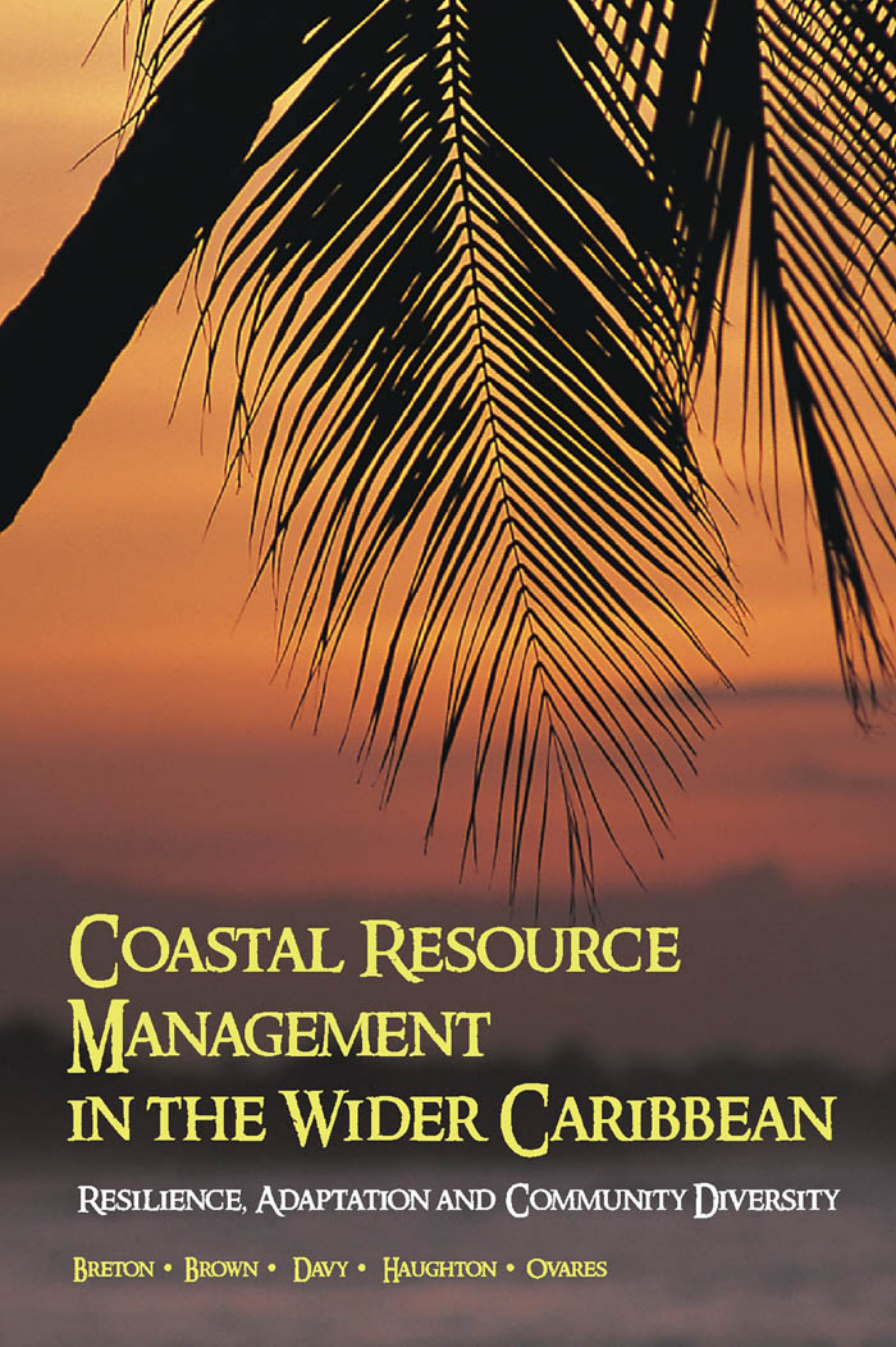


Coastal Resource Management in the Wider Caribbean

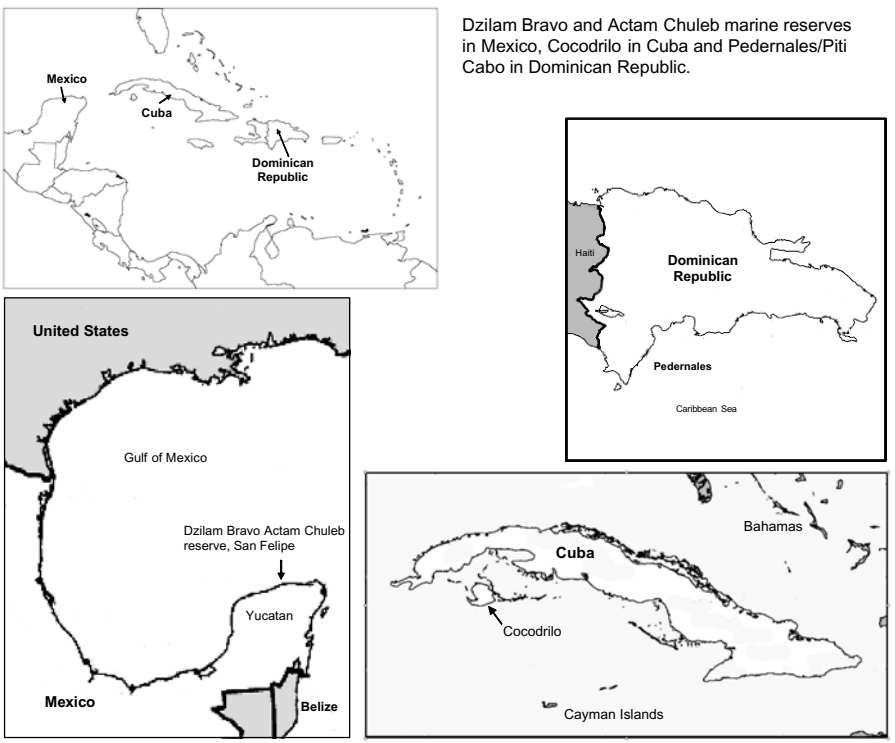
Resilience, Adaptation and Community Diversity

Breton • Brown • Davy • Haughton • Ovares

4

Communities and Stakeholders in Marine Protected Areas in the Caribbean

Julia Fraga Berdugo, Yvonne Arias, and Jorge Ángulo



Dzilam Bravo and Actam Chuleb marine reserves in Mexico, Cocodrilo in Cuba and Pedernales/Piti Cabo in Dominican Republic.

Figure 9
Location of selected communities

This chapter on communities and stakeholders in marine protected areas (MPAs) presents the results of research into Caribbean coastal resource management from an ethnographic and a pan-Caribbean perspective. Three case studies in Mexico, the Dominican Republic, and Cuba help reveal key

elements that demonstrate the heterogeneity of this geographic area. We found a gradient with respect to the management approaches used by each country, which shifts from a top-down approach in the Dominican Republic and Cuba to a bottom-up approach in Mexico.

This chapter also examines community dynamics with respect to different categories of management for natural protected areas, as well as issues surrounding the environmental values of Caribbean communities.

