

Appendix

Template for Submission of Scientific Information

to Describe Ecologically or Biologically Significant Marine Areas

*Note: Please **DO NOT** embed tables, graphs, figures, photos, or other artwork within the text manuscript, but please send these as separate files. Captions for figures should be included at the end of the text file, however.*

Title/Name of the area: Saba Bank

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Abstract (*in less than 150 words*)

The Saba Bank is a unique and highly significant area for the entire region. Biophysically it is a submerged atoll, the largest actively growing atoll in the Caribbean, and one of the largest atolls in the world, measuring 1,850 km² (above 50m depth contour). The area is significant in terms of its unique ecological, socio-economic, scientific and cultural characteristics. Its extensive coral reefs, fishing grounds and algae beds are very vulnerable to damage from international shipping, in particular anchoring of tankers and other cargo ships. Large ships also pose a hazard to the artisanal fishery practiced on the Saba Bank. In addition some of the shallowest areas of the Saba Bank pose a hazard to navigation. The area is extremely fragile to damage by international shipping (anchoring) and poses a risk to navigation and fishery in the area. The Saba Bank has been declared a protected area by the Dutch Government (15 Dec 2010 and an application to IMO has been submitted requesting for a PSSA status for the Bank.

Introduction

The Saba Bank (17°25' N, 63°30' W) is an undersea elevation with a flattened top, a bank, 3 - 5 km Southwest of the island of Saba and 25 km west of St. Eustatius (Figure 1). It is raised about 1000m above the general depths of the surrounding sea floor and its shape is approximately square or slightly elliptical, the long axis trending ENE-WSW. With a length of 60 to 65 km and a width of 30 to 40 km, the total surface area is approximately 2200 km² (measured to the 200 m isobath). The platform is somewhat tilted with the north-western part of the surface being deeper than the south-eastern part. The largest part of the bank is between 20 and 50 m depth, but a substantial eastern part (app. 225 km²) is between 10 and 20 m depth. On its western rim depths are around 50 m, while on the eastern and south-eastern edges, where a prominent coral ridge system (55 km long) runs along the platform, depths vary between 7 and 15 m (Van der Land 1974, MacIntyre et al. 1975). Saba Bank is a classic subsurface atoll consisting of a submerged mountain with a margin or ring of actively growing coral reefs. As such it constitutes the largest atoll in the Atlantic Ocean Basin and one of the three largest atolls on earth.

Location

The Saba Bank is completely within the Exclusive Economic Zone of the Netherlands. Part of the Bank is within island authority (less than 12nm). See attached maps for a designation of the protected area and a general bathymetric map. The Bank is not part of a submission to the Commission on the Limits of the Continental Shelf.

Feature description of the proposed area

At present the Saba Bank is increasingly being investigated by the scientific community and Hoetjes and Carpenter (2010) present an overview of biodiversity research that has taken place on the Bank. Below a summary is given with respect to the different taxa that are present on the Saba Bank (Table 1). Research to date has been mainly focused on species diversity and little is known about the functioning of the Bank. In the future ecological processes should also be studied in order to better understand and protect the Bank effectively. Below in Table 1 the different species groups (in alphabetic order) are shortly discussed. The total number of species that were found in the references in Table 1 represent a sample of what is present and is limited by sampling effort. Generally, the higher the effort the more species will be found, although this increase will gradually level off.

Table 1. An overview of the results of a literature survey with respect to the diversity of the Saba Bank including reports and peer-reviewed articles.

