

Ecosystem-based zoning in the Bay of Samana, Dominican Republic

Based on zoning Ecosystems in the Bay of Samana, Dominican Republic

Zoning Based on the ecosystem of the Bay of Samana, Dominican Republic

TOMAS DIAZ ROMERO ¹, Elianny DOMÍNGUEZ YEW ², and STEVEN R. SCHILL ³
¹ CEBSE. Av. La Marina, Bullseye, Samana, Dominican Republic. hradio2@yahoo.es.

² Dominguez Elianny Tejo, The Nature Conservancy, Mayen Guerra Street # 235 Arroyo Hondo,

Santo Domingo Dominican Republic. * edominguez@tnc.org.

³ Steven R. Schill, The Nature Conservancy, E. 3050 N. 571, Provo, Utah 84604 USA. sschill@tnc.org.

SUMMARY

The Nature Conservancy (TNC) in partnership with the Center for Conservation and Eco-Development of Samaná Bay and its Environment (CEBSE) completed an effort of years to develop the first analysis of marine zoning in the Dominican Republic (DR) using the approach based on ecosystems and the integration of the needs of the sectors of fishing, tourism and conservation for Samana bay. With generous support from USAID, the David and Lucile Packard Foundation, and technical teams of the Ministry of Environment and Natural Resources (MARENA) and the Dominican Council of Fisheries and Aquaculture (CODOPESCA), a planning team conducted research and interviews with fishermen and tourism entrepreneurs in the communities surrounding the bay, organizing three public meetings to ensure the participation of sectors. Based on the results obtained for four zoning schemes bay involving the complete range of potential uses, from areas for strict conservation of resources to users open areas under compliance with existing regulations were designed. Other important achievements of the project include training events on the use of marine planning tools, public access to the database of the project and awareness efforts of the general public on environmental issues. Upon completion delivery technical report of the project and proposed zoning MARENA, this institutional alliance will continue to work with the government to develop a legal framework and ensure the implementation of a final proposal. The adoption and implementation of a comprehensive marine ecosystem-based zoning is a critical step for the sustainability of the economy and resources of Samana Bay. Unlike cases of land study, there are no examples of marine areas in the country that are managed following a marine zoning plan. If successful implementation of a final proposal would be the first example of the benefits gained by establishing a balance between socio-economic and environmental goals through marine spatial planning.

KEY WORDS: marine zoning, ecosystem-based approach, Dominican Republic

INTRODUCTION

The Convention on Biological Diversity (CBD) is based on the grounds that the biological resources of the planet, represent a world heritage for present and future generations of mankind (UNEP 2007). In compliance with the commitments taken in front of the CBD on protected areas and conservation of biodiversity, RD concluded the process gap analysis Biological its National System of Protected Areas (AVBAP) in 2008 (Dominguez et al. 2008). Subsequently, in 2009 the Dominican government presented the Presidential Decree No.57109 by which you were added a total of 31 protected areas which cover a total of 13,210.24 kilometers of land and marine habitats. Within its marine coastal component,

2008). Inside the bay it was identified that existing protected areas were limited to the coastline without offering legal protection for those coastal and marine resources extending beyond this limit; the only exception being the Sanctuary Banks Plate and Christmas covers only the eastern end of the bay. As a technical recommendation to develop a marine zoning process that will bring an integrated management of biodiversity and local socio-economic sectors was proposed.

In 2006, the Oceanographic Commission Governmental Organization (CIO) of the United Nations Educational, Scientific and Cultural Organization (UNESCO) implemented the "First International Workshop on Marine Spatial Planning" together with the Program on Man and Biosphere (MAB). The results were compiled in the report "Visions for a Sea Change" (Charles and Douvère 2007) which provides technical guidance on the link between ecosystem-based marine spatial planning and approach; also it provides legislative, political and scientific aspects that accompany the implementation of both strategies. The context of this document, the special marine planning was described as a planning process to improve decision-making and implementation of ecosystem-based approach.