TABLE 4
MAIN FEATURES OF THE SELECTED COMMUNITIES

	Cocodrilo	San Felipe	Piti Cabo-Pedernales
Country	Cuba	Mexico	Dominican Republic
Location	Isla de la Juventud 15 km from Punta Frances marine park	Northeast coast of Yucatan	Parque Nacional Jaragua, southeast part of the country
Population	308	1,832	650, located in various small fishing stations
Economy	Artisanal fishing, small agriculture, and woodcutting	Fishing and tourism	Artisanal fishing with seasonal migration
Other	Scuba diving from cruisers in the area	Creation of local marine reserve in 1995	Communities without legal status in the park

Approximately 60 per cent of the people of Latin America and the Caribbean live in coastal areas, where their increasing population is causing serious problems. The Caribbean has been listed as one of the world's four or five hot spots by Conservation International, and five of the 200 ecoregions classified by the World Wildlife Fund (WWF) as priorities for world conservation efforts are located in this region.

The establishment of protected areas in the Caribbean dates back more than 200 years, with the 1765 creation of the Main Ridge Reserve in Tobago. Jamaica established its first marine area in 1907 (Insular Caribbean WCPA Report to the World Parks Congress, Durban, 2003).[1] Currently, the region has more than 400 protected areas, representing more than 15 per cent of its surface area. There are roughly 300 marine areas (a common island asset), among which 25 are marine reserves. These play a crucial, invaluable role in

conserving coastal marine biodiversity resources, and in ensuring their use by local and regional residents.

Mexico's conservation policy was based on creating and strengthening natural protected areas. It emerged in the 1980s and 1990s (Halfter 1981; McNeely, Harrison, and Dingwall 1994; Barzetti 1993; SEMARNAP 1997), reflecting the trend towards environmentalism and conservation in the West. These protected areas were created and expanded during the past eight decades, in a clearly top-down approach that was started, primarily, through government initiatives, as noted by Gómez-Pompa and Dirzo (1995). During the 1990s, it became necessary to reclassify natural protected areas that had been artificially created and which were not operational (Garrido 1991; Pérez-Gil 1993; INE-SEMARNAP 1995–2000). Moreover, such areas exhibited the vicious circle represented by lack of financing, lack of community involvement in conservation strategies, and lack of trained personnel, along with many other shortcomings.

San Felipe

In Mexico, creating protected areas was justified as a way of halting ecological deterioration of the country's most representative ecosystems, safeguarding ecological capital for national development, and ensuring that the areas could be handed down to future generations. The Ecological Balance Act (Ley General de Equilibrio Ecológico, LGEEPA) was passed in 1988. Its article 45 calls for the establishment of natural protected areas.[2]

These areas constitute a geographic network for conservation and sustainable development initiatives that are becoming

strategic assets for Mexico, and with new methodologies and scientific knowledge the value of the goods and services they generate can be estimated in economic terms, and elements of judgment can be derived for guiding private and public decisions affecting conservation. (INE-SEMARNAP 1995–2000, 5)

In 2002, Mexico had 444 natural protected areas, 60 per cent of which contained aquatic habitats and 40 per cent land habitats. MPAs have been growing in number since the 1990s, under various categories of management.[3] There are some discrepancies in the number of MPAs reported in Mexico.[4] All of these marine areas were proposed through outside initiatives

such as environmental non-governmental organisations (NGOs), scientists, and government natural-resource administrators. Their creation was also determined on the basis of biological and economic considerations relating to fisheries management.[5]

Cocodrilo

In Cuba, the creation of terrestrial and marine protected areas is a key element in the National Environment Strategy (Ministry of Science, Technology and Environment, 1997). In July 1997 the government adopted the Environment Act, Law 81, reflecting the national interest in protecting the environment and establishing general objectives for what has come to be known as the National System of Protected Areas (SNAP). It represents the culmination of a participatory process that sought to find a strategic working tool through which future actions could be channelled. The goal was to preserve the most significant values of Cuba's natural heritage and, in particular, its biodiversity, within designated protected areas (National Centre for Protected Areas 2002).

The system now has 263 identified protected areas, of which 35 have been officially approved and 23 are at an advanced stage of processing. The remainder remain at the proposal stage. Once the system is fully established, 41 per cent of the national territory, including the island's offshore shelf, will be protected under various management categories, consistent with the development objectives of each region (National Centre for Protected Areas 2002).

As part of this system, there is a proposal to create a Managed Resource Protected Area (APRM) in the southern portion of the Isla de la Juventud. APRMs represent a management category within SNAP. The objective is to protect and maintain biological diversity and simultaneously to provide a sustainable flow of natural goods and services to meet local and national needs (Decree Law 201 on the National System of Protected Areas, December 23, 1999, Council of State). APRMs are supposed to embrace other, and more strictly defined, protected areas such as natural reserves, national parks, and ecological reserves. Thus, the Punta Frances National Marine Park (PNMPF) examined in this case study constitutes an integral part of the APRM on the Isle of Youth.

Petit Cabo-Pedernales

In the Dominican Republic, key dates in the protection of natural areas include 1919 (executive order), 1928 (ban), 1933 (national park), 1966 (scientific reserve and natural monument), 1967 (forest preserve), and 1976 (natural scientific reserve). In 1977, a national historic park was declared and a year later an archaeological zone established. In 1986, the first scenic route was designated, and in 1992 and 1993 the categories of ecological park and anthropological reserve, respectively, appeared. The natural monument, wildlife refuge, and refuge categories came into use in 1995. In 1996, a scientific reserve was declared. Since that year, other categories have been declared, including an anthropological reserve, a biosphere reserve, a biological reserve, a national recreation area, an ecological corridor, and a natural area.

On November 8, 1974, Law 67 was adopted, creating the National Parks Directorate as the senior body overseeing the Dominican Republic's protected areas. On August 18, 2000, Law 64–00, the Environment and Natural Resources Act, was promulgated and the Ministry of Environment and Natural Resources created. Although many areas were created by presidential decree, Law 64–00 includes all the areas; as a direct result, all automatically became protected by law.

The National System of Protected Areas currently contains a variety of ecosystems divided among different management categories, many of which are inconsistent with recommendations of the International Union for the Nature Conservation (IUCN). However, draft legislation for a Protected Areas Act proposes significant changes to categories and areas. Within the Ministry, the Protected Areas and Biodiversity Department (formerly the National Parks Directorate) has direct responsibility.

The preceding paragraphs outline historical developments in the three countries on the legal and management fronts. Table 5 summarises the sociodemographic and economic features of each community studied, as an aid to appreciating the approach taken in each case and, above all, addressing the following three concerns:

1. To what extent does the community structure permit management of a protected area?

2. To what extent are socioenvironmental research results accepted by our governments as the basis for effective management?
3. Does the category assigned to a protected area bear any relationship to the community that uses the area?

