. Detail boundaries are being defined with the community members and authorities.

Broad acceptance is expected based on the wide participation during the process. For example, the fishermen decided not to fish within the National Park (eg. Mangrove lagoon) even though no regulations currently exist in that area. Some groups are asking for closed seasons for lobster, while others are more concerned with the establishment of the marine reserve. Much more work is needed, but a collective conscience is being generated.

### THE EXPECTATIONS

Complementary with this process there are great expectations necessary to consolidate the initial results. For example:

- i) Implementing the Marine and Fishing Resource Management Plan for the Archipelago. This opens the way to research studies in wide array of fields and helps decision-makers apply management policies and programs.
- ii) Promoting training, participation and conciliation with the civil sector are the priority activities within the archipelago's resource management and conservation programs. These programs contribute substantially to successful realization of the project's operative aspects.

- iii) The proposal to create new reserve zones in the archipelago is a gradual process of agreement with social organizations are concerned with resource use.
- iv) Research projects defined by the traditional fishing industry should focus on developing measures that encourage the creation of new marine reserve areas in the archipelago.

Studies that lead to the introduction and acceptance of new technologies by the traditional fishing industry should be centered on programs based on traditional fishing methods. Such programs should require low economic investment and include regular training through workshops. A principal factor is to support an attitude of participation towards each project and study.

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