The Community-Based Zoning Process to Establish the Seaflower Marine Protected Area, San Andres Archipelago, Colombia

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ABSTRACT

Declared nationally by the Minister of Environment, Housing, and Territorial Development in 2005, the Seaflower is Colombia's first marine protected area (MPA) and the largest in the wider Caribbean. It covers 65,000 km^2 and is divided into three administrative sections. CORALINA, the local representative of Colombia's National Environment System (SINA), is responsible for day-to-day management. The proposal to establish a locally managed MPA emerged during a search for solutions to the issues, threats, and conflicts posed by the historical open-access regime, which were identified during stakeholder consultations. The community and CORALINA agreed that establishing a multiple-use MPA would be a viable tool to improve conservation, reduce human-based impacts on ecosystems and biodiversity, and promote sustainable use. Early in the planning process, MPA objectives were developed in collaboration with stakeholders. To realize these objectives, the MPA was zoned for management levels ranging from total protection to controlled industrial fishing. The process to zone the Seaflower MPA was an on-going collaboration between institutions and resource users. Decisions were made jointly, with the community having input on boundaries and the last word on zoning. Formal agreements were signed with stakeholders; followed by the enactment of section boundaries, zoning, and general regulations by CORALINA's Board of Directors to operationalize these agreements. This paper describes the zoning process, discusses challenges, and presents lessons learned during the five-year process.

KEY WORDS: Community-based conservation, marine protected area, zoning

Proceso de Zonificación en Cooperación con la Comunidad para Establecer el Área Marina Protegida Seaflower en el Archipiélago de San Andrés, Colombia

El área marina protegida – MPA - Seaflower es la primera área de su género en Colombia y la más extensa de la Región del Gran Caribe. Fue declarada por el Ministerio de Ambiente, Vivienda y Desarrollo Territorial en el año 2005, cubre un área total de 65,000 km^2 y esta dividida en tres secciones administrativas. CORALINA, la entidad local representante del Sistema Nacional Ambiental (SINA), es la responsable del manejo del MPA. La propuesta de establecer el MPA emergió de un proceso de consulta con los diferentes usuarios del mar en la búsqueda de soluciones frente a los aspectos, amenazas y conflictos asociados al uso histórico de régimen de acceso abierto de los recursos costeros y marinos. La comunidad y CORALINA estuvieron de acuerdo, que establecer un MPA de uso múltiple podría ser una herramienta viable para mejorar la conservación, reducir los impactos sobre los ecosistemas y la biodiversidad generados por las actividades humanas e impulsar un desarrollo sostenible. Los objetivos del MPA se desarrollaron en las fases iniciales del proceso de planificación. Para cumplir con estos objetivos, el MPA se zonificó de tal manera que podría responder a diferentes niveles, desde total preservación hasta manejo controlado de la pesca industrial. El proceso de zonificación se desarrolló gracias a una permanente colaboración entre las instituciones y los usuarios de estos recursos, lo que permitió que las decisiones se tomaran concertadamente, teniendo la comunidad la posibilidad de influir sobre los límites y la zonificación definitiva. Igualmente se logró firmar acuerdos formales con los diferentes actores, los cuales se ratificaron por parte del Consejo Directivo de CORALINA en lo relacionado con los tres sectores, la zonificación y la reglamentación general, esto con el fin de hacer operativo los acuerdos. Este artículo describe el proceso de zonificación, discute los retos y presenta las lecciones aprendidas durante este proceso desarrollado por cinco años para el establecimiento del MPA Seaflower.

PALABRAS CLAVES: Conservación en la comunidad, Área Marina Protegida, zonificación

INTRODUCTION

The Seaflower Marine Protected Area (MPA) was declared nationally in 2005 by the Minister of Environment, Housing, and Territorial Development and is Colombia's first MPA and the largest in the wider Caribbean. It covers 65,000 km^2 and is divided into 3 administrative sections -- Northern 37,522 km^2, Central 12,716 km^2, and Southern 14,780 km^2 (Figure 1).