It based on coastal and marine environments ecosystem management in Latin America and the Caribbean through the development, use and dissemination of marine zoning tools in the DR. It is expected that the project results provide a support tool for integrated national coastal and marine resources in support of the mission of the Ministry of Environment and Natural Resources RD.

METHODOLOGY

Methodological concepts

For the following special marine planning project was defined as a tool that aims to achieve the balance between social and economic needs of human communities, and the need to conserve and protect the marine environment. Therefore it offers a concerted planning with users through a participatory and open process, which is a comprehensive and consensual approach to making future decisions about users and resources. The marine spatial planning process can be implemented at the site level or larger scale, and raises distribute the three-dimensional marine space for specific uses according to targets set at the biological / ecological, economic and social in legislation and policies level. It should maintain a comprehensive and adaptive approach to help resolve conflicts between users and natural resources, so that it support an ecosystem-based interest in the areas of management. This planning allows human uses within the marine environment integrated, consistent and futuristic decisions are based.

As for the concept of ecosystem-based (EBE) approach, the definition of the CBD that was adopted: "The ecosystem approach is a strategy for the integrated management of land, water and living resources for which conservation is promoted and sustainable use in an equitable way" (CBD 2010). Therefore, this approach seeks to achieve equity goals of conservation, sustainable use of resources and the benefits arising from such uses. Similarly, detailed implementation guidelines were adopted in the document *Decision V / 6 of the fifth meeting of the parties (CDB 2010)* including the recommendation to consider the ecosystem approach to achieve adaptive management that can provide answers to situations of uncertainty and can use information derived from research stands. As for the process design proposals for marine zoning study area, it was conducted a literature review which will provide fundamentals and technical principles to guide work for a multi-user marine zoning and based on EBE. various projects worldwide marine zoning were analyzed taking into account the technical aspects, methodologies and approach

Working with users, management decision-making to negotiate and / or resolve conflicts between users, and integration processes, publication and public dissemination of information.

Methodological design

Specific objective of the project was proposed to develop at least three marine zoning schemes for the study area using the EBE, considering socioeconomic needs of multiple users and ensuring their active participation in the process. The methodological design was structured as follows:

- i) Bibliographic Collection news and investigations carried out to date in the study area, including previous efforts marine zoning and sectoral systems;
- ii) Development of a geo-referenced database project data;
- iii) Identification of gaps critical information for project implementation and execution of fieldwork necessary to eliminate gaps prioritized;
- iv) initial design marine zoning schemes developed by the technical team.
- v) Workshops in the study area to display, review and incorporate inputs of selected users;
- vi) Presentation of the project results to the authorities of the Dominican government and feedback process;
- vii) Presentation of final technical recommendations to the Dominican Government;
- viii) Product Design public dissemination of project results.

Atlantic Ocean

The project study area was defined as within Samana Bay; the coastal stretch north to Cabo Samana; its coastal stretch south to the community of Nisibón; and the ocean area adjacent to the bay to the isobata 750 m. In addition, they watersheds that discharge into the bay as part of analysis of environmental impacts to consider when zoning for the study area (Figure 1) were included. Socioeconomic users selected by the project were:

- i) The Tourism Sector: representing the activity of whale watching tours all tourist boats around the bay, tourist cruises and diving made around Cayo Levantado;
- ii) The Fisheries Sector: represented by shrimp fishing, fishing for reef fish and pelagic / deep sea fishing;

- iii) The Conservation Sector: represented by species breeding areas of commercial and ecological interest [including fish, crustaceans, molluscs and marine mammals] defined by the project, the areas inhabited by the species humpback whale (*Megaptera novaeangliae*) Extensions coastal marine protected areas in force, and the three major coastal marine ecosystems described below.

Additionally, account was taken as a secondary user maritime traffic for commercial purposes, represented by commercial vessels passing within the bay.

