ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS

in the Benguela Current Large Marine Ecosystem

Omabaca Canyon and Seamount Complex

PROPOSED DESCRIPTION

Ombaca Canyon and Seamount Complex

Proposed EBSA Description

Abstract

The proposed Ombaca Canyon and Seamount Complex EBSA focuses on offshore canyons, seamounts and key oceanographic features that relate to elevated productivity in the area. It is situated 120 km offshore of Porto Amboim, extends to the boundary of the Angolan EEZ, and covers an area of approximately 37 321 km^2. Although biodiversity has not yet been comprehensively surveyed, the area is known to support various turtle and cetacean species. The seasonal upwelling also creates periods of intense primary productivity, that in turn promotes productivity of many fish species that are commercially important throughout the BCLME, including supporting very early life history stages of these and other key species. It is also likely that the canyons and seamounts support diverse communities, highly likely to support fragile habitat-forming species, such as corals and sponges. Currently, the entire area is considered to be in Good ecological condition, with virtually pristine biodiversity patterns and processes intact: this site is thus recognized highly for its Naturalness in both benthic and pelagic features.

Introduction

The site comprises a rugged benthic topography of canyons and seamounts, situated within the semi-permanent Angola-Benguela Front. A key characteristic of the oceanography on the Angolan continental shelf is the upwelling phenomenon that starts in May-June, reaches its peak in August-September and probably ends near the end of the year. This upwelling results in intense primary production that in turn influences the production and distribution of fish, thereby playing a critical ecological role for ecosystems in the area. It is known that fish species often adapt their reproductive strategies to ocean currents and productivity cycles, so spawning times and the distribution of the main Angolan species tend to coincide with the observed seasonal oceanographic patterns (Sætersdal et al., 1999). The interactions of the main currents in the region generate areas of divergence along the continental margin (such as the coastal upwelling) as well as along the equator. The intensity of these processes varies with each season.

