Appendix Template for Submission of Scientific Information to Describe Ecologically or Biologically Significant Marine Areas

Title/Name of the area:

Seaflower Marine Protected Area

Presented by:

Martha Cecilia Prada Triana, PhD, working as scientific advisor for CORALINA
Elizabeth Taylor, CORALINA General Director
Vía San Luis, San Andrés Island, Colombia
Telephone: 57- 8-5128272

Abstract

The Seaflower MPA is located in the Southwestern Caribbean eco-region and, over 6,500,000 ha of Colombia most northern boundary. It comprises diverse coastal and marine ecosystems of the Archipelago of San Andres, Old Providence and Santa Catalina. The MPA contains the largest, most productive open-ocean coral reefs in the Caribbean; provides rare, unique and unusual reef environments; contains remote areas demonstrating high integrity and little anthropogenic influence; and displays a continuum of habitats that support significant levels of marine biodiversity. With the presence of 192 Red-Listed species, it is an important site for the conservation of endangered and threatened species of global concern. The Seaflower MPA was recognized by UNESCO as the Biosphere Reserve, and preselected by Colombia as a potential World Heritage Site is zoning as a multiple-use area with five zoning types. The Seaflower MPA provides an exceptional example of marine habitat diversity, complexity, and inter-connectivity.

Introduction

The Seaflower Marine Protected Area (MPA) contains the largest, most productive open-ocean coral reefs in the Caribbean; provides rare, unique and unusual reef environments; contains remote areas demonstrating high integrity and little anthropogenic influence; and displays a continuum of habitats that support significant levels of marine biodiversity. With the presence of 192 Red-Listed species, it is an important site for the conservation of endangered and threatened species of global concern. As much of the MPA remains unexplored, the site's intrinsic conservation value will increase even further with additional scientific study. Featuring barrier reefs, reef lagoons, reef slopes, fore-reefs, deep coral plateaus, seamounts, deep coral reefs, mangroves, seagrass and algal beds, soft and hard bottoms, beaches, and open ocean, the Seaflower MPA provides an exceptional example of marine habitat diversity, complexity, and inter-connectivity on a regional basis. The low lying cays of the atolls are Holocene in origin, ranging from less than 100 m to several hundred meters in diameter.

Location

Seaflower is an open ocean MPA surrounding the inhabited islands and including the coastal and oceanic coral reefs of the San Andres Archipelago, which is a Colombian administrative department in the Southwestern Caribbean. The largest island and center of government, San Andres Island, is about 800 km northwest of Colombia and 100 km east of Nicaragua. As presented in Figure 1, the Seaflower MPA outer boundaries are:

Point 1: 14° 59′ 08” N	82° 00′ 00” W
Point 2: 14° 59′ 08” N	79° 50′ 00” W
Point 3: 13° 10′ 00” N	79° 50′ 00” W
Point 4: 13° 10′ 00” N	81° 00′ 00” W
Point 5: 12° 00′ 00” N	81° 00′ 00” W
Point 6: 12° 00′ 00” N	82° 00′ 00” W

The Seaflower MPA comprises 6,500,000 hectares divided into three Administrative Sections (Northern 3,750,000 ha, Central 1,270,000 ha, and Southern 1,480,000 ha), with only 0.01% of the MPA as is terrestrial surface, this comprised of several tiny cays located in the midst of atolls.

The reef atolls of the San Andres Archipelago, is a region of complex bathymetry, and may play an important role in the Caribbean's oceanic circulation patterns, as current velocities increase when water flow meets elevations of the sea floor. In fact, the south-east current commonly known as the Panama-Colombia gyre, which is formed by anticyclonic meso-scale eddies (100 to 500 km). This accounts for the remaining 40% of the incoming flow (Andrade and Barton 2000). The Panama-Colombia gyre is considered unique because of its year long presence and broad area of influence (Mooers and Maul 1998), and is composed of an intense cyclone flanked by an anticyclone and cyclone, all embedded in a larger, weaker cyclonic circulation (Andrade and Barton 2000). Richardson (2005) suggests that this gyre is quasi-permanent, which is uncommon for cyclonic gyres, and that its internal speed can reach 100 cm s^{-1}. Deepwater circulation in the Caribbean Sea is also poorly understood, though it is considered to be dominated by eddies. In the central Caribbean Sea, the deep flow is linked to a cyclonic circulation (Joyce et al. 2001), while it is thought that there is a deep eastward flow along the southern boundary of the Caribbean Sea (Andrade et al. 2003).