Taxonomic group	Author	Number of different species found	Remark
Fish	(McKenna 2006)	200	Possibly 2 new species
Fish	(Toller et al. 2010)	97	High abundance of predatory fish indicate healthy system in contrast to other areas in the Caribbean
Fish	(Williams et al. 2010)	270	Expected number of species between 320 and 411.
Hard corals	(Meesters et al. 1996)	28	
Hard corals	(McKenna 2006)	40	
Mammals	(McKenna 2006)	One female humpback whale, <i>Megaptera novaeangliae</i> with a calf	
Mammals	(Lundvall 2008)	Humpback Whales (<i>Megaptera novaeangliae</i>), Sperm Whales (<i>Physeter macrocephalus</i>), Spinner Dolphins (<i>Stenella longirostris</i>), Bottlenose Dolphins (<i>Tursiops truncatus</i>).	
Marine macro algae	(McKenna 2006, Littler et al. 2010)	Around 200 species found.	Diversity is extremely high. Possibly 12 new species. All species can be viewed at http://sweetgum.nybg.org/saba/algae.html
Sea birds	(Lundvall 2008)	Frigate Birds (<i>Fregata magnificens</i>), Red Billed Tropicbirds (<i>Phaethon aethereus</i>), Brown Pelicans (<i>Pelecanus occidentalis</i>), Audubon's Shearwater (<i>Puffinus lherminieri</i>)	
Sea turtles	(Lundvall 2008)	Green Turtles (<i>Chelonia mydas</i>) Leatherbacks (<i>Dermochelys coriacea</i>), and Loggerheads (<i>Caretta caretta</i>) have been observed	
Sharks	(McKenna 2006)	1 nurse shark	
Soft corals	(McKenna 2006)	20	
Soft corals	(Etnoyer 2007, Etnoyer et al. 2010)	47	Exceptionally high diversity. Two new species
Sponges	(McKenna 2006, Thacker et al. 2010)	45-50 new and 39 from previous expeditions, totaling 84 species.	Probably only 45-82% of all species.
Sponges	(Thacker et al. 2010)	84	Underestimation and new species are expected

Sea birds. Postma and Nijkamp (1996) found that seabird densities on the Saba Bank averaged two times higher than off the Bank. On the Saba Bank most seabirds appear to be concentrated around the 200 m isobath. The most common species recorded (April-May) were Red-billed Tropicbird, *Phaeton aethereus*, Magnificent Frigatebird, *Fregata magnificens*, Sooty Tern, *Sterna fuscata*, and Bridled Tern, *S. anaetheus*. Other species were Pomerine Skua, *Stercorarius pomarinus*, and Wilson's Storm Petrel, *Oceanites oceanites*. In the pelagic areas adjacent to the bank, the

Brown Noddy, *Anous stolidus*, and Audubon's Shearwater, *Puffinus lherminieri*, were most common.

Hard corals. Coral reefs are present along the east and southeast edges of the Bank and are rich in terms of cover and diversity of reef-building corals. The stony corals form the habitats (fore reef, back reef, lagoon) that other species groups use. Individual coral colonies can be found over the whole Bank. The coral reef area is quite broad, up to a kilometer in width, which means that the total reef area of the Bank is very large and may well constitute the largest coral reef area within the Dutch Caribbean.

Fish. Some habitat types such as mangroves and sea grass bed are not present on the Saba Bank. Therefore fish species that occur solely in these habitats are absent from the Bank. Despite this, the Bank still is high in diversity of fish and ranks as the 8th highest diversity in the Greater Caribbean (Williams et al 2010).

Mammals. Mammals have been sighted already many times (Hoetjes and Carpenter 2010), but little effort has been made to carry out bias-free surveys from which population densities can be calculated. It is likely that a shallow area as large as the Saba Bank plays an important role in a mostly much deeper region.

Marine macro algae. Littler et al. (2010) remark "Prior to this survey, the two most diverse areas for algae reported in the Caribbean had been Diamond Rock, Martinique and Pelican Cays, Belize, a mangrove, sea grass, and coral complex. Habitats on Saba Bank have far exceeded both of these places for species diversity. A major reason for this uniqueness and richness is the sheer size and habitat range of the seamount/atoll." Thus, the Saba Bank appears exceptionally rich in diversity of marine macro algae.

Sea turtles. The enormous diversity and abundance of marine algae and sponges means that there is ample food for these animals. Therefore it is assumed that the area is important as a feeding area for turtles. There have been several confirmed sightings of Hawksbills (*Eretmochelys imbricata*) during a survey in 2007. Leatherbacks (*Dermochelys coriacea*), and Loggerheads (*Caretta caretta*) have also been seen on the Bank (Lundvall 2008)

Sharks. Sharks appear to be reasonably common on the bank (Lundvall 2008). Species that have been found during a dedicated survey in 2010 (Williams et al. 2010) are nurse shark (*Ginglymostoma cirratum*), cuban dogfish (*Squalus cubensis*), reef shark (*Carcharhinus perezii*), tiger shark (*Galeocerdo cuvier*), and lined lantern shark (*Etmopterus bullisi*).

Soft corals. The species diversity of soft corals appears to be exceptionally high (Etnoyer 2007, Etnoyer et al. 2010) and already two new species have been found. Soft corals may benefit from the high energy environment of the Bank, which makes it a excellent environment to develop local endemisms.