These sections include the archipelago's most significant coral reef, mangrove, and seagrass ecosystems: San

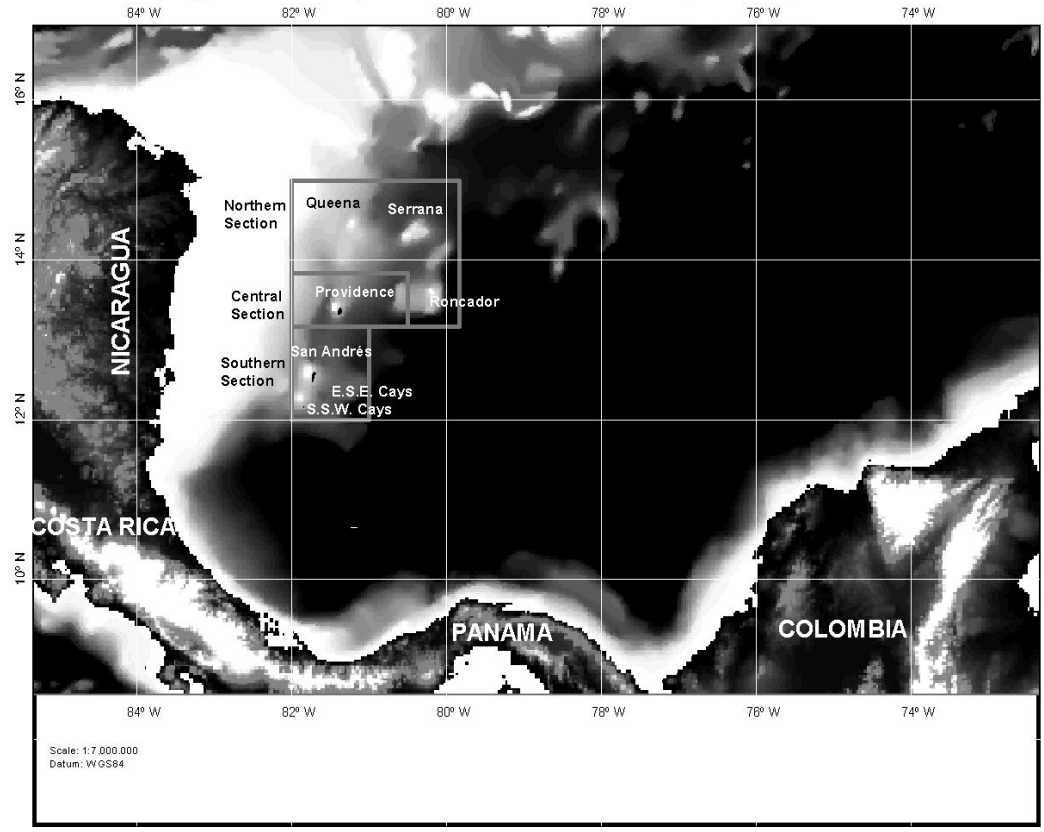

Figure 1. Location of Seaflower Marine Procted Area, Archipelago of San Andres , Old Providence and Santa Catalina, Colombia.

Andres barrier reef and coastal waters, southern archipelago atolls (Albuquerque/SSW Cays and Bolivar/ESE Cays), Old Providence and Santa Catalina barrier reef and coastal waters, and significant atolls and banks of the northern archipelago (Quitasueño/Queena, Serrana, and Roncador). CORALINA, the regional environmental authority, is responsible for day-to-day management. The marine area of the Old Providence McBean Lagoon National Park, which is managed by the national park office, is included in the Central Section. CORALINA's Old Providence office and the local branch of national parks work closely together in this section.

The idea to set up a locally managed MPA emerged during the search for long-term solutions to growing coastal and marine problems. Stakeholders and CORALINA decided that a multiple-use MPA could be a viable way to reduce human impacts and threats on productive, vulnerable ecosystems and also improve sustainable use (Howard *et al.* 2003). The archipelago's economic situation meant that planning had to take economic realities into account for conservation initiatives to be effective. In 2001 unemployment was 53.6%, with 48.6% of the population living on less than US$1 per person per day (van't Hof and Connolly 2001). Stakeholders agreed that properly designed zoning done collaboratively could serve both conservation objectives and local needs. This paper offers a preliminary look at the community-based process led by CORALINA, in which a government agency and local stakeholders worked together to design MPA boundaries and zones.