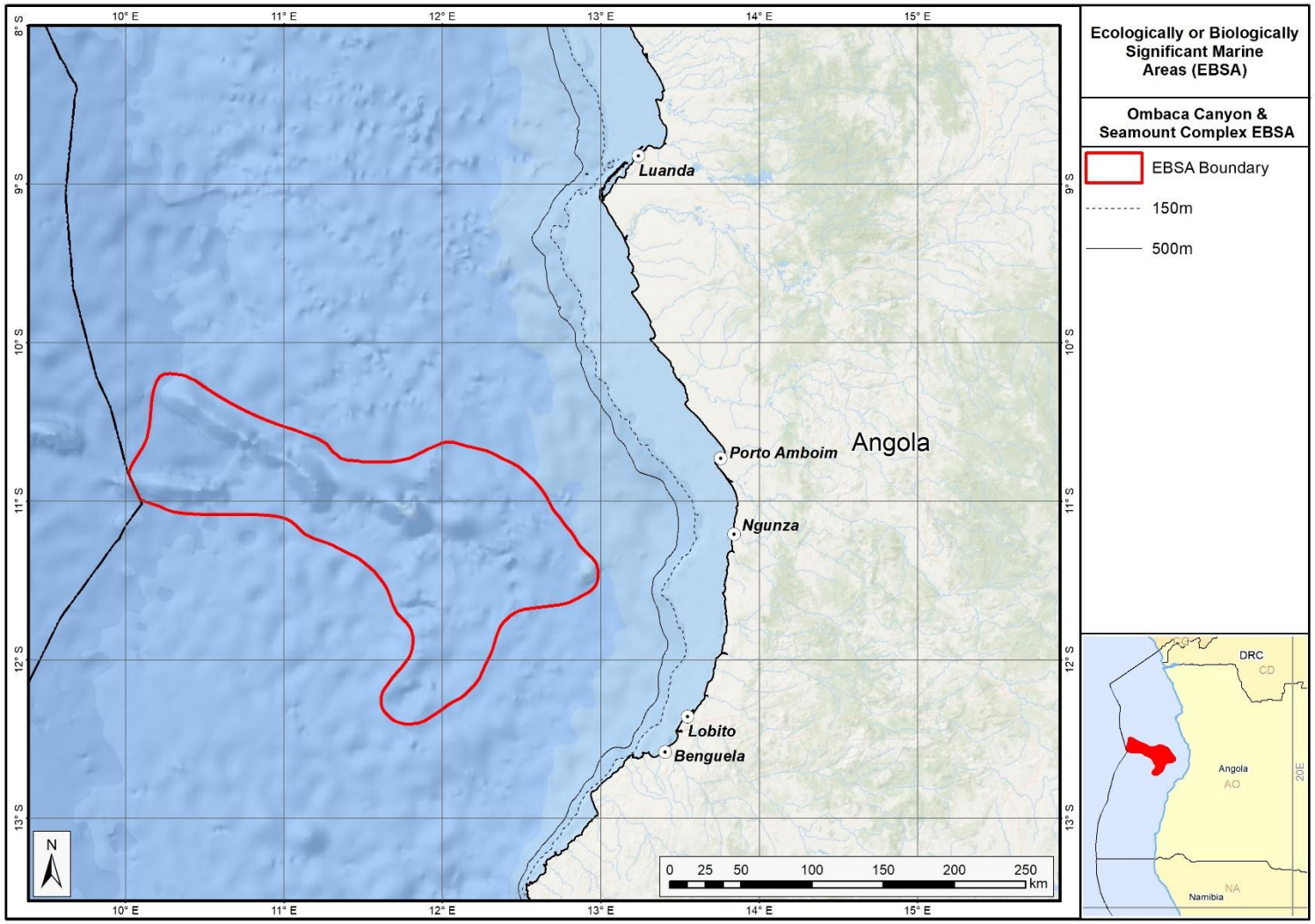
Description of the location

EBSA Region

South-Eastern Atlantic

Location

The proposed EBSA is approximately 120 km offshore of Porto Amboim, between Luanda and Benguela, and extends to the outer boundary of the Angolan Exclusive Economic Zone. It has an approximate area of 37 321 km^2. The proposed EBSA lies entirely within Angola's national jurisdiction.



Proposed delineation of the Ombaca Canyon and Seamount Complex EBSA.

Feature description of the proposed area

The outer portion of the continental shelf and slope is mostly regular with a smooth, gentle gradient of approximately 20 $m.km^{-1}$ within the depth range of -200 to -1000 m, and of approximately 12 $m.km^{-1}$ between depth ranges of -1000 to -2000 m. At approximately 50 km from the Benguela coastline, the seabed maintains these characteristics but, immediately to the north (towards Sumbe), the seabed rises sharply to depths of shallower than -1000m.

Ocean currents and circulation patterns in the region include a complex set of flows that are linked to a larger system of currents in the tropical east Atlantic. The dominant circulation patterns of the Angolan central and southern continental shelf are driven by the warm Angola Current that moves southwards, and where this current meets the cold Benguela Current at the Angola-Benguela Front (Moroshkin et al., 1970; Meeuwis and Lutjeharms, 1990; Shannon and O'Toole, 1998; and Lass et al., 2000). The Angola Current is fast and stable and penetrates up to depths of 250-300 m, covering both the continental shelf and slope. The typical current speed is 50 $cm.s^{-1}$ but it can reach or even exceed speeds of 70 $cm.s^{-1}$ (Moroshkin et al., 1970). The origin of this current, at least on the surface, is the southeastern arm of the South Equatorial Counter-Current.