TABLE 5
SOCIAL ORGANISATION OF THE COMMUNITIES UNDER STUDY

Socioeconomic characteristics	Mexico San Felipe	Cuba Cocodrilo	Dominican Republic Pedernales, Piti-Cabo
No. of fishers	621	23	500
Main activities	Artisanal fishing, livestock, and incipient tourism	Fishing and farming	Fishing
Emigration	Low to moderate	Very low	Medium
Immigration	High	None	Highly seasonal
Education	Primary and secondary	Primary, secondary, and higher	Majority unschooled
Health services	Two centres: Ministry of Health and Assistance (SSA) and Mexican Institute of Social Security (IMSS)	A family clinic	None
Religion	Catholic	Catholic	Catholic
Family relationships	Strong family ties (same surnames)	Strong ties	Weak ties
Ethnic group	Mestizo	Mestizo	Mestizo
Role of women	Collecting squid for bait	Services and administration	Processing the catch
Local organisations	Fishing cooperatives (3)	People's councils	None
Main problems	Partisan rivalry between National Action Party (PAN) and Revolutionary Institutional party (PRI), break-up of the cooperative (two sections A and B), crisis in the fishery vs. low emigration of young people to the Mayan Riviera and Cancún	Substandard housing, poor transportation, few employment opportunities, little contact with the outside world because of geographic isolation	Precarious living conditions, no basic services of any kind, broken families, few economic alternatives, overlapping of official functions

THE ACTAN CHULEB MARINE RESERVE IN MEXICO (Julia Fraga Berdugo, Jorge Eúan-Ávila, Silvia Salas Marquez, and Ratana Chuenpagdee)

This case study of the Actan Chuleb Marine Reserve describes a local initiative for the conservation of fishery resources that has now been in place for 10 years, and which has seen repeated intervention by local and outside stakeholders with varying interests and motivations. The process reveals how the state serves to try to promote conservation through legislation (the Ecological Balance Act). However, the state has been incapable of handling management at the local level. The result is that the community of San Felipe asserted its own collaborative management of the resource. The Actan Chuleb Marine Reserve (Actan Chuleb is a Mayan term for a species of marine bird) is perhaps the only example in Mexico of a reserve established and managed by a local community. In this case, a group of 30 traditional fishers established a marine area of 30 km^2, located 5 km from the port and village of San Felipe, with its 1,832 inhabitants. The port of San Felipe is on the northeast shore of Yucatan

San Felipe: Shifting patterns of community use of coastal resources

Every human community lives face to face with nature in a manner mediated by symbolic, cultural, economic, and political dimensions. Looking into the mirror of the past, we can identify resources and ecosystems that were transformed by the activities of coastal inhabitants and by the models of capitalist economic growth in two areas: the terrestrial and the marine. San Felipe has followed the spiral of socioeconomic development based on exploitation of its coastal resources since the twentieth century. These have evolved from subsistence farming to extensive ranching. Since the 1970s, there has been a concentrated effort to build a commercial fishery. Currently, the fishing effort has been combined with ranching. The twenty-first century is witnessing a sudden search for alternatives to the traditional fishery. This is because the fishing grounds are shrinking, and the coastal landscape—with its beaches, estuaries, and marine wildlife—is now viewed as the most promising alternative for the local economy.

In addition to this historical approach to understanding the use and management of the coastal resources of San Felipe, we must not overlook

the internal social fabric that underlies the interaction of inhabitants with resources and ecosystems. That social fabric explains the current conditions of participation, the initiatives for protecting resources, and the potential for community-based management of marine resources (Chuenpagdee, Fraga Berdugo, and Eúan-Ávila 2002, 2004).

San Felipe has two social characteristics that must be remembered: close family relationships and the general acceptance of the Catholic religion. The first is the product of its geographic isolation during the first 50 years of the twentieth century, when its domestic economy was based on self-consumption of locally grown crops—corn, grasses, and tubers. Farming yielded to extensive livestock ranching in the 1950s, which is currently the second most important economic activity after the artisanal fishery. The fishery received a boost in 1970 with the establishment of the fishing cooperative known as the Authentic Fishermen of San Felipe. Fishing sparked the community's economic development, expanded communications with the outside world, drew *campesinos* into fishing, and produced technological innovations in fishing methods, boats, and port infrastructure. At the same time, new fishing organisations appeared, and the government established a greater presence to administer the fishery resources.

Other factors affect the community and its interrelationships and culture. Marriage with outsiders has diversified social and family relationships. The Catholic religion not only has dominated behaviour but also has constituted the focal point of community and working life. When farming was the main activity, people turned to a fusion of Mayan gods and Christian images to appeal for better yields. When farming was replaced by livestock, Christian figures were seen as intermediaries between the ranch owners and the yield from their herds. Now that fishing is the principal activity, the Christian figures have become the main protectors, guardians, and harbingers of good luck to fishers.

Fishing brought with it growing numbers of people who are devoted to this activity. This sparked a net demographic growth (immigration minus the difference between deaths and births). San Felipe's population rose from 300 in 1950 to 1,254 in 1980, and to 1,832 in 2000 (CONAPO-CINVESTAV 1987; Fraga Berdugo1992; INEGI 2000).

These successive broad stages in socioeconomic development (subsistence farming, extensive ranching, artisanal fishing, and regional tourism) plus the internal characteristics of family and religious bonds explain another

fundamental feature of this community. This is its ability to organise self-management based on the fishing cooperative, the municipality (and its president), and the Fuerzas Vivas, a type of village council formed by the leaders of local producers' organisations. Such self-management has made it possible to attract investments to improve community infrastructure and social welfare (construction of a church, a school, a sports field, and a health clinic, paint for house fronts, street cleaning, etc.).

In 1990, this self-management capacity led to the creation of the marine reserve. Initially referred to as the 'area for hard times in the fishery', it was subsequently renamed 'the natural fish nursery', and then the 'fish sanctuary'. Finally, it took the name by which it is known today—the Actan Chuleb Marine Reserve—as a result of an official municipal decree signed by the Fuerzas Vivas in 1995 and 1997. These different categories of local use and management reflect the progressive changes that took place in the intergenerational interactions within the community and in the relations with outsiders. Older fishers use the first two terms, while the younger fishers and NGO staff refer to the more recent one.

Actan Chuleb Marine Reserve: A 10-year local initiative

MPAs were being established elsewhere in the 1990s with a clearly top-down focus. However, as we noted earlier, through their own local initiative, fishers of San Felipe created a marine zone of 30 km^2 that contains no land portion (no dunes or mangrove swamps), located 5 km from the port, with its own rules and penalties.

Creation of the reserve was made possible by an institutional arrangement[6] peculiar to San Felipe, reflected in a community-based organisational structure. It was the result of an initiative of the fishing cooperative, with the support of the municipal government and the Fuerzas Vivas committee, which has the power to take decisions on any community matter. It also reflects a new concept of the coastal landscape, motivated by scarcity—the need to conserve fishing resources, especially those of high commercial value such as lobster—and market incentives (Fraga Berdugo 2002). People accepted the conservation argument without discarding their local knowledge and experience. On the basis of traditional knowledge, the boundaries of the reserve were initially set at the line of submerged vegetation, or 'dry grass' as it is known, in an area protected from marine currents and wave action. Here, fish species

seek shelter for feeding and spawning. Therefore, boundaries of the reserve were based on physical and biological components of the environment (Fraga Berdugo, Euán and Chuenpagdee 2001).

