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The Saya de Malha Banks

Introduction

The Indian Ocean is the third largest of the earth's five oceans. The topography of the sea bed on the high seas of the Indian Ocean is characterized by large areas of abyssal plane with extensive ridge systems and numerous seamounts, Banks, plateaus and other underwater features. Among the deep-sea ridge systems, the Mascarene Ridge includes the Saya de Malha Banks, which in some areas is less than 20 metres deep and is mostly in international waters between Mauritius and Seychelles. Named by Portuguese sailors more than 500 years ago for the carpets of seagrass that extend across the Banks, the Saya de Malha Banks in the Western Indian Ocean are home to the least explored and what is believed to be the largest seagrass meadow in the world (Hilbertz et al. 2002).

Site Description

The Mascarene Plateau, including the Saya de Malha Banks is considered to be a remnant of the ancient supercontinent Gondwana, going back to the continental break-up some 120 million years ago and subsequent separation and rifting of the African and Indian continental plates. The seafloor of the area is geologically complex and characterized by a series of plateaus, Banks, shoals and islands, surmounted in the north by the granitic islands of the Republic of Seychelles and in the south by the Mascarene Islands including Mauritius. The Saya de Malha Banks are located between 8°30' - 12° S and 59°30' - 62.30° E in the western Indian Ocean along the submerged, crescent-shaped Mascarene Ridge that runs between the Republic of Seychelles to the north and the Republic of Mauritius to the south. Mauritius and the Seychelles have jointly filed an extended continental shelf claim with the United Nations Commission on the Limits of the Continental Shelf (UNCLCS) in 2009 that includes the whole of the Saya de Malha Banks.

The Saya de Malha Banks are 40,808 square kilometers in area and are comprised of two Banks, Ritchie Banks, a smaller northern Banks to the north, and the aptly named and larger South Banks (Vierros 2009). They are separated by a fault and surrounded by deep water. Beneath 1500 meters of limestone, the remains of ancient coral reefs, the Banks are composed of basaltic basal rock (Payet 2004). The two Banks, separated by a sill and sloping steeply down to abyssal depths, consist of a series of narrow underwater shoals that range in depth from 8 to 150 meters (New et al. 2005). Because of the rich supply of nutrients and plankton delivered to the Banks from adjacent deep waters (upwelling), the Banks are an oasis of high productivity. Additionally, the entire 2,200 km long Mascarene Plateau forms a barrier modifying the predominantly westward passage of the South Equatorial Current, causing upwelling, nutrient enrichment and enhanced chlorophyll and secondary production. Due to their size and shallowness, the Saya de Malha Banks represent one of the largest shallow tropical marine ecosystems on Earth, and they may contain the most extensive seagrass area in the world, potentially covering much of the over 40 000 km² area of the Banks (Hilbertz et al. 2002).

Seagrass covers roughly 80-90% of the bottom, with a diverse range of coral species covering around 10-20%, and sandy areas less than 5%. Seagrass lawns were exclusively made up of a single species, *Thalassodendron ciliatum*, which is distinguished from other seagrasses by its ability to grow with the rhizomes directly attached to hard bottom and by the fact that it grows deeper than any other species. The predominant algae are calcareous encrusting and branching red algae, which cover most of the bedrock under seagrass lawns and overgrowing dead corals as well as living ones. Encrusting red calcareous algae are the preferred substrate for settlement by larval coral planulae, and so promote coral reef regeneration, as witnessed by the predominance of juvenile corals of many species that had settled since the 1998 Global coral reef bleaching event (Hilbertz et al. 2002).



The Saya de Malha Banks is also characterized by a highly diverse population of coral reef fishes, with the greatest diversity in close proximity to the bottom and strongly concentrated in areas of high coral cover. In contrast, pelagic fishes appeared to be much higher over the edges of the shelf, where far more flying fish, bonito, and tuna were seen. The shallow water marine ecosystem provides also feeding habitat for the green turtle (*Chelonia mydas*). Schools of spotted dolphin, spinner dolphin, pilot whales, and beaked whales are present on the Banks and at the Banks edges, in small groups or in medium sized aggregations encircling fish schools (and attracting flocks of terns overhead to areas of jumping fish), or in large packs swimming parallel to each other in long lines (Hilbertz et al. 2002). The area is known to be a breeding ground for pygmy blue whales (*Balaenoptera musculus breviceuda*). Though overall poorly investigated, the fauna described so far revealed 9 families of fishes, more than 150 species of invertebrates, with more than 100 species of gastropods from the Banks. An overall rate of 5 % of endemic species is estimated (Vortsepneva and Spiridonov 2008).

Relevance for global conservation

Ecosystems like Saya de Malha are of extreme importance to global conservation, because they may provide a crucial refuge that allows species to survive without excessive harvesting, and because they may serve as critical stepping stones allowing species to spread into new habitats and maintain genetic flow between remote and otherwise isolated populations.

Ecologically and Biologically Significant Areas (EBSAs)

Based on peer-reviewed literature and technical reports, assessment of the ecological and biological characteristics of the Saya de Malha Banks using the seven scientific criteria adopted by the Parties to the Convention on Biological Diversity in 2008 (CBD 2008; Decision IX/20, Annex I) for the identification of open ocean and deep sea areas of significance indicates that the Saya de Malha Banks meet all seven criteria for EBSAs:

(1) Uniqueness or rarity: Unique ecologically and geomorphologically, the Saya de Malha Banks are a crucial reservoir of biodiversity that support the biodiversity of the islands and coastal areas that border the western Indian Ocean. The Banks represent the largest shallow water biotope in the world and support what is believed to be the largest seagrass community in the world covering an area close to the size of Belgium (Hilbertz et al 2002).