The process of identifying major ecosystems in the study area resulted in the following selection:

- i) The ecosystem Funds Mud: represented by the area of the bay associated with the mouth of the Yuna and Barracote rivers, ecologically provides optimum habitat for species of penaeid shrimp of commercial interest for the sectors of fishing and tourism ;
- ii) The Seagrass ecosystem represented by extensions located on the north and south coasts of the bay and is part of the "breeding grounds" defined by this project;
- iii) The Coral Reef ecosystem represented by various extension thereof extending from the central area of the bay to its western end, and ecologically constitute one of the most productive ecosystems and greater commercial interest for fisheries;
- iv) The Mangroves (its coastline) ecosystem was conceived as the water mirror understood from the waterfront up to 5 meters away into existing mangrove forests in the study area.

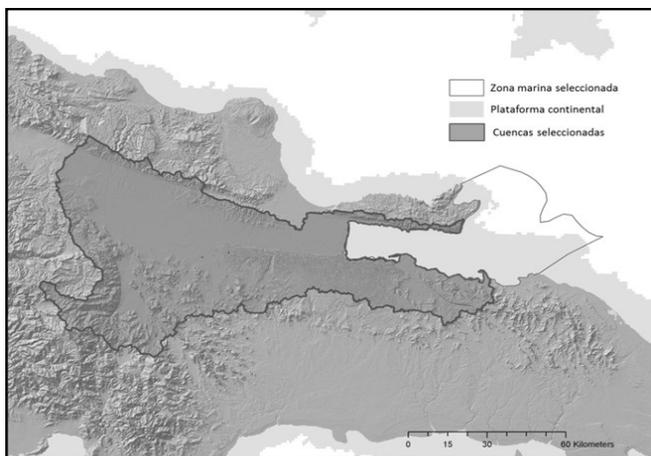


Figure 1. Project study area in the Dominican Republic.

Zoning design schemes Marina

a total of three technical workshops were conducted to determine the guidelines and parameters for designing marine zoning schemes. As a result of the first workshop CEBSE technical teams and TNC selected and completed a detailed review of Marxan with Zones Program (Marzone) tool selected for the project. As an initial exercise of zoning for the study area, inputs and parameters required Marzone and the first program runs were performed, as a feedback process for equipment was provided. During the second technical workshop, participation of technical staff the Deputy Minister of Marine and Coastal Resources and the Dominican Council of Fisheries and Aquaculture country joined. This work unit was designated as **the planning team of the project. The following objectives were met during this second workshop:**

- i) group consensus on the goal of marine zoning process for the study area " *Create a zoning scheme multi-users to Samana Bay, which supports sustainable use and effective management of benefits and services they offer their marine resources, balancing present and future needs, while reducing conflict and supporting partnerships between actors. "*
- ii) Consensus Group " *When designing schemes zoning for the area of study, the team should meet at least the objectives set by the planning team. "*

See Table 1.

- iii) Review and weighting the results of the first run of the Marzone tool.
- iv) review and consideration of the proposed Comprehensive Management for Sustainable Use in Areas of Hatcheries and reproduction of shrimp fishing in the Bay of Samana, which was the result of a previous effort carried out jointly by the Vice Ministry of Coastal Resources and Marinos and CODOPESCA

Once obtained and analyzed the results of Marzone program, the team observed two important aspects. First, it was observed that except for relatively small areas of conflict (such as the area around Cayacoa) in the bay there is little spatial coincidence between selected users and therefore does not apply one of the most important benefits of the tool is to balance and weigh the needs of use for a space defendant simultaneously by multiple sectors. Secondly, it was determined that the understanding of the resulting spatial analysis tool requires a technical level that is not yet accessible to players selected in the study area. In considering these issues and their implications for the next phase

participation of stakeholders, the team decided to use the results of the tool as inputs to design two additional zoning schemes under the consensus of the members of the planning team. It was also determined that these additional schemes would be presented to users as official project proposals and then be compared with the results of the tool for technical purposes. Thus, it was reached to categorize the decision process design zoning schemes as presented in Table 2.