The establishment and local management of the reserve, which exhibits the features of collaborative management between users and the local authorities, is questioned by some. On the external front, it has no recognition from the state or federal governments, because it is located in the Bocas de Dzilam State Reserve, created in 1989. It is also very close to the western boundary of the Ria Lagartos Biosphere Reserve (Fraga Berdugo 2001). While the reserve is not recognised in law or in the management plan for the state reserve, it is considered an area of restricted use, managed by the community of San Felipe. The community argues for its right to establish and manage the reserve and to receive support, on the grounds that the reserve is the result of a collective decision. The marine reserve relies on local conservation control, based on a reinterpretation of the landscape, which contrasts with the dominant view (Nigh 2001). Thus, a confrontation exists between two interpretations of the same landscape. The local one regards it as a marine reserve, while the official one treats it as a restricted area within another reserve, according to the Management Plan of the Dzilam Bravo State Reserve (Biocenosis1999).

The reserve is questioned within the community because the local administration has not taken into account all the stakeholders. In particular, independent fishers feel excluded from the decision-making process. Female fishers who have organised a cooperative are also demanding a seat at the table for taking decisions about the reserve, such as those relating to enforcement patrols. While the independent fishers do not openly challenge the reserve, in practice some of them breach its management rules.[7] During the 10 years of the reserve's existence, stakeholders have questioned the shift of focus from community to monetary interests. There was a clearer community interest in the first years of its establishment (1990 to 1998), when those responsible for patrolling the reserve kept the population informed of their actions. At that stage, both men and women questioned and criticised decisions on any matter affecting the reserve. In contrast, according to a fisher who was a former reserve warden, since 1999 the main concern has been money for maintaining the reserve.

This shift reflects the flood of donations that the fishing cooperative received from two sources, the United Nations Development Programme (UNDP)

and the Nature Conservancy Fund, for its conservation and enforcement work in the marine area between 1997 and 2000.

The foregoing reflects the complexity and the temporal and contextual variability of institutional arrangements among the different stakeholders, inasmuch as they involve questioning and negotiation of different interpretations of the landscape and environmental entitlements (Leach, Mearns and Scoones 1999). In the eyes of outsiders, San Felipe seems a relatively homogeneous community that, as a whole, maintains control over the reserve. However, when seen from within, there is a division between members of the fishing cooperative and the independent fishers, and between those who support the community interest and those who give priority to the monetary interest in conserving the area. At the same time, the two sources of power within the community, the municipal government and the cooperative, are moving at different levels of intervention to ensure sound management of the reserve. They are basing this upon the family ties among their representatives, who change every three years. The 'mercantilisation' of conservation (Rist 1996) through the Actan Chuleb Marine Reserve is a symptom of the current disagreement among the inhabitants of San Felipe.

The state and San Felipe

Through the Ecological Balance Act, the federal and state governments regulate and administer protected natural areas, including those in the Ria Lagartos Biosphere Reserve and the Dzilam Bravo State Reserve, in which the Actan Chuleb Marine Reserve is located.

The two reserves have management plans with similar consequences in social terms. Both regard San Felipe's inhabitants as a problem since they see the bigger reserves as inadequate for the management of their local resources. However, at the same time, they are potential stakeholders or clients for environmental education and ecotourism activities, which are promoted within the larger reserves (see the management plans of the two reserves). In its current unofficial version (Duhne 2000), the Dzilam Bravo management plan recognises the local initiative to establish the marine area and its zoning as a restricted use area. The programmatic plan for the Actan Chuleb Reserve (1998), drafted by the fishers' wardens under the supervision of the Research Centre on Natural Resources (CIRNAC), a Mexican NGO, establishes rules for the marine reserve (Ortiz, Ortiz and Hirose, 1998).

Those rules include a prohibition on all types of commercial fishing and any type of fish farming or use of fish tanks. They prohibit the sunken hook-and-line techniques that poachers use, where the penalty is confiscation of the entire catch. Fishing is not permitted in the main channels linking the reserve to the sea. The catching of various species of fish, such as sharks and wreckfish, in the reserve is prohibited, and the penalty is confiscation of catch plus a fine of 5,000 pesos. Before any species of sea cucumber can be taken, studies must be submitted showing its life cycle, population, distribution, and relationship to the environment, and the environmental impact of taking it. Mexican official standards must be respected, against the applicable penalties. Citizens are required to inform the authorities of any irregularity in the reserve.

Failure to comply with these rules, which were established to protect against the exploitation of the reserve's species, is punishable with suspension of fishing licences. People caught in the act of destroying or harming the zones or areas earmarked for study, conservation, and reproduction are punished. People who enter designated zones for manatees will be punished. In fact, this zone can be entered only with permission from the reserve authorities. Diving is allowed only for viewing the species and must not disturb them, and it may be practised only when the administration considers it appropriate.

While these rules exist in the Programmatic Plan for the Fish Sanctuary (1998), a copy of which was sent to the State Ministry of Ecology in 2000, the initiative has no official backing. From an interview with a municipal president, we learned that the cooperative and the municipality have no enforcement powers, since they would be operating outside the law. On seven occasions, the local government has fined poachers fishing in the reserve, because the cooperative transferred this responsibility to the municipality under the cover of a community agreement. Yet the power of the municipal authorities is slipping from their hands with each change of administration (every three years the executive and councillors change). In addition, depending on the family relationships between the executive and council representatives, there may be little inclination to enforce proper management of the marine reserve. Another obstacle to sound management of the reserve is the fact that in 2003 the fishing cooperative was split into two sections for reasons of partisan political rivalries and other internal considerations.

Change at the state government level is another obstacle to collaborative management of the marine reserve, because it allows for no continuity in the process, and incoming representatives are unfamiliar with the social issues at stake in protected areas.

Discussion and outlook

How can we summarise the 10-year history of this local initiative for a protected marine area? We may distinguish three broad stages in this initiative, which are closely linked to the internal characteristics of the community and to external institutional relations. The first stage was that of the reserve's establishment (1990–95) without any external involvement or financing. The second stage covers the high point of the reserve's history (1995–2001), a period marked by strong municipal government support and good relations with the fishing cooperative. At that time, family ties were very close between the two representatives of these institutions. This period witnessed community recognition of collective benefits, the search for external funding for enforcement activities, and visible returns through the restocking of marine species. The stagnation stage (2002–04) has seen disorganisation in the cooperative in charge of management (for example, this was the first time a reserve was being divided into two sections), the arrival of poachers who lay out their nets by night, a lack of understanding among the two key authorities in the community (the municipal president and the president of the fishing cooperative), and the failure of the Fuerzas Vivas to make successful trade-offs.

The local benefits of control over the reserve and the need to maintain it are accepted by fishers of the cooperative, who account for 80 per cent of the permanent fishing population in the area. However, these people are also faced with new circumstances. They have to ready the reserve to receive sport-fishing tourists, now that hotel owners, primarily in Cancún, have made arrangements to assure a steady stream of visitors. Here again, the focus is shifting from a community interest to a monetary interest in conservation, according to local informants.

In June 2003, a start was made at decentralising control over the reserve through the proposed Marine Reserve Committee. In March 2004, that committee, consisting of two representatives of each of the community's producer organisations, obtained registration as an NGO. This process has

been supported by the municipality but not by the cooperative itself, because there are two camps within the cooperative: those who approve decentralisation and those, essentially the directors, who do not. Faced with this situation, we must take account of the following elements for a more in-depth analysis of the future outlook for the reserve:

- a still incomplete process of decentralising the reserve (cooperative versus community);
- recognition of the area's tourism potential if it is maintained as a marine reserve;
- the demand for participation by other stakeholders (independent fishers and members of the women's cooperative) in patrolling the reserve;
- the need for financing for alternative activities to fishing; and
- the demand for a new representative structure, despite the new committee created in 2003.