The climate is warm and humid and is influenced both by the islands‟ geographical location and physiography. The islands are in the path of the Northeast Trade Winds, with mean monthly velocities of between 4 and 7 m/s and occasional storms with winds over 20 m/s in the latter half of the year (Geister and Diaz 1997). Mean annual air temperature in the Seaflower MPA is 27°C with a 10°C seasonal range. Average relative humidity is over 80%. Average annual rainfall is 1,900 mm with a dry season from January through May and a rainy season from June through December. Precipitation, however, fluctuates considerably within and between rainy seasons.

Feature description of the proposed area

The Seaflower MPA‟s islands and atolls, volcanic in origin and closely linked to the formation of the Nicaraguan Rise and the Caribbean Sea, are strategically placed with respect to regional water circulation. The archipelago is comprised by a series of atolls and coral banks lined up in a NNE direction that extend for over 500 km.

The Seaflower MPA exhibits complete and inter-connected ecosystems, displaying a highly diverse range of important habitats and ecological niches from the open-ocean and complex weathered coral reef formations, including rare tall pinnacles and coral cave systems, to coastal mangroves and beaches. They are valued locally for fisheries, tourism, and shoreline protection, and by tradition, but are also important for national and global conservation.

Although the Seaflower MPA has not been subject to high levels of scientific study, and remains largely unexplored, information gathered to date indicates outstanding biological value and significant marine biodiversity, with actual levels of species richness likely to be much higher than currently known. The coastal and marine ecosystems and wealth of biodiversity were recognized in UNESCO‟s declaration of the San Andres Archipelago as the Seaflower Biosphere Reserve in 2000 and its designation as an Important Bird Area by BirdLife International in 2004. The MPA is also found within the Western Caribbean Coral Reef Hotspot, identified by Conservation International, and is a Secondary Endemic Bird Area on the edge of the western flyway. Overall, the MPA contains more than 200,000 ha of significant corals, mangroves and seagrass beds that provide feeding and breeding grounds for birds, reptiles, fish and invertebrates, including many endemic, vulnerable, threatened and endangered species. Of an estimated 60-70 scleractinian coral species (often referred to as hard or stony corals) found in the Caribbean Sea, at least 48 species are known to occur in the Seaflower MPA and represent more than 80% of Colombia's coral reefs. At least 54 species of octocorals are known to occur in the Seaflower MPA, including 3 black coral species and 11 undescribed species, with possible high endemism. Zea (2002) documented total of 96 sponge species within the Seaflower MPA, but the inventory has recently been updated to 130 species. The beaches of the islands and atolls of the Seaflower MPA

are crucial habitats for nesting populations of 4 IUCN Red-listed sea turtle species: the loggerhead turtle, *Caretta caretta* (EN), hawksbill turtle, *Eretmochelys imbricata* (CR), green turtle, *Chelonia mydas* (EN) and leatherback turtle, *Dermochelys coriacea* (CR). The Seaflower MPA also supports important commercial fish populations such as queen conch, spiny and spotted spiny lobster, snappers and groupers. Of an estimated 500-600 fish found in the Greater Caribbean region, 407 species have been recorded from the Seaflower MPA, from this a total of 52 species (13%) are International Union for the Conservation of Nature (IUCN) Red-listed.

The San Andres Archipelago is at the edge of the western flyway and to date 126 migrant bird species have been documented in the MPA, of which it has been estimated that at least 85 migrant species belonging to 25 families specifically use the mangroves, wetlands and cays as stopover sites. There are an additional 31 resident bird species including 2 introductions. The St Andrew vireo, *Vireo caribaeus* (VU) is endemic and there are 12 endemic sub-species.