In addition, the team decided to also incorporate the graphical representation of the proposed schemes 5 and 6 shown in Table 2, which are pre-project initiatives, as inputs to the phase of stakeholder participation. The purposes of this decision were to allow comparisons among all

zoning schemes available to date, and truly reflect the marine zoning in this bay has been a need for management raised through the years and remains unresolved. In addition, it should be noted that the process remained under consideration other biological, ecological and resource management issues such as:

- i) To respect the current system of protected areas in the Bay of Samaná and the protection offered by the 300 meters covered by buffer zones.
- ii) If possible, avoid fragmentation of marine ecosystems.
- iii) Provide conservation priority areas offspring on ecosystems and other users.
- iv) Maintain connectivity possible areas used by manatees.

Table 1. Management objectives for each user defined by the planning team.

FISHING SECTOR	TOURISM SECTOR	PRESERVATION SECTOR
Identify regulated fishing areas	Support industry efforts to maintain healthy ecosystems for public enjoyment	Identify uses in the bay that favor viable long-term ecosystem
Identify areas closed to fishing	Support safety at sea	Identify opportunities for reduction threats to biodiversity
Support the monitoring and enforcement of laws and regulations; support and monitoring	Identify locations for the expansion of tour-sustainable mo	Support the effective management of areas protected bay
Support adaptation to climate change	Support adaptation to climate change	Support adaptation to climate change

Table 2. Categorization of zoning schemes produced during technical workshops planning team.

PROPOSED SCHEME	DEFINITION
1. Maximum Scheme Team, provided by the planning team	The scheme covers the entire study area, and the determining factor inputs are technical team. the entire bay space used by each user is analyzed, together with their needs and weaknesses of current management. Taking these considerations into account, we proceeded to identify and designate areas geographically predominance for each user. In the case of user preservation, it took into consideration the geographical areas and current impacts on these ecosystems users, and specific to be designated a primary goal of conservation areas were identified. It is important to note that these designations do not necessarily exclude other uses that are compatible with conservation objectives.
Scheme 2. Minimum Equipment, provided by the planning team	The scheme includes a minimum area of each ecosystem and each zone used by the selected users. The determining factor is the technical inputs of the team.
Scheme 3. Maximum Marxan provided by the MARXAN with Zones	The scheme covers the entire study area, and the determining factor are the results of Marzone program, which maximum targets for each ecosystem and incorporated for each user.
Scheme 4. Minimum Marxan provided by the MARXAN with Zones	The scheme includes a minimum area of each ecosystem and each zone used by the selected users. The determining factor are the results of Marzone program, which minimum targets for each ecosystem and incorporated for each user.
Scheme 5. Fish Stocks Government, provided by the Deputy Minister of Marine and Coastal Resources, and CODOPESCA	The scheme covers the estuarine zone of the study area from the mouth of the bay to its central area, and the determining factor inputs are the technical team of the Dominican Government agreed with the fisheries sector.
6. Outline 1991 provided by the Plan of use and management Haitises National Park and surrounding areas	The scheme covers the entire study area, and raises the marina area Nucleo category exclusively for the conservation sector.

v) and meet the objectives for each user, detailed above.

Design User Participation

To ensure the participation of selected users for this project, the team organized a total of 3 events participation. First held a workshop for community Sanchez, representing the fishing sector on the ecosystem works muddy bottoms predominating mouth of the bay. A second workshop was held in the community of Samana, with the convening of the sectors of fishing and tourism as the main users of the coral reef ecosystem and the eastern part of the study area. The third workshop was held in the city of Santo Domingo, with the convening of the tourism and conservation latter including representatives of the Dominican authorities on environmental matters.