METHODS

The Seaflower MPA was developed through a 5-year participatory mapping and zoning process involving stakeholder groups including fishers, dive shops and watersports operators, and other fisheries management and marine authorities. Stakeholders were identified early in the process and organized into focus groups (Baine *et al*. in press). Groups worked alone at the beginning and with other groups or in plenary as the process progressed. Decisions were made jointly, with the community having the final word. Funding was provided by the Global Environment Facility, implemented by the World Bank. Technical partners included The Ocean Conservancy and Island Resources Foundation along with a number of collaborating institutions; especially Florida Keys National Marine Sanc-

tuary (NOAA-NOS), UNEP, and UNESCO's Coastal and Small Islands Platform (CSI).

MPA objectives were also developed early in the planning process. These objectives, which supported an integrated approach, are: 1) Preservation, recovery and long-term maintenance of species, biodiversity, ecosystems, and other natural values including special habitats; 2) Promotion of sound management practices to ensure long-term sustainable use of coastal and marine resources; 3) Equitable distribution of economic and social benefits to enhance local development; 4) Protection of the rights pertaining to historical use; and 5) Education to promote stewardship and community involvement in planning and management.

Information gathering

To gather the information needed for effective zoning, the MPA project team completed desk studies to organize and review what existed and to identify gaps. Since little information was available, a great deal of new information was collected using a variety of approaches and methods. Research was a major activity during the project planning phase and also during the first two years of MPA planning. Indigenous knowledge about past and present distribution of resources and patterns of use was collected from stakeholders through surveys, interviews, and social mapping. Information was gathered from scientists, managers, and communities about risk and vulnerability. Socio-economic information was collected from primary user groups, and a study examined the value stakeholders gave criteria related to zoning.

Baseline data were gathered in field expeditions at key sites. A rapid assessment method was used to collect information on coral condition. Benthic habitats and key species were also studied. Project economists simultaneously gathered traditional information on resource distribution, abundance, and use for each site. Major expeditions were mounted by the project's technical partner, the Ocean Conservancy, while research in accessible near-shore sites was done jointly with national organizations including the National Marine Research Institute-INVEMAR, the National Park offices at the national and local levels, and local researchers from the Fisheries Secretariat and Christian University. On-going monitoring as part of CARICOMP, COSALC, and SIMAC added to the available information; the first two are international monitoring networks linked with UNESCO-CSI while the latter is Colombia's national monitoring system.

Zoning

To realize general objectives five types of zones were designed: 1) no-entry, with use restricted to research and monitoring; 2) no-take, allowing a variety of non-extractive uses; 3) artisanal fishing, for use by traditional fishers only; 4) special use, for specific uses like shipping lanes, anchorage, ports, and marinas or uses with the potential to generate conflict like heavily used water-sports areas; and 5) general use, where minimal restrictions apply to preserve MPA integrity.

Zoning criteria -- representativeness, connectivity, inclusion of key habitats, ease of demarcation, likelihood to foster compliance, and potential to effectively meet MPA objectives -- were identified by the MPA project team with input from international advisors. The criteria were introduced and explained to the community. Finally, based on these criteria, the general objectives, and stakeholders' preferences, specific objectives for zoning were designed. These are:

- Species protection. Provide protection to biodiversity and species of special concern.
- Habitat protection. Protect representative habitats and those that are critical to the survival of species of special concern and to the maintenance of ecosystem functioning, taking into account habitat connectivity.
- Recovery. Allow for regeneration of degraded benthic communities and/or overexploited populations of fish and other marine species.
- Socio-economic impacts. Minimize adverse socio-economic impacts.
- Sustainable use. Ensure sustainability of consumptive and non-consumptive uses of the resources.
- Conflict resolution. Eliminate or minimize incompatible uses and conflicts between users.
- Equity & tenure. Guarantee equitable distribution of economic and social benefits & protect historical/ traditional rights.
- Implementation. Consider ease of demarcation for management, compliance, and enforcement.