The Seaflower MPA is home to 192 IUCN Red-listed species including 5 marine mammal species, 4 marine turtle species that take advantage of excellent nesting beaches, 52 fish species, 43 scleractinian coral species, 2 hydrocorals, and 86 bird species including the endemic St. Andrew Virio and at least 12 endemic sub-species. It has been confirmed that at least 7 seabird species breed in the Seaflower MPA. The MPA has the highest octocoral species diversity in the Western Caribbean with possible high levels of endemism, and poriferan species diversity on a par with Caribbean continental shelf reef areas.

Within the MPA, studies over the past decade are beginning to highlight the MPA‟s importance in connectivity. Pizarro (2006), using local and Caribbean hydrodynamic models combined with biological studies of coral larvae, studied the potential connectivity between the coral reefs of the MPA and other Caribbean reefs, focusing on the larvae of the hard corals *Montastraea annualris*, *M. faveolata* and *M. franksi*. Local hydrodynamic measurements demonstrated retention of larvae on parental and nearshore reefs within the MPA, facilitated by weak current velocities within the SAI lagoon. Pizarro (2006) also highlights that the MPA reefs are a potential source of larvae for the reefs of Central America (Nicaragua, Costa Rica and Panama) and the coast of Colombia. Regional modeling suggested a larval flow of approximately 4%. Similar results have been found in the case of queen larvae with a potential to provide larvae up north of the archipelago, while providing most of the potential production to local reefs (Lonin et al, 2010), in the case of the zoanthid (*Palythoa caribaeorum*) by Acosta et al 2008.

Feature condition and future outlook of the proposed area

Results of research and monitoring since 1999-2003 reveal that coral conditions appears to be stable, with a mean 20% of live coral tissue and more than 40% of the substrate covered by macroalgae, however there is spatial variation that can vary increasing reef conditions specially in deeper areas. The main fishery is the spiny lobster, a highly regulated one that exploits a stable and in even in recovery stocks, associated in part with the reduction in fishing efforts due to the global economical crisis. In another case, the queen conch fishery, an appendix II CITES, unlike many Caribbean sites still presents areas with high densities and therefore subjected to regulated fishing. Presence and abundance of reef fish is in decline.

A major local driver of the anthropogenic threats to marine conservation in the Seaflower MPA is population pressure on resources and ecosystems, this include not only more Colombians users, but also a significant proportion of illegal fishers whose use prohibited fishing gears in detriment of the area biodiversity and productivity. Global climate change with expected sea level rise and ocean acidification, as well as increase in severe climate conditions is also crucial in areas dominated with only small islands and vast coral extensions. Tourism development is increasing but still not to the point of massive habitat destruction, however require better regulatory framework to avoid unsustainable use.

In the last decade significant progress in the resource management and community participation in the decision taken process its being in place, there is high expectation for improvement of overall ecosystem services. Many of the decisions are based on dedicated scientific studies.

Assessment of the area against CBD EBSA Criteria

Sharing experiences and information applying other criteria (Optional)

CBD EBSA Criteria (Annex I to decision IX/20)	**Description** (Annex I to decision IX/20)	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Some**	**High**
Uniqueness or rarity	Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features.				x
Due to complexity of benthic habitats that encompasses true atolls, generating a complex oceanic dynamics prone to regional connectivity.					
Special importance for life-history stages of species	Areas that are required for a population to survive and thrive.				x
Very small islands with an ethnic minority recognized en the national constitution					
Importance for threatened, endangered or declining species and/or habitats	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species.				x
Well developed coral reefs, and associated mangrove and sea grass beds, home to multiple species given the area a high bio-diversity.					
Vulnerability, fragility, sensitivity, or slow recovery	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery.				x
Due to coral dominance in the area, the minimum land and the exposure to natural disasters and climate change					

Other Criteria	**Description**	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Some**	**High**
Add relevant criteria	Presence of alien species altering natural ecosystem relationships			x	
The presence of lion fish is a factor of further fish degradation specially in an area with great regional connectivity					