RESULTS

Schemes developed through Marzone Tool

Overall, the tourism sector for the program designated as "tourism zone" area around tránsito marino routes of cruise ships and commercial vessels as shown in Figure 2; while prioritized as "conservation areas" to seasonal distribution area annually use humpback whales and whale boats. As for the designation of space fisheries sector and the conservation sector, a trend was evident in designating as "conservation zones" areas near the coast where they meet the greatest diversity of ecosystems and species distribution ranges of interest; and in

designate as "fishing" the most remote marine areas of the coast where the predominant use of ecosystems for fishing purposes. Secondly, compliance with the maximum and minimum goals that the planning team established for each user, with the sole exception of the activity of whale watching in the tourism sector was verified. In analyzing this result in particular, it was noted that the geographical space used by this activity is very competitive and sued for all users of the bay during the annual whale season (January to April each year). It was observed that the zonificar this geographical space, the program gave priority to use to meet the goals of users and fisheries conservation; and he chose to designate "tourist area" to the area around tránsito marino routes of cruise ships and commercial vessels, as explained above. Another type of result that provided the program is the sidewalk frequency information with which a geographical area is continuously selected for a specific user. That is, that when making its "corridas" seeking zoning schemes that meet the established goals, the program continually recognized those areas were selected for the same user because its contribution is more efficient for the user. For example, most of the areas of coral reefs and muddy bottoms, were selected with very high frequency user for fishing. as he explained above. Another type of result that provided the program is the sidewalk frequency information with which a geographical area is continuously selected for a specific user. That is, that when making its "corridas" seeking zoning schemes that meet the established goals, the program continually recognized those areas were selected for the same user because its contribution is more efficient for the user. For example, most of the areas of coral reefs and muddy bottoms, were selected with very high frequency user for fishing. as he explained above. Another type of result that provided the program is the sidewalk frequency information with which a geographical area is continuously selected for a specific user. That is, that when making its "corridas" seeking zoning schemes that meet the established goals, the program continually recognized those areas were selected for the same user because its contribution is more efficient for the user. For example, most of the areas of coral reefs and muddy bottoms, were selected with very high frequency user for fishing. That is, that when making its "corridas" seeking zoning schemes that meet the established goals, the program continually recognized those areas were selected for the same user because its contribution is more efficient for the user. For example, most of the areas of coral reefs and muddy bottoms, were selected with very high frequency user for fishing.

Schemes developed by the team Planner

For the preparation of a Maximum Scheme Team, the Working Group proceeded to analyze the entire bay space used by each user, along with their needs and weaknesses of current management. Given these considerations, the working group proceeded to identify and designate areas geographical predominance for each user. In the case of user preservation, took into consideration the geographical areas and current impacts

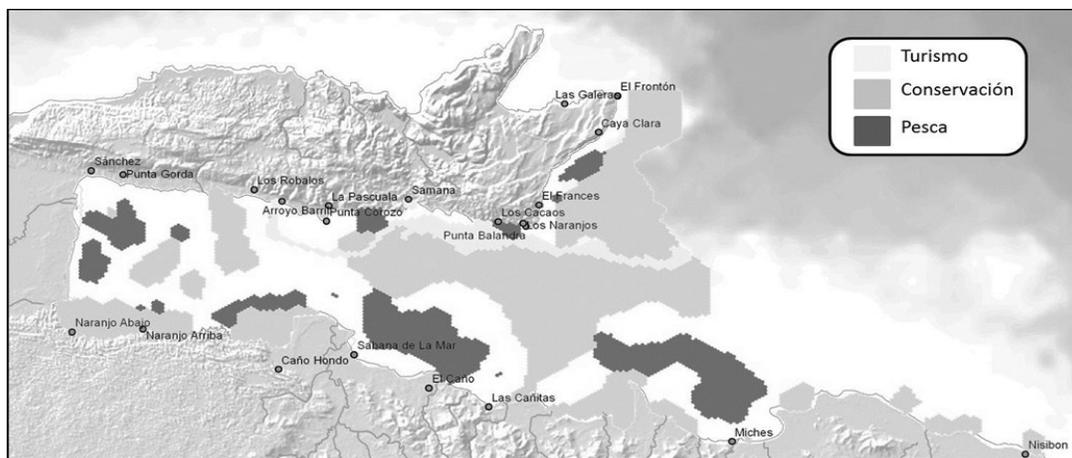


Figure 2. Minimum Marxan scheme, prepared by Marzone tool; It covers a minimum area of each ecosystem and each zone used by the selected users.