The Angola-Benguela Front forms where the warm Angola Current, moving south, meets with the cold Benguela Current, moving north. This phenomenon occurs typically in the south of the Bay of Lobito at 14°S – 16°S and is a semi-permanent oceanographic feature. The gradients of temperatures at the surface reach 4°C.°$latitude^{-1}$, but on average are 1.5°C.°$latitude^{-1}$. This Front varies by season, reaching maximum levels in the summer when it is wider and is located further south, compared to winter when the front retracts towards the north and has a lower temperature gradient. These variations are related to the seasonality of the Angola Current (Meeuw and Lutjeharms, 1990). Episodic inflows of warm, saline water towards the south may displace the Angola-Benguela Front up to 23°S (Shannon et al, 1986), with effects associated with the general level of biological productivity in the north of the system. Shannon et al. (1986) classified these events as 'Niños de Benguela' because they are comparable to the 'El Niño' of the tropical east Pacific Ocean. However, a northward shift of the Angola-Benguela Front has never been observed on this same scale. High concentrations of phytoplankton biomass occur below the surface where the water column is highly stratified, a phenomenon that also occurs offshore of central Angola (Holligan et al., 1984, Joint et al., 1986, In: ARC, 2013).

Data presented by the INIP (2013) show that phytoplankton is dominated by diatoms and dinoflagellates throughout most of the year in almost all years that were studied (2004, 2008, 2009 and 2010), but that dinoflagellates and cyanobacteria (blue algae) may have dominance over diatoms (2011) and that cyanobacteria may completely dominate the composition of phytoplankton (2012).

There is a lack of detailed knowledge regarding the concentrations and distributions of ichthyoplankton (fish eggs and larvae) in Angolan waters, but eggs and larvae of South African pilchard (sardines; *Sardinops sagax*), Round Sardinella (*Sardinella aurita*), European anchovy (*Engraulis encrasicolus*), cape horse mackerel (*Trachurus trachurus capensis)* and hakes (*Merluccius* sp.) occur in the Angola-Benguela Front area as well as the mesopelagic zone. Round Sardinella and Madeiran Sardinella (*Sardinella aurita* and *S. eba* (*maderensis*)) juveniles are vastly distributed over the Angolan Continental Shelf (Wysokinski, 1986, INIP, 2013), thus it is likely that these species, together with

Cunene horse mackerel *(Trachurus trecae),* are important components of the region's ichthyoplankton (ARC, 2013). The area coincides with the distribution of two species of Sardinella (*S. maderensis* and *S. aurita*), Cunene horse mackerel (*Trachurus trecae*), other demersal fish (mainly *Dentex*) and deep-water king prawns (ARC, 2013). Other species occurring in deeper areas of the continental shelf and slope include squid, shrimps, crabs and Smallscale Splitfin (*Synagrops microlepis*) (ARC, 2013).

Five turtle species have been recorded in Angolan waters, namely: leatherbacks (*Dermochelys coriacea*)**,** olive ridleys (*Lepidochelys olivacea*), green turtles (*Chelonia mydas*), loggerheads, (*Caretta caretta*) and hawksbills (*Eretmochelys imbricata*) (Carr and Carr 1991; Fretey 2001, Weir et al., 2007). Of these species, only the green turtles, leatherbacks and olive ridleys nest in Angola (Carr and Carr 1991; Fretey 2001). Leatherbacks are known to forage in productive waters and around seamounts, and likely use this area as a foraging ground.

Whales and dolphins are commonly observed in Angolan waters with confirmation of 11 dolphin and 14 whale species in the region. Among these, four species are classified as threatened *as per* the IUCN criteria (IUCN, 2013) namely, Sei whale, blue whale and common whale being classified as Endangered, while the Sperm Whale is classified as Vulnerable.

Broadly, therefore, the EBSA is a particularly productive area, with productivity likely also enhanced by the rugged undersea topography. However, more research is required to better establish the linkages between the benthic and pelagic systems, that might ultimately require splitting this EBSA into a benthic and dynamic pelagic EBSA. Also, the link between the seamounts within and beyond Angola's EEZ needs to be investigated, as well as the dynamics of the Angola-Benguela Front in Angola and in the adjacent ABNJ; this new information, subject to international processes, may require an extension of this EBSA into ABNJ. In the interim, however, it is presented here as a Type 2/4 EBSA (sensu Johnson et al., 2018) as a collection of features that are connected by the same ecological processes, and as a dynamic feature viz. the Angola-Benguela Front.