Each stakeholder group worked together to produce maps showing their preferred allocation of zones based on their knowledge, needs, and use. Since the marine area being looked at was so large, zoning was done by sections and focused on coastal waters or those that include significant ecosystems like off-shore banks, cays, and atolls. First the Southern and Central Sections were zoned simultaneously in San Andres and Old Providence/Santa Catalina by their respective communities. The Northern Section was zoned last. Because the community of both the Southern and Central Sections frequent this area, zoning was done on both islands with the various user groups. Representative fishers from the Southern and Central Sections occasionally met together to discuss and agree on Northern zoning. Stakeholders also identified external boundaries and divisions between sections as part of the process.

CORALINA pulled together the information after each activity – the results of mapping workshops, surveys, interviews, etc -- and entered it into the Geographical Information System (GIS). Information gathered during expeditions was analyzed and systematized with support from project technical partners and participating organizations. After each user group mapped its use patterns and preferred zones, GIS maps were created to illustrate all the

information. A technical committee made up of MPA team members overlaid these maps, considered other information gathered during the process, and produced zoning alternatives for each section. The entire MPA team met to evaluate and fine-tune each alternative to ensure that it was faithful to the community's zoning preferences and use patterns as well as satisfying zoning criteria and objectives.

Before alternatives were taken back to the community, they were reviewed by the MPA's International Advisory Board (IAB), who looked primarily at conservation effectiveness. The IAB has an advisory role but is not involved in decision-making. Members include marine managers, scientists, and policy experts from around the world who volunteer their time. CORALINA then produced final alternatives for each site that were consistent with expert recommendations and faithful to the participatory process. Finally, the alternatives were taken back to the users in plenary. Meetings continued until a consensus was reached on final zoning.

RESULTS

Outcomes

The MPA project's initial goal was to protect a minimum of 2,000 km^2 of significant marine ecosystems within a system of four MPAs in the waters of the San Andres Archipelago (CORALINA 2000). Ultimately the participatory planning process resulted in the single MPA with three management sections covering 65,000 km^2 or about 22% of the archipelago's waters. Each section is zoned for management levels ranging from total conservation to controlled artisanal fishing. In accord with the community's wishes, industrial fishing is allowed only in the Northern Section. The five zone types are found in each section. Their total coverage is given in Table 1.

The Seaflower MPA was enacted at the national level in January 2005 by the Ministry of Environment, Housing, and Territorial Development. This declaration legalized the external boundaries delimited in collaboration with stakeholders and named CORALINA as management agency. The three administrative sections were approved by CORALINA's Board of Directors in June of the same year. Meanwhile stakeholder agreements were reached that defined zoning plans for each administrative section, including detailed maps of key sites. These plans were also approved by CORALINA's board in June, while the artisanal fishing zones were approved by the Departmental Fishing Board in July. This board includes representatives of the Secretary of Agriculture and Fisheries, CORALINA, INCODER (national fisheries management), and the artisanal fishers. General regulations on the uses and actions permitted in each type of zone were included in these agreements. Regulations are consistent for zone types across sections, except for special use zones where uses and regulations are zone-specific (these are not yet enacted).

Criteria

The potential effectiveness of each zoning plan was evaluated against the six zoning criteria. The first criterion was representativeness. Examples of all coastal and marine habitats and ecosystems found in the San Andres Archipelago are included in the MPA. Another criterion considered essential for effective conservation was connectivity. The three MPA sections include large buffer areas and are contiguous, minimizing threats from fragmentation and edge effect. Conservation (no-entry and no-take) zones in each section include integrated ecosystems; *e.g.*, barrier reef, lagoon, seagrass beds, and mangroves in a single zone. Design was based on theory and experience as information on aspects relevant to connectivity like larval dispersal, movement of juveniles, and transfer of materials was unavailable.