caused by users of these ecosystems, and specific to be designated a primary object of conservation areas identified. It is important to note that these designations are not necessarily excluded other uses were considered compatible with the conservation objectives of the user. To prepare Minimum Equipment Scheme, the working group analyzed Maximum Scheme Equipment and proceeded to minimize areas were designated primarily for purposes of preservation. Schemes Maximum and minimum equipment largely able to maintain the original geographic scope of the three users selected for the study area, including greater geographic extension activity was the "Whale Watching".

To achieve such results, the planning team zoning schemes designed consecutively for each user (ie fishing, tourism and conservation) and for each of the activities that make up that user. They initiating user tourism, from the collected information three geographical areas where the user tourism predominates identified in the bay: the area next to Cayo Levantado, the marina area used for whale watching, and finally the coastal marine area adjacent to the Haitises National Park, used for ecotourism purposes. Taking into consideration these areas, the design process focused on geographically delimit these areas, to analyze usage conflicts within each recording potential solutions,

It is important to note the particular case of the "tourist area" surrounding Cayo Levantado, which identified the planning team as a very conflictive area where there have been several cases of accidents and even death of visitors. The area was designated as "Zone multi-use or multi-users" where converge needs of fishing, tourism, conservation and a number of lanes that are not officially organized, making it the priority area for integrated management. In addition, at the southern end of this "multi Caravan multi-users" using the information collected during the project, the team also identified a deep and protected reef area little wave, which is considered a potentially preferred by humpback whales site, especially for mothers and calves that need to find refuge areas during the first months of the calf. Therefore, the argument to give priority to this area to provide short-term integrated management structure is reinforced. As for the remaining areas of tourism (marina area for whale watching and marine coastal zones adjacent to the Haitises National Park) in both cases the team noted that the greatest conflicts arise against other users, but are due to

monitoring and management weaknesses of these two activities occurring within protected areas. Therefore, these two aspects would be evaluated in more detail, receiving input from users during local participatory workshops.

Regarding the user conservation, it should be noted that both schemes team as in the two previous proposals for the project, the authors agreed on specific areas of ecosystems muddy bottoms and coral reefs, which recommended to integrate objectives conservation and / or preservation of natural resources that exist there. This is a very important observation, since the results of the project identified today in the Bay of Samaná still in practice "free access and extraction" of their coastal and marine resources, lacking systems patrolling and monitoring in the mirror of water. The team noted that the application from the land of existing laws and regulations for each of the users (staff present only in landing and anchorage areas), it is not efficient to achieve integrated and effective management of the study area. Consequently, for the user conservation team it chose to identify geographic areas as places to propose conservation and / or preservation of natural resources, and present these ideas at the stage of user participation. fishing on muddy bottom, reef and pelagic fishing: Finally, as the user three very specific fishing within the bay areas were distinguished. For each identified area, the same scenario of a "free access" to the entire geographical extent of fishery resources identified, and lack of monitoring and patrolling efforts in water. It was also noted that the user performs its fishing activities within or adjacent to protected areas of the bay; therefore again the team chose to identify geographic areas proposed as conservation sites and / or preservation of natural resources (with emphasis on fisheries resources and creating synergies with the conservation user) and present these ideas at the stage of participation users.

Finally, for user Fishing was not possible to make a design for marine zoning area on the western edge of the study area (area of open sea). This was because there is a gap of full information on the characterization of biological and ecological this sea area, and their users. During the course of collection and research project, only informal comments on some small groups of fishermen who sail this sea area for pelagic fishing purposes were obtained. Whereas there may actually be deep pelagic and fisheries resources, like other unexplored resources, this is an information gap identified for future initiatives.