Governments—municipal, state, and federal—are facing diverse situations and interests with respect to protection and conservation of resources. In the particular case of the marine reserve, the problem is appreciated from different perspectives. Some are short-term, and there are conflicting interpretations and perceptions of the laws that have been issued.

When examining natural protected areas, this Mexican case reflects the need to take account of the social relationships existing between the inhabitants of the communities and the different interests relating to use and management of resources. In the following paragraphs, we shall examine a case in Cuba and the similarities and unique features that exist there, given the social and political structure of the island.

COMMUNITY AND MARINE PARK ON THE ISLA DE LA JUVENTUD, CUBA
(Jorge Ángulo, Rodney Borrego, and Reynaldo Borrego)

In Cuba, our area of study was the National Marine Park of Punta Frances (PNMPF), located on the Isla de la Juventud. This area has been designated for recreational scuba diving since 1976, when it was placed under a special regime of use and protection by the Ministry of Fisheries (MIP). Adjacent

to the Park is the coastal community of Cocodrilo, founded at the beginning of the last century. It has remained in splendid isolation since then because of its geographic location.

The objective of this study was to evaluate the real and potential benefits the park brings to the community. To this end, we worked with secondary information sources and qualitative interviews involving community members, including the president of the community, the official historian, and the general public, in addition to various government representatives of the zone. Through these interviews, we were able to ascertain that under the current conditions in the community of Cocodrilo, the people feel no sense of ownership over the resources of the PNMPF. In addition, they receive no direct benefits from it of any kind. We propose some possible routes for resolving this problem.

Isla de la Juventud

Since 1976, the area around Punta Frances has been a national marine park, with management category APRM (managed resource protected area). It has been used for tourism purposes by the Ministry of Tourism; therefore it has been subject to special conditions governing its use and protection. The region contains special natural features that make it one of the principal tourist destinations in the country for observational scuba diving (Gonzalez-Sanson, Breton, andOvares, 2002).

Although this marine area has been subject to some form of protection for a long time, it is not legally recognised as a national marine park. Instead it is a 'zone under special use and protection' (Resolution 560 of the Ministry of Fisheries, December 24, 1996). That resolution merely regulates commercial and sport fishing activities, while other primarily tourism-related activities conducted in the zone fall outside its purview. This has led to conflicts between park uses and users that have become very evident in recent years, and there are fears that the environmental impact will increase in the near future. This means that it is essential to take specific measures to protect the integrity of the marine and land ecosystems in the zone and assure proper management of this MPA as an instrument for conservation and rational use of coastal resources (Bohnsack 1993; Bohnsack and Ault 1996; UNEP 1996; Agardy 1997; Mascia 1999).

Community of Cocodrilo

One of the most interesting aspects of this research project was the coastal community of Cocodrilo, which stands isolated on the southwestern shore of the Isla de la Juventud, approximately 20 km from the PNMPF and 100 km from Nueva Gerona, the municipal capital (see Table 4). Cocodrilo was established at the beginning of the twentieth century with the arrival of fortune seekers from Jamaica and the Cayman Islands, and it remains the only human settlement on the southern portion of the island. Thus, it is socially isolated. One of the first settlers was Atkins Jackson, who came there with his family. The place was originally known as Jacksonville, but the name was changed to Cocodrilo (crocodile). For many years the village was inhabited by English-speaking people who introduced their customs and their culture, and who lived essentially from catching fish and sea turtles and exploiting the land. Some examples of these early settlers' typical architecture and their subsistence economy are still preserved.

The community currently has a population of 308: 135 females and 173 males. The working-age population numbers 174 (90 men and 84 women). Of these, 106 are actively employed, representing 60 per cent of the workforce. The community includes 93 children and adolescents. Although the employment level is high, it is still a struggle to strengthen people's working links. Attempts are being made to develop new sources of employment. It is the women who are most affected by unemployment. A total of 34 women are working, representing only 19 per cent of the working-age population (Tenenbaum, Jeréz, Pillar, Portilla and Cruz 1998; National Centre for Protected Areas 2001).

The community is represented within the Cuban system of government through the People's Council of Cocodrilo. It is chaired by a delegate who is elected democratically from among the inhabitants of the zone, and who is responsible for representing the community and conducting all dealings with the government. Therefore, the president of the council is closely involved in all aspects of efforts to achieve social and economic development. As well, there are a number of political and mass-action organisations that effectively unite collective efforts and guarantee proper use of the material and financial resources received from the territorial government. These organisations include the Federation of Cuban Women, the neighbourhood

Committee for Defence of the Revolution, the Union of Young Communists, and the children's Pioneers Organisation. In their dealings with the government, community delegates are held accountable to the voters for their performance. Public meetings are held at which people set out the basic problems of the community and demand or propose solutions. The majority of the population thinks highly of this form of government, on the whole, as was made clear during our interviews. The country's difficult economic situation is an obstacle to achieving improvements in the community over the short term.

Farming and fishing are the principal sources of employment; other opportunities include forestry and the production of charcoal, as well as plant and wildlife conservation. Farming output has improved since the farming cooperative was revived; this has brought about a notable increase in the food supply for the community. Efforts are being made to establish a goat farm to increase the supply of fresh milk and meat. There is a fishing cooperative, which constitutes the principal source of employment in the community. The catch has remained quite stable despite the deteriorated state of the boats and the lack of electricity and drinking water in the cooperative's facilities. The men fish in pairs, setting out in the morning and returning at dusk. Because of the condition of the boats, fishers see very little possibility of moving to better fishing grounds. The methods used to catch fish include hook and line, drift nets, fish cages, and paternoster lines; turtles are taken with nets.

The entire catch is purchased by the cooperative directly from the fishers at prices established nationwide by the MIP. The payment scheme for fish provides fishers with a bonus in freely convertible currency (US dollars), which amounts to 20 per cent of the value of the catch. This payment mechanism operates nationwide and could promote community development. However, being the only human settlement on the south shore of the island, Cocodrilo is an isolated entity and so receives a high state subsidy in staple products. If working conditions could be improved (for instance, through better boats and refrigerated storage facilities), the fishing families of Cocodrilo could see their purchasing power increase significantly, and their economic well-being would rise accordingly.

An important element in this community, and one that merits special mention, is the fact that turtles are being caught. International regulations are in place that prohibit the fishing and marketing of these endangered

species. In fact, Cocodrilo is the only place in Cuba, and among the few places in the Caribbean, where it is permitted to take turtles, which are consumed locally as a traditional food. In the case of the hawksbill or Carey turtle (*Eretmochelys imbricata*), both its meat and its shell are used. The shells are graded, tagged, and shipped to Havana for storage with a view to future marketing, if approval can be secured from the Convention on International Trade in Endangered Species (CITES). The fishers receive 110 Cuban pesos per ton of loggerhead or caguama turtle (*Caretta caretta*), 200 pesos per ton of green turtle (*Chelonia mydas*) and 590 pesos per ton of hawksbill. The fishers do not receive any US dollar bonus for turtles.