(2) Special importance for life-history stages of species and (3) Importance for threatened, endangered or declining species and/or habitats: The Saya de Malha Banks are important to the life cycle of the seagrass species that populate the Banks. Seagrass and coral reef habitats of the Banks are also critical to the life history stages of myriad species of both flora and fauna that spend all or part of their life history on the Banks and the Banks are a critical stepping stone for coral dispersal throughout the Indian Ocean (Hilbertz et al 2002).

(4) Vulnerability, fragility, sensitivity, or slow recovery: the

coral and seagrass communities that dominate the substrate of the Banks are sensitive to disturbance and vulnerable to physical destruction.

(5) Biological productivity and (6) Biological diversity: While the open ocean is characterized by low productivity and low species diversity, the Saya de Malha Banks is an area of both high productivity and relatively high species diversity. Secondary production is evident in the form elevated levels of zooplankton biomass, the diverse fish communities present on the Banks, and the operation of a commercial hook and line fishery from Mauritius (Grandcourt 2003, Gallienne and Smythe-Wright 2005, Sanders 1993).

(7) and Naturalness: The remoteness of the Saya de Malha Banks provides them with a higher degree of naturalness than most other seagrass communities in the world, the vast majority of which are in near shore environments. Hence, by their remoteness, they are removed from most land-based sources of anthropogenic stress.

In conclusion, the complex suite of biological, ecological, and geomorphological characteristics of the Saya de Malha Banks and its associated species on the Banks and in the nutrient-rich environs, make the Saya de Malha Banks a globally unique and significant marine ecosystem which meets all seven of the CBD EBSA criteria. Such an area warrants further investigation as well as protection.



Vulnerable Marine Ecosystems (VMAs)

Its biological, ecological, and geomorphological complexity associated with nutrient-rich environs, lead Saya de Malha Banks as example of VME. Indeed, criteria which meet this status rely on the uniqueness and rarity, functional significance, fragility, life-history traits and structural complexity.

Priority seascape of Global outstanding

In the framework of a conservation planning prioritization process in the Western Indian Ocean Islands Marine Ecoregion, the Saya de Malha Banks has been proposed as priority seascape of global outstanding (November Workshop, Indian Ocean Commission/WWF, 2009).

Importance for Fisheries

The fisheries resources of Saya de Malha Banks have been exploited by Mauritian mother ship-dory fishing operations since the late 1960s (Grandcourt 2003). These fisheries remain important for the Mauritian fishing industry (5% of Mauritius' GDP). Saya de Malha as well as the other shallow Banks of the Mascarene Plateau (Albatross and Nazareth) is a major source of frozen fish for the Mauritian market and the fishery production represents around 30% of total fish consumption in Mauritius. Average annual catch of frozen fish from 1999 to 2008 is approximately 1673 tonnes comprising lethrinids, snappers and groupers. Snappers and groupers are also targeted by the semi-industrial fisheries (12 000 kg of chilled fishes) and the drop-off of Banks fisheries (73000 kg of catch, <http://www.gov.mu/portal/goc/fisheries/file/chap1to9.pdf>). The high production of the Saya de Malha Banks has led to the diversity of fish communities, which are subject to an intensive commercial hook and line fishery (FAO 2006). The Banks may play a role in the maintenance of the straddling fish stocks that supply much of the catch in neighboring waters of Seychelles and Mauritius (FAO 2006, Hilbertz et al 2002). With regards to Seychelles fisheries on Saya de Malha Banks, the FAO (2010) has recorded no evidence.

Oil exploration and Mining

Results of two test wells drilled by Texaco, Inc., in 1975 do not offer much encouragement for the petroleum prospects (Meyershoff and Kamen-Kaye 1981).

Surveyed areas of the Mascarene Plateau to map the distribution of manganese nodules showed that most of the areas, including the Saya de Malha Banks, are nodule barren (Nath and Prasad 1991).

Recommendations

Despite the global relevance of the Saya de Malha Banks due to its ecological, biological and economic importance, challenges are to be faced particularly on the sustainable utilization and exploitation of its high seas marine living resources. Indeed, the current fisheries that have been providing economic opportunities should be responsible and sustainable while ensuring the long-term conservation of marine biodiversity, and addressing the significant adverse impacts that will compromise the Saya de Malha Banks ecosystem integrity.

For the time being, there are currently no conservation and high seas fisheries management measures put in place. Therefore, in order to find the balance between sustainable utilization of the marine living resources and the long-term conservation of the Saya de Malha Banks ecosystem integrity, WWF is proposing for discussion with the two concerned parties (Mauritius and Seychelles) the opportunity to carry out a "feasibility study" which has two outputs:

- (i) Analysis of the existing international and regional conventions and conservation and management tools that provide guidance for appropriate legal regime, conservation and fisheries management measures and type of governance for the Saya de Malha Banks, and
- (ii) Proposition of a statement of strategy and action plan for the short, medium and long-term.

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