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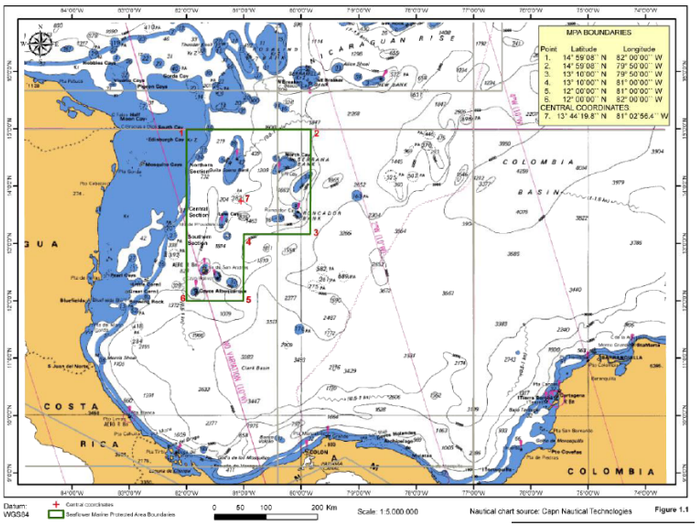
Maps and Figures



Seaflower MPA general location

San Andres Island reefs, beaches, urban development

Example of well reef development

Presence of *Acropora* reefs, an international protected species

Presence of important shark populations

High fish biodiversity

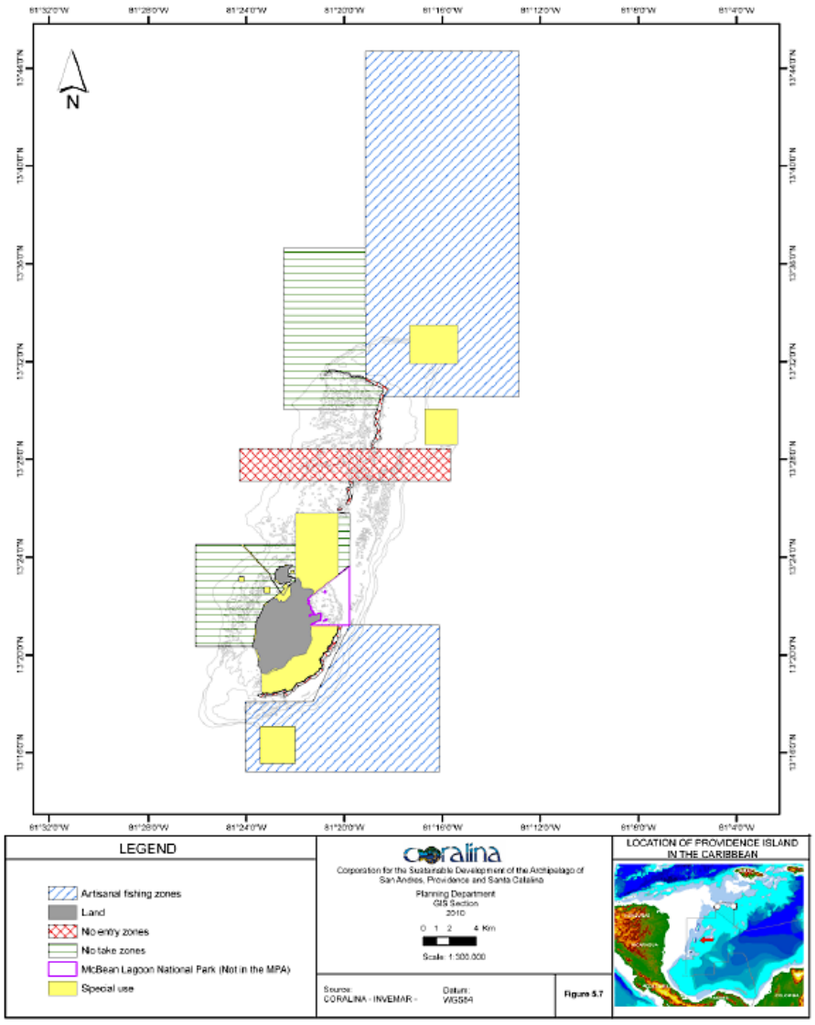

Major fisheries, spiny lobster and queen conch

Complex benthic habitats present in true atolls with oceanic unpopulated keys

Nesting colonies of sea birds

Presence of endangered sea turtle

All mangrove stands are protected



Example of multi-use MPA zoning

Participative decision taken process in place

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