The community has a sea turtle nursery that belongs to the MIP and is the only one of its kind in the country. Its objective is to contribute to conservation of the species by reducing natural mortality in the early stages of development. Newly hatched turtles are collected on nearby beaches and transferred to the nursery where they are kept in tanks until they are three years old. During this time, they receive special care until they are released to the wild. The facility provides employment for local inhabitants, and is considered a potential tourist attraction that could draw visitors to the community.

Because of the high priority that Cuba places on public health and education, the inhabitants enjoy free and full access to these services. This is no doubt a very favourable element for the community's development, since basic living needs are covered by the Cuban Government.

There are three nearby electric generating plants. Current average consumption is 13 kilowatt-hour, and in November of last year, service became available 24 hours a day. Previously there was power for only nine hours a day during the week and 12 hours a day on weekends. Much is made of the use of alternative energy sources. In this case, the family medical clinic and the school are powered with photovoltaic panels, guaranteeing that medical and educational services are always available.

Discussion and outlook

One of the most widely used arguments for creating MPAs around the world is that it will produce both direct and indirect benefits to coastal communities (Russ and Alcala 1994; Kelleher, Bleakley and Wells 1995; Lauck, Clarke, Mangel and Munro 1998; Boersma and Parrish 1999; Suman,

Shivlani and Milon 1999; Hatcher 1999; Nowlis and Roberts 1999; Roberts, Bohnsack, Gell Hawkins and Goodridge 2001). Yet there are few practical examples to support such an argument. The case at hand represents a practical example that does not in fact fit with the initial hypothesis.

Before 1976, the Punta Frances area was used freely and without restrictions by the community of Cocodrilo, whose members took advantage of its opportunities for recreation and enjoyment. The area's natural beauty attracted local visitors and outsiders who, despite the poor state of the access road, would come for camping. Another use, although on a much smaller scale, was fishing, because the entire island shelf is very rich in species of commercial interest. Punta Frances was also famous as a highly productive breeding ground for pelagic species.

In 1976, limits were placed on access to Punta Frances with a view to conserving the area and devoting it to tourism uses. This decision was made because the area's superb natural features made it one of the country's best destinations for recreational scuba diving. With the decision to preserve the area, fishing was banned, and this affected fishers not only from Cocodrilo but also from other provinces who relied on this fishing ground. The situation resulted in a sharp dispute between the International Scuba Diving Centre of the Colony Hotel (the agency responsible for tourism operations in the area) and the MIP.

During the 1980s this dispute was exacerbated to the point where an accord had to be struck between the parties. To this end the MIP issued Resolution 273/85 which, while it placed partial limits on fishing activity, did not resolve the problem, because it allowed the use of unselective mass-catch techniques in areas adjacent to Punta Frances. In 1995, international diving groups and individuals issued a call for more effective protection of the zone. It was then decided that the Ministry of Science, Technology and Environment (CITMA) should take over the matter and create a multidisciplinary group to analyse and resolve the problem. As a result of CITMA's efforts, the following was agreed:

- to recommend to the National Centre for Protected Areas (CNAP) and the Environment Unit (UMA) of the Isla de la Juventud the creation of the PNMPF and adoption of an operations management plan;

- to have the MIP revise its fishery regulations for the area;
- to have the Ministry of Tourism publish diving regulations for the area; and
- to make the UMA responsible for drawing up a set of regulations for the area and enforcing them.

All of these agreements have been fulfilled except for the first, which is still at the government approval stage. As noted earlier, the zone is legally recognised in MIP Resolution 560/1996.

Despite good intentions and interest in resolving the problem, there is a critical element missing that leaps to view. In the make-up of the multidisciplinary team created by the CITMA, there was no direct representation from the community of Cocodrilo, meaning that its interests in the area were not considered. This oversight contributed to the current feeling of indifference towards the park among the inhabitants of Cocodrilo.

Indeed, from the interviews we conducted, we can say there is no significant interaction between the PNMPF and the community of Cocodrilo. On the contrary, local residents referred to it as a 'no-go zone' where all access is banned, and from which they derive no benefit of any kind. We heard expressions like 'I didn't know that was a park', 'I have no interest in visiting it', and 'I don't see that it's going to bring us any benefits.' If this situation is to be reversed, these views must be taken into account by those who have to make decisions about the local and regional environments.

Another interesting aspect that emerged from interviews was that the local inhabitants recognised that their limited vocational training was a major obstacle to finding employment in the park. Currently, there are only three people with post-secondary education in the community, one of whom used to work in the park but no longer does so. Nonetheless, on several occasions people have been brought in from other places to do work that could just as well be performed by inhabitants of Cocodrilo.

Although there is a pronounced indifference towards the park among local inhabitants, some of them can see potential benefits for the community. These are both economic and non-economic. Economic benefits include the possibility of jobs, the provision of goods and services to tourists visiting the park, and fishery benefits through the use of resources from the open sea that are not covered by Cuba's fisheries regulations. As mentioned,

Punta Frances contains splendid fishing areas for pelagic species. Non-economic benefits include the establishment of relationships with new people from other places, thereby increasing cultural cross-fertilisation (this is especially important, given the community's historic isolation) as well as raising local people's cultural awareness, and the strengthening of their sense of ownership and custody over the natural treasures of the PNMPF. Such exposure will reinforce traditional values and pride in their history and culture among community inhabitants, and will help them transmit these to other places and people. In this connection, we could see that the inhabitants were very proud that their community was free of social problems such as drugs, prostitution, and crime. Many pointed out that people in the community leave their doors unlocked.

It was also interesting to note the consensus among community members that the current system of government is the best one for resolving the problems currently affecting them. Most of the people we interviewed called for making better use of existing tools. They referred to those political and mass-action organisations which they felt could focus efforts on reducing tensions between the park and the community. One option that emerged from this project was the creation of a pro-nature group in Cocodrilo. Funding for it was received from the Cuban NGO Pro-Naturaleza, and it is hoped that the group will serve as a catalyst for reconciling the PNMPF and the community of Cocodrilo.

In conclusion, under current circumstances, the community of Cocodrilo feels no sense of ownership over the resources of the PNMPF, and receives no direct benefits of any kind from the park. We believe that the decision to protect this marine area should have been worked out in consultation with the community, given its interests in the area. Had this been done, today the community of Cocodrilo would enjoy better living conditions and could set a good example for other coastal communities in the Caribbean in terms of the benefits of establishing an MPA.

FISHING COMMUNITIES IN THE JARAGUA NATIONAL PARK, DOMINICAN REPUBLIC

(Yvonne Arias, Ernst Rupp, Jeannette Mateo, Víctor Gómez, and Milton Haughton)

This case study focuses on the socioeconomic characteristics of local stakeholders and of the fishing activity itself, which relates primarily to the species *Strombus gigas,* the pink or queen conch (known locally as 'lambí'), in the Jaragua National Park. Our study looks at existing legal mechanisms, threats, characteristics of the park, some features of the fishing communities, and the outlook for management of the coastal marine zone. We used interviews with fishers, conch merchants, and women who are involved in the conch business, as well as the authorities and key stakeholders in the fishery. We evaluated levels of knowledge about the conch and perceptions about the institutional setting surrounding the fishery. We administered a total of 79 questionnaires to collect socioeconomic data and information on the fishery.