A related consideration was inclusion and conservation of key habitats. Multiple coral, benthic, beach, algal and pelagic sites are conserved in each MPA section; while mangroves and seagrass beds are found and protected in two (Southern and Central). Planning took into account replication to improve resilience; however, again decisions were based on theory, given that resilience has not been studied in the archipelago. Targets for the percentage of key habitats, marine area, or ecosystems to be included in conservation zones have not been developed for the country or the San Andres Archipelago. The project team looked at percentage targets used in other sites and at recommendations of marine scientists but concluded that there

Table 1. Seaflower MPA: Zone coverage (area)

Zone type	*Primary purpose*	*Size*
No-entry	Preservation/ conservation	116 km^2
No-take	Conservation	2,214 km^2
Artisanal fishing	Sustainable use	2,015 km^2
Special use	Sustainable use	68 km^2
General use	Buffer (allow sustainable use and protect conservation areas)	60,587 km^2
	Total	65,000 km^2

was insufficient information to set specific targets for San Andres. Another concern was that going into the process with coverage targets as a criterion would be prescriptive and could limit -- or be perceived as an attempt to dictate – the community's decision-making. Therefore, percentage of coverage was not a separate criterion in Seaflower design or part of the inclusion criterion, and was not considered during zoning. Nonetheless, the zoning process produced high levels of coverage for the archipelago's known coral reefs, mangroves, seagrass and algal beds. Results are summarized by percentage in the three sections in Table 2.

Another criterion was ease of demarcation. This played a significant role in the designation of external boundaries but was considered less in zoning. External boundaries were delimited using straight lines in accord with longitude and latitude coordinates. The divisions between the three sections are also straight lines that are easily identified and mapped. On the other hand, some of the zones are difficult to demarcate. All zones have been entered into CORALINA's GIS and mapped but developing easily accessible methods that will allow users and authorities to accurately identify where they are on the water is a challenge in the case of some zones.

Likelihood to foster compliance was also a criterion. Factoring socioeconomic concerns and existing use patterns into zoning is essential for compliance. Compliance is always important in protected area management, but in sites with weak enforcement and poor funding it must be a priority to ensure effective implementation. Therefore, the Seaflower's zoning is based both on existing and traditional use and also on stakeholder preferences, which should promote compliance. Considering historical and present use and preferences also helps meet MPA objectives to improve equity and respect traditional rights. The final criterion was that MPA zoning have the potential to effectively meet MPA objectives. To reach objectives that integrate conservation, economic and social development, and equity required that large areas that would be viable for conservation and also that were historically used for fishing and, more recently, for water sports needed to be included. All the islands' coastal waters, the main fisheries and watersports areas, and large connecting areas (buffers) were included to satisfy this criterion.

DISCUSSION

Challenges

Like any organization CORALINA faced a number of challenges by choosing to do community-based zoning. Taking a participatory role in natural resource management and collaborating with government were new to people in San Andres. Facilitating and respecting community input in decision-making, advocating for locally based resource management, and actively working for community empowerment were new approaches for government.

First, in order to participate effectively, stakeholders had to be trained. Neither the community nor local organizations could be expected to participate fully or make intelligent decisions without knowledge and information. Among other things, this meant learning about MPAs and other management options, coastal and marine resources, conservation issues, socioeconomic factors, what had been done in other sites, and the existing legal and policy framework that affected the decision-making process and would impact or limit what could be implemented.

Besides resulting in MPA zoning, additional objectives of participatory planning were to build capacity and create empowerment; which is to say that the process was also important, not just the end product. Therefore, mass education was required in conservation, marine resources, MPAs and other management alternatives, and participatory methods. CORALINA carried out environmental education initiatives that targeted all ages, levels, and groups of the community. Such programs continued throughout the planning process. Primary stakeholders were also educated in existing policies, regulations, and their legal rights in regard to participation, environmental affairs, and access to and usage of marine resources.

CORALINA's commitment to locally based management and to a planning process controlled by the community meant training not only primary stakeholders but also local scientists, managers, and other CORALINA staff. When the project began, there was no local experience with MPA planning or management. In addition to extensive training by visiting experts and in off-island training programs, the International Advisory Board (IAB) was set up to meet this challenge. This board, which is continuing to support the Seaflower during implementation, advised the project team and stakeholders on MPA issues, helped build staff capacity, and acted as contacts with their respective

Table 2. Seaflower MPA: Ecosystem/habitat coverage in conservation zones (percentage)

Ecosystem /Habitat	*Southern*	*Central*	*Northern*
Corals	51%	35%	72%
Mangroves	100%	100%	not applicable
Seagrass beds	74%	48%	not applicable
Algal beds	52%	26%	81%

organizations and the international marine science community.