Space statistics in the Study Area

The team obtained some general statistics on the marine space Samana Bay. This project total geographical area of 1,732 km² was analyzed. It is including all the sub space from inside the bay Samana to isobata 750 m. This marine area was determined that 63% is used by the user maintenance (ecosystems, species and areas of interest), 36% is used by the fishing user, and finally 27% is used by the tourism sector. Although they represent a very small proportion of marine space the Dominican Republic in Samana Bay meet the space requirements of economic sectors, supporting its activities on natural and cultural resources offered by the bay. **Total demand bay space for three users was estimated at 2,169 km². If we calculate the geographic spaces that each sector to use with the exclusion of other users.**

User feedback

Sánchez community, as the main user of the fishing area on muddy bottoms, selected as the preference *Reservations scheme Pesqueras Government* (see Table 2) which raised a total of 6 polygons as "fish stocks" located along the coast of muddy bottoms. Participants confirmed that the proposal clearly represents their interests, joined the fisheries sector representatively and wish to request that it enter into force as soon as possible. Subsequently, participants provided information on illegal practices, destructive and unsustainable fishing; and also they noted weaknesses in the management of fisheries in the Bay area, specifically referring to the monitoring and control of fishing in the water body.

In the workshop in the city of Samana, they were attended by representatives of the three selected users. For the fisheries sector, participants they understood and advocated conservation areas where fishing offspring are not allowed, although they differ in what would be their geographical boundaries. Also they supported the proposal *Reservations scheme Pesqueras Government (5)* (See Table 2) for areas of "fish stocks" discussed above. For the coral reef ecosystem, it was confirmed that the reef formations towards the eastern end of the bay are considered by the fisheries sector and in better health at the same time, they represent the main area most frequented reef fishing by local fishermen and other communities outside the bay. During these two workshops involving users was not possible to identify a single zoning scheme for the whole bay; it became clear that the participants handle a vision of sectoral management and geographically targeted at specific sites of interest or conflict with other users. This view also appreciated the work sessions

on problem areas and identifying proposed solutions.

Given the results obtained locally in the study area, the technical team agreed to make two last exercises zoning qualitative, for presentation at the last workshop user participation to be held in the city of Santo Domingo. The first scheme is based on the distribution of each natural component (ecosystems and endangered species) and various ways are used to delimit areas of potential conflict indicator. Using this criteria a zoning scheme with a total of 9 zones characterized by its main user, its conservation objectives and implementation of existing legislation was designed. The identified areas were:

to. Strict conservation zones; b. areas based ecotourism nature; c. fishing areas; and d. multipurpose areas.

The second scheme is presented in Figure 3, and was obtained from a weighting of feedback obtained from users, and the goals and objectives set by the project. The resulting scheme includes the following categories:

- i) **Areas of natural resource reserves - where strictly to the natural** resources protection is provided. On the basis of polygons proposed in Scheme Fish Stocks Government (5), two additional polygons that were identified during the course of the project were included. The first is the area seagrass into the protected area Jina bay, which was designated as a priority area for users; and the second consisted of a coral reef area on the eastern end of the bay, which was bounded by the planning team.
- ii) **Conservancies - where it offers** level of protection to marine and coastal resources and practices prohibiting extractive activities while maintaining a control system visits and systems monitoring and control of all activities permitted are established. For this purpose, three zones within existing in the study area protected areas were identified: the marina bay area Jina; and into the Marine Mammal Sanctuary reef area in the bay platform edge.
- iii) **Tourist areas - where recreation and leisure activities are offered to** the public while maintaining control systems and monitoring visits in compliance with regulations and standards established by the Dominican government. For this purpose two zones of permanent within existing in the study area protected areas were identified: Cayo Levantado is currently a high demand tourist destination; and the coastal area

adjacent to the Los Haitises National Park; and whale watching area with seasonal.

iv) Fishing areas - in which practiced the

fishing activity in compliance with the rules, regulations and Fisheries Law of the Dominican Republic; and also it is offered to patrol systems, surveillance and monitoring of fishery resources fishing industry. For these purposes the remaining expanses of muddy bottoms ecosystems and coral reefs, and marine extension opposite the eastern end of the Samana Peninsula where pelagic zone with the help of the fisheries sector was delimited identified.