Jaragua National Park

The zone where the Jaragua National Park is located was formerly known as the Cacicazgo of Xaraguá, which was ruled by the Cacique (or 'strongman') Guarocuya, who was one of the most important leaders of the Taino. The area was used for the fishing of conch, among other resources. Vestiges of this activity can be seen in the thousands of shells in the *concheros,* conch deposits. A particular feature of the *concheros* is the circular opening in each shell, through which the meat was extracted.

The zone has always been considered of high conservation value because of its biological diversity, because it is a refuge for endangered species, and because its fishery holds great scientific and commercial interest. It is also a strategic military zone, with a navy base on Beata Island. With its great concentration of seagulls, the island of Alto Velo was once a major source of guano, which was extracted and exported. The geological features of the park are such that there are no significant human settlements, for the thickness of the vegetation and the poor quality of the soil made it inhospitable to humans. Therefore, the forest cover of the protected area is intact and in a very good state of conservation.

The park was established on August 11, 1983, via Presidential Decree 1315. All the technical steps necessary to its establishment were taken, in terms of surveying its natural, cultural, and economic resources. Social conflicts were identified using a multisectoral and interdisciplinary participatory approach. Since its creation in 1983, it has faced continuous threats from proposed subdivision of its lands, primarily along the coastal area, to meet private demands of the tourist industry. The park is located in the southwestern part of the Dominican Republic, in the Enriquillo region in the province of Pedernales, with geographic coordinates 17.47° N to 17.97° N and 71.27° W to 71.73° W. It has a total area of 1,374 km^2, of which the coastal marine zone embraces 905 km^2. This circumstance makes it one of the largest protected areas in the Caribbean. It occupies the southern portion of the Barahona Peninsula, and includes within its boundaries the islands of Beata and Alto Velo, as well as the Los Frailes and Piedra Negra cays.

Along with its buffer zone, Jaragua National Park constitutes one of the few remaining areas of pristine Antillean wild lands, particularly those occurring in arid and coastal-marine ecosystems. The park protects a unique sample of numerous ecosystems belonging to important biogeographic provinces of Hispaniola, which have served as centres of plant and animal speciation and dissemination for the Antilles. It possesses twelve types of terrestrial plant associations. Its ecosystems include beaches, rocky coastlines, wetlands, seagrass meadows, coral reefs, cays, and islands. The park's unique flora and fauna present high levels of endemism, at both the species and the higher taxa levels.

The pristine white sandy beaches, such as those of the Bahia de las Agilas and Trudillé, and the wetlands offer incomparable scenic vistas, as do the rocky cliffs along the mainland and on Beata Island. The park represents one of the most significant habitats for *in situ* conservation of biodiversity in the Caribbean. It represents the only protected portion of coastal marine lowlands of the 'South Paleoisland,' an ancient division of Hispaniola. Some of the most extensive and best-preserved seagrass meadows of the region are found within this park's marine ecosystems. These support several wildlife species that are threatened or of commercial importance. In other words, the best-preserved reefs in the Caribbean are to be found in its waters.[8]

Research techniques

This study focused on fishing communities and their activities, primarily conch harvesting, at five fishery sites in the Jaragua National Park. We conducted interviews with fishers, conch merchants, and women involved in the conch business, as well as with the authorities and key stakeholders in the fishery. We evaluated levels of knowledge about the conch and perceptions about the institutional framework that governs the fishery.

To collect socioeconomic data and information on the fishery, we conducted a total of 79 semi-structured interviews with conch fishers in five communities in or adjacent to the Jaragua National Park: Pedernales, La Cueva, Trudillé, Piti Cabo, and Beata Island. These interviews were conducted between September 2002 and April 2003. Using the key-informant interview technique, we interviewed the six biggest conch merchants in the community of Pedernales, the main port of departure for fishing in the zone. We performed a strengths, weaknesses, opportunities, and threats (SWOT) analysis with a focus group consisting of ten people, including the major conch merchants and fishers. We interviewed seven women –the only females involved directly in the conch business—between January and May 2003, in the communities of Manuel Goya, La Cueva, La Colonia, and Trudillé.

The park's fishing communities

One feature of the communities that are economically involved in the park is that they are located both within the park and in its immediate vicinity. As explained earlier in this chapter, this meant we had to adopt a flexible notion of what constitutes a community, since most of the settlements consist of fishing camps that have no real legal status. Pedernales, the major permanent marketing point for park products, stands on the frontier with Haiti, and La Cueva, Trudillé, Beata Island, and Piti Cabo are secondary points with seasonally shifting populations.

The fishers lead a very precarious existence, with no basic services of any kind, living in dwellings made of palm fronds, with sand floors. Because it is impossible to live as a family unit within the park, fishers are separated from their families, which are generally headed by the mother and dwell in villages far from the fishing encampments. More than half of the fishers are single

and they move from one camp to another, depending on the fishing prospects. Family settlement is strictly prohibited on Beata Island, which is considered a strategic military site and has a permanent naval base.

Most of the conch fishers are between the ages of 20 and 40 years, and about half have no primary education. Nearly all are self-taught divers who previously worked at lowlier occupations as cleaners, porters, cooks, and fishing crew.

Conch fishing generally involves diving, with or without air tanks. The necessary equipment includes a harpoon, a mask, flippers, a sack, a hook, and a diaphragm for scuba diving or a snorkel for skin diving (Tejeda 1995). The compressor used in conch fishing is of the kind built for painting automobiles. The divers generally descend from boats made of fibreglass. Most fishers claim they are aware of the risks of scuba diving and have experienced the bends, or know of others who have suffered decompression accidents. However, these incidents do not seem to be tabulated, and other accidents, such as compressor failure or attacks by sea creatures, are rare.

The Enriquillo region is considered one of the most biologically diverse in Hispaniola. Like the park, it is located in the province of Pedernales—the most desperately poor province in the country. A fisherman's net income varies greatly from one year or fishing season to the next. In all cases, proceeds are shared between the fisher and his helper, in more or less fixed proportions. Nonetheless, fishers feel that despite the risks inherent in their livelihood, they earn more and enjoy greater independence than do the poverty-stricken people in the communities from which they come.

Discussion and outlook

At least in legal terms, the coastal marine resources of the Dominican Republic are in the midst of a period of transition that threatens them with a fragmentation which has no scientific basis.

Governance is highly complex, because so many government institutions are involved: the Ministry of Environment and Natural Resources (Departments of Protected Areas and Biodiversity, and Coastal Marine Resources), the armed forces (the Navy), which field the park wardens and inspectors, and other authorities such as the local mayors. The resulting overlap of functions and lack of coordination, coupled with the scarcity of

human, logistic, and economic resources, provides no guarantee of effective management.

Among the elements that must be taken into account in planning for effective management are the growing number of fishers (estimated in 1997 at 500, associated with 20 fishing stations), encroachment into conch breeding areas, health risks facing the fishers, their lack of experience in other fields, the absence of alternatives, the low degree of involvement of key stakeholders in management decisions, the failure of fishers to form cooperatives or associations, and the lack of systematic records that would allow lessons to be drawn from previous experience.