In CORALINA's experience, giving users who are very familiar with the seascape the final word on zoning resulted in zones that successfully met objectives and criteria but that can be difficult for those less familiar with the sea to identify. Zones delimited by indigenous knowledge have borders that can be identified easily by those who share the knowledge but not always by others. For example, artisanal fishers use traditional names and markers to navigate through their historical waters that are unknown to outsiders. This challenge to the results of a truly community-based bottom-up zoning process does not mean that the process does not result in effective zoning and should not be used, but rather that creative ways of making borders known or of adjusting zone limits to be more easily identifiable must be developed.

Another major challenge was getting industrial fishers to the table. Other primary stakeholders – including artisanal fishers, tourism and watersports businesses, government offices, and the military (naval maritime authority, coast guard, port captains, and oceanographic institute) – were extremely supportive and committed to the process. However, the industrial fishers were unwilling to get involved, no matter what strategies were used to encourage them. Finally, after the MPA had been legally declared and when zoning was becoming a reality, owners of industrial boats or fleets announced that they wanted to be fully involved. To accommodate this, zoning for the Northern Section -- as the only section in which other stakeholders were willing to allow industrial fishing -- was declared in draft form, with the stipulation that there would be a period of time to meet with industrial fishing interests to incorporate their input into final zoning.

Conclusions and lessons learned

Any participatory, community-based process is challenging. Even defining community and who forms the community can be difficult, because a community is rarely a unified, organic whole with a homogenous social structure and shared norms (Agrawal and Gibson 2001). One of the earliest lessons CORALINA learned was that identifying and then focusing on common interests between different users and ethnic groups, which built community and reduced conflict, was the best way to bring people together. This reduced conflict and facilitated the creation of a new community – the marine or MPA community – that enabled diverse stakeholders to work together on zoning. A major contribution of the socioeconomic and value surveys was helping identify stakeholder groups' common and disparate interests. Strongly shared interests were the positive value placed on conservation and the negative value placed on industrial fishing by outside interests (Howard *et al.* 2003). United by these concerns, stakeholders previously in conflict over resource use began to work together to create their MPA.

Marine resource users have a wealth of indigenous knowledge that is essential to the zoning process. Culturally appropriate, site-specific methods need to be developed to draw out this information and properly incorporate it into zoning. Concurrent education about aspects that are new to stakeholders is essential to ensure effective participation in zoning. Technical and scientific knowledge should also be freely transferred and transparency calls for sharing information related to all aspects of project development.

It is very important to document the entire process to legitimize stakeholder input and decision-making. Careful records allow the process to be defended if challenged -- by anyone from international or national bodies to other government offices to some of the stakeholders themselves. Signing formal stakeholder agreements on final zoning was an especially strong tool to demonstrate consensus to those who needed to enact the legal declarations – in this case, the Ministry of Environment, Housing, and Territorial Development (external boundaries), CORALINA's Board of Directors (administrative sections and zones), and the Departmental Fishing Board (artisanal fishing zones).

Finally, having a well-designed method was important but summarizing the method, as is done in this paper, can mistakenly lead to the conclusion that the process progressed in linear fashion with sequential activities. In reality, actions overlapped, happened simultaneously or cyclically, and might be revisited many times. The process would be adjusted or adapted to suit the communities' expressed desires or needs at a given time. For example, information on traditional use might be gathered at the same workshop where stakeholders worked on zones. Surveys and interviews could be conducted during an education event. Zoning alternatives might be combined during plenary or a new zone limits might be delimited. Commitment to real grassroots participation meant being willing to share the entire process with the community and being aware that the community would work at its own pace and not always in ways envisioned by CORALINA. In any authentic community-based process -- because stakeholders can dictate what happens and when -- the lead agency has to be very flexible and very patient, to ensure that work is done effectively and that everyone remains fully involved and aware throughout the process.

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