The latter scheme was subsequently analyzed in greater detail by the technical teams of CEBSE and TNC, and was finally selected as our official technical recommendation to the authorities of the Dominican government.

CONCLUSIONS

As institutions of technical cooperation for the Dominican authorities are institutional commitments TNC and CEBSE provide our support to increase effective management of protected areas (such as reserve areas of national biodiversity) and the implementation of integrated management approaches that reflect the human and living resources of the planet being. Having weighted the results of the project, detailed below our final technical recommendation for Samana Bay, Dominican Republic. We believe that the sustainability of the environmental benefits and services offered by Samana Bay users, required to continue with this process marine spatial planning as the strategic choice to achieve integrated management of human activities, ensuring coastal and marine resources for the future. Therefore, we recommend continuing with planning a second phase covering the following challenges in the study area:

- i) Given the international commitments of the Dominican Republic and in response to international efforts to establish national biodiversity strategies, is our technical recommendation that the Dominican authorities leading sectors of fishing, tourism and conservation of natural resources, continue the process multi-sectoral marine zoning, to achieve a spatial planning that supports the integrated management of Samana bay.
- ii) a second phase to this marine spatial planning in the Bay of Samana, in which priority to eliminating information gaps for fishing and conservation sectors; the revision of the existing legal framework

for marine zoning as a tool for policy development related to marine spatial planning of the bay; the review of the legal basis for achieving implementation of marine zoning scheme agreed; and the definition of geographical boundaries and allocations of space is achieved through a zoning scheme approved by the Dominican government.

- iii) For the second phase, it is recommended also cover the challenge of eliminating management model *from the ground* for marine and coastal resources Samana, like the principle of *common benefit* that persists for fisheries resources offered by the bay. To achieve these two objectives, in a second phase planning process will support the design and implementation of surveillance / patrolling, monitoring ecological, monitoring human activities and programming of the relevant technical training. This planning should be established between the authorities of MARENA, CODOPESCA and Naval Marina so that integrated systems that meet the needs of the three main users in the study area are achieved.

THANKS

sincerely we appreciate the support provided by the Agency for International Cooperation of the United States (USAID) and the David and Lucile Packard Foundation for supporting us in achieving successful implementation of this project. This project was made possible thanks to the generous contribution of the American people through the US Agency for International Cooperation of the United States of America (USAID) under the terms described in the Cooperation Agreement No. 517-A-00-09-00106 -00 implemented by the Nature Conservancy and the Center for Conservation and Eco-development of Samaná Bay and its surroundings. The content and opinions expressed herein are the responsibility of the Environmental Protection Program and do not necessarily reflect the views of USAID.

LITERATURE CITED

- CDB. 2010. *Decision V / 6 of the Conference of the Parties to the Convention on Biological Diversity. Ecosystem Approach*. <http://www.cbd.int/decision/cop/?id=7148>.
- Charles, E. and F. Douvère. 2007. *Visions for a Sea Change*. Report of the First International Workshop on Marine Spatial Planning. Intergovernmental Oceanographic Commission and Man and the Biosphere Program. IOC Manual and Guides, 46: ICAM Dossier, 3. Paris, France. UNESCO. (Inglés). 208 pp.
- Dominguez, E., K. F. Grasela and Nunez. 2008. Analysis of gaps representation of the national system of protected areas (SINAP) of the Dominican Republic. Technical Report Ministry of Environment and Natural Resources. 162 pp. Great Barrier Reef Marine Park Authority. 2004. *Great Barrier Reef Marine Park Zoning Plan 2003*. Posted by Great Barrier Marine Park Authority. Australia. 220 pp. UNEP. 2007. Convention on Biological Diversity. history Agreement. <http://www.cbd.int/>.