Sponges. A high number of sponge species were found with a comparably small sampling effort (Thacker et al. 2010). The large area and wide variety of Saba Bank's reef habitats suggest that they provide an important reservoir of sponge biodiversity for the Caribbean. Sponge community health appeared to be very good compared to other localities in the Caribbean. Unique and potentially endemic sponge species were collected from each site, thus further exploration of Saba Bank might also reveal additional species that are new to science. Some sponge species grow to an age of hundreds of years and are especially vulnerable to anchor damage.

Feature condition and future outlook of the proposed area

The Saba Bank has a unique position in terms of geomorphology and biodiversity. The Bank is relatively isolated from land-based influences and intensive fisheries. Therefore, disruption of the ecosystem by common sources of reef degradation such as eutrophication, sediment runoff and overfishing may be small or even absent. Damage caused by other agents such as temperature increases as a consequence of climate change, diseases, the sea urchin (*Diadema antillarum*) die-off in 1983, hurricanes, and the introduction of invasive species such as the lion fish (*Pterois volitans/miles*) most probably occurred as well on the Saba Bank. There is growing scientific support that resilience of coral reef ecosystems to these region-wide disturbances may be better in areas that are relatively free from anthropogenic pressures (Mumby et al. 2007, Smith et al. 2008, Carilli et al. 2009). One of the biggest direct threats to the Saba Bank ecosystem is probably the anchoring of large tankers and cargo vessels. Their anchors and heavy chains may flatten large extensions of reef area that may require decades or longer to regenerate. With the designation of the

area as a protected area (2010), anchoring has been forbidden.

Generally the appears to be suffering from the consequences of global climate change (e.g. bleaching, acidification, lion fish invasion) and algal cover may have increased after extensive mortality following the 2005 bleaching. On the other hand the Saba Bank is removed from land-based sources of pollution and the area still offers some of the most pristine coral reefs of the Caribbean. A research program has been started in 2011 by the Dutch Government (commissioned to the Institute of Marine Research and Ecosystem Studies, IMARES) to provide more knowledge on the ecological functioning of the Bank.

Assessment of the area against CBD EBSA Criteria

(Discuss the area in relation to each of the CBD criteria and relate the best available science. Note that a candidate EBSA may qualify on the basis of one or more of the criteria, and that the boundaries of the EBSA need not be defined with exact precision. And modeling may be used to estimate the presence of EBSA attributes. Please note where there are significant information gaps)

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
<i>Explanation for ranking: largest atoll in the Caribbean. Recently, new species have been discovered.</i>					
Special importance for life-history stages of species	Areas that are required for a population to survive and thrive.				x
<i>Explanation for ranking: Fish spawning aggregations have been observed. Size and position of the Bank may give it a important function for other areas (connectivity).</i>					
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
<i>Explanation for ranking: Area is very large (app. 2000km²) and provides substrate and food for many different kind of taxa (corals, sponges, algae, fish)</i>					

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
<i>Explanation for ranking: coral reefs are very sensitive to human impact (fishing, anchoring) and harbor many protected species.</i>					

Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.				x
<i>Explanation for ranking: The area has been an important source of fish (reef fish and lobster) for decades. The area is known by the fishermen for its exceptionally high production.</i>					
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.				x
<i>Explanation for ranking: The Bank's biodiversity has been studied very recently by a team of researchers and a number of new species were found. The area was cited as one of the richest in the Caribbean in terms of biodiversity of algae, fish, and corals.</i>					
Naturalness	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation.				x
<i>Explanation for ranking: The area is surrounded by very deep water and is far away from larger land masses, thus hardly influenced by well-known disturbances such as excess of nutrients, runoff, coastal development, and overfishing. In comparison with other Caribbean areas the Bank stands out because of its naturalness and pristinity.</i>					

Sharing experiences and information applying other criteria (Optional)

Other Criteria	Description	Ranking of criterion relevance (please mark one column with an X)			
		Don't Know	Low	Some	High
<i>Connectivity</i>	Based on its sheer size the area is likely to be a source for larvae of coral and fish species and therefore be important for the biological diversity of other areas within the region.				x
<i>Explanation for ranking</i>					

References

(e.g. relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to relevant audio/visual material, video, models, etc.)

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Other material

<http://www.kennisonline.wur.nl/Eleni/BO-11-011.05> (Dutch)

Saba Bank, Treasure beneath the sea. 2002. Video documentary. Department of Environment and Nature, Netherlands Antilles.

Maps and Figures

Attached: KMZ file of Saba Bank bathymetry; protected area designation.

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None known.