The proposals emanated from studies conducted during the 1990s associated with Artisanal Fishery (PROPESCAR), along with several projects under the authority of the Coastal Marine Biodiversity Conservation, which included the Global Environment Facility (GEF) and UNDP. As well, results from other scientific studies could provide valuable input for the planning and management of the resource—provided that the opinions of local merchants and fishers are considered. These local people must be involved in designing a permanent mechanism for exchanging high-quality information as the basis for managing and settling disputes.

Conclusion

This summary of the three cases proves that communities play varying roles in the management and conservation of MPAs. This concluding summation offers the reader an opportunity to consider the questions posed earlier, in the comparative table of the three countries, and to delve further into what is becoming a crucial issue in the Caribbean.

The three case studies used different levels of analysis to portray the community dynamics that must be taken into account in any relationship between people and natural protected areas. The social, cultural, economic, demographic, and political characteristics of the communities are in constant flux. Social changes often come swiftly, and any management plan that proposes a protected area must allow for flexibility in deciding the proper use of the area under protection.

It is essential to take into account the characteristics of the communities before attempting any management activity, bearing in mind that the Caribbean is the setting for many economic and ecological interests in the conservation

of marine and coastal resources. The wealth of landscapes, wildlife, and biological diversity make the Caribbean a priority region for pooling efforts to achieve economic development that is compatible with the conservation of coastal resources.

These three case studies show that tourism is slowly displacing fishing as a source of livelihood. In the case of San Felipe, the Actan Chuleb Marine Reserve, which was established for conservation purposes by the fishers themselves and where taking is either banned or conditional, is becoming an area of tourism interest, primarily for sport fishing. In the Cuban case, the tourism interest is much more evident and has a longer history than in San Felipe. However, in contrast to San Felipe, the community of Cocodrilo receives no direct benefits from being a protected area. The Jaragua Marine Park in the Dominican Republic was created in 1983 with a view to incipient tourism. However, today its management is focused on attracting an 'outside' or tourist clientele with no benefits for the local users, since they do not even have the legal right to establish permanent communities within the park.

As these three case studies show, Caribbean communities exhibit great heterogeneity: the populations are different in their ethnic composition and their size, and also in the role that stakeholders play with others on the business and government fronts.

The fishers of Cuba are dependent on the central government for their use of and access to fishery resources, and they rely on a cooperative to sell their output at preferential prices. Fishers in the Dominican Republic and in Mexico are highly dependent on one or a few private merchants. The relationship between fishing and MPAs must take account of the varying size of those areas and the timing of the decree establishing them. In the case of Actan Chuleb Marine Reserve, which was created in 1995 with only 30 km^2 set aside, people feel that the zone is highly productive because it is a natural spawning ground for fish. As well, by setting and enforcing their own rules they have gradually turned the zone into a place that works to their benefit. By contrast, in both Cuba (where the reserve dates from 1996) and the Dominican Republic (where a national park was created in 1983 and a biosphere reserve in 2002), the relationship is more diffuse, and actually foreign to the objectives of conservation.

This area of study is very vulnerable to social conflicts over the use of and access to resources and land. Part of the vulnerability stems from the mobility of the local population in search of the means of subsistence, especially in

Jaragua, because it is in a frontier zone. Against this backdrop, the legality of conservation efforts (management plans and land-use ordinances) is a point of potential conflict, particularly if stakeholders are excluded from taking decisions for collaborative management of the resources. The technical viewpoint continues to prevail in ecological planning, even in the Cuban case. The three countries are caught up in the international conservation movement, which has a clear top-down focus, and although Cuba has a community participation model, it is not being applied to conservation policy in protected areas. We can see this in the case of the Punta Frances Marine Park, where local people indicated that they did not know it was a park and that they saw no benefits accruing to them from its status as a park.

Another element that emerges from these case studies is that the protected areas exist only on paper: there is no assured financing or any involvement of local residents in their management plans. In San Felipe, the intent was to create a marine area without government involvement, subjecting it to community rules. However, there was little hope of success because the state is responsible for conservation. Thus, conservation is in the hands of outside agents who are unable to forge a clear understanding between local users and the administrators of the resources. In our interviews in June 2004, the state government authorities proposed that this marine area should be decreed a 'core zone' of the Dzilam Bravo State Reserve, created in 1989. This term and the 'restricted use area' term (previously proposed) are in conflict because their scope is not understood and because they represent a legal notion that clashes with the daily concerns of stakeholders.

One of the clearest trends that we observed in the case studies is that marketing of these areas for tourism is outside the control of the local communities. With this 'invasion' of uses for a mobile market, there is no guarantee that the Caribbean communities will rebound. They will never again be the same, whatever the ability of their inhabitants to perform the economic activities that the global market is imposing on them.

Notes

1. The first marine protected area in the United States was Fort Jefferson National Monument in Florida, established in 1935.
2. These are areas set aside to preserve representative natural environments; to ensure sustainable use of ecosystems; to provide a suitable field for scientific

research; to generate, retrieve, and disseminate traditional knowledge and practices for sustainable use of ecosystems; and to protect the natural surroundings of zones, monuments, and archaeological sites of historic or artistic interest.

3. Articles 5 and 7 of LGEEPA established eight management categories for protected areas: biosphere reserves, national parks, natural monuments, natural resource protection areas, flora and fauna protection areas, sanctuaries, state parks and reserves, and urban ecological preservation zones.
4. The Environment Ministry lists 22 biosphere reserves, 33 national parks, 4 natural monuments, 2 natural resource protection zones, 26 flora and fauna protection areas, 17 sanctuaries, and a significant number of state reserves and urban preservation areas (www.semarnat.gob.mx).
5. The Yucatán Peninsula is home to a number of Natural Protected Areas. Seven biosphere reserves were decreed between 1986 and 2000: Reefs of Sian Ka'an, Banco Chinchorro, Calakmul, Ría Celestún, Ría Lagartos, Los Petenes, and Reserve of Sian Ka'an. Six national parks were decreed between 1987 and 2000: Arrecife Alacranes, Arrecifes de Cozumel, Costa Occidental de Isla Mujeres, Punta Cancún y Punta Nizuc, Arrecife de Xcalak, Arrecife de Puerto Morelos, and Parque Nacional de Dzibichaltún. Two flora and fauna areas were decreed in 1994: Laguna de Términos and Yum Balám. Two sanctuaries were created on October 26, 1986: a beach adjacent to Rio Lagartos Playa, and Isla Contoy Beach.
6. We understand institutions as 'regularised social patterns' that emerge from a set of structures or rules in use (Leach, Mearns and Scoones 1999).
7. During our interviews in April 2004, local stakeholders declared that there was a growing lack of interest in patrolling the reserve, compared to the early 1990s. 'Now there is fishing in the reserve and it's not like it was when people took care of it. Then there was conservation, now the only interest is money.'
8. The National System of Protected Areas is currently covered by the framework of Law 64–00. The Sectoral Law on Protected Areas was submitted by the Ministry of Environment and Natural Resources to the National Congress in 2002. In April 2004 the Senate, responding to demands that marine coastal areas should be used for conventional tourism, approved amendments to the Draft Sectoral Law on Protected Areas to exclude major coastal areas of the national parks. That bill is currently under debate, following observations from the executive branch, and the coastal zones of these two national parks thus remain at risk.

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