Feature condition and future outlook of the proposed area

An assessment of ecological condition based on cumulative pressures within the EBSA showed that 100% of the benthic and pelagic area is in good ecological condition, suggesting that the whole EBSA area is (near) pristine, and has virtually all natural biodiversity patterns and processes still intact.

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Summary of types of habitats and status of threats for Ombaca Canyon and Seamount Complex. Data from Holness et al. (2014).

Threat Status	Ecosystem Type	Area (km^2)	Area (%)
Least Threatened	Cunene Abyss	8 916.1	24
	Kwanza Lower Slope	18 078.1	48
	Kwanza Seamount	5 864.9	16
	Kwanza Upper Slope	243.9	1
	Lobito Upper Slope	7.5	0
	Sumbe Upper Slope	4 210.8	11
Grand Total		**37 321.2**	**100**

Assessment of the area against CBD EBSA Criteria

CBD EBSA Criteria (Annex I to decision IX/20)	**Description** (Annex I to decision IX/20)	**Ranking of criterion relevance**
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.	High
Explanation for ranking Regional delineation of seamounts and canyons in the Benguela Current Large Marine Ecosystem revealed that these are rare features (Holness et al., 2014) that likely also support rare and/or unique biological communities.		
Special importance for life-history stages of species	Areas that is required for a population to survive and thrive.	Medium
Explanation for ranking Seamounts are known to be associated with relatively high productivity from upwelling, and that they consequently serve as foraging and aggregation areas for many top predators, and other threatened vertebrates, such as turtles – and particularly, leatherbacks. They may also provide important "stepping stones" that allow species to expand their ranges.		

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.	Medium
Explanation for ranking Although none of the ecosystem types represented in the EBSA are threatened, there are several threatened species that frequent the area. These include five turtle species: leatherbacks (*Dermochelys coriacea*, Vulnerable), olive ridleys (*Lepidochelys olivacea*, Vulnerable), green turtles (*Chelonia mydas*, Endangered), and hawksbills (*Eretmochelys imbricata*, Critically Endangered) (Carr and Carr 1991; Fretey 2001, Weir et al., 2007). Seamounts are generally associated with higher productivity where turtles, particularly leatherbacks, spend time foraging. Four species of cetaceans are classified as threatened, including three Endangered whales (Sei whale, blue whale and common whale) and the Vulnerable Sperm Whale. Other threatened species include the fish *Sardinella maderensis* that is listed as Vulnerable.		
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.	Medium
Explanation for ranking The biological communities associated with the Ombaca Canyon and Seamount Complex have not been comprehensively sampled. However, it is well established that seamounts serve as an important habitat for many fragile, habitat-forming species, including corals and sponges. The turtles and cetaceans associated with this site are also slow growing, and are vulnerable to and slow to recover from declines in their populations. Conservatively, this area is ranked as Medium, but may very well be High.		
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.	High
Explanation for ranking Biological productivity is elevated in the region as a result of the seasonal upwelling. This results in intense primary production (by diatoms, dinoflagellates and cyanobateria) that in turn influences the production and distribution of fish, thereby playing a critical ecological role for ecosystems in the area. Seamounts are also recognized as sites of relatively higher productivity compared to surrounding areas.		
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.	Medium
Explanation for ranking		

The proposed EBSA has not yet been comprehensively sampled for biodiversity, however, there is likely a rich diversity associated with the complex bottom topography, as has been found on other seamounts and in other canyons, including both benthic and pelagic assemblages. Of the diversity that is known, there are many crustacean, fish, turtle, and cetacean species that are resident in or migratory through the area. Studies in a proposed area of this EBSA recorded 195 sampled species (of 8 phyla). However, the juvenile stage was not taken into account when quantifying benthic diversity statistics (except for biomass), resulting in a total of 191 species (excluding the juvenile stage).		
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.	High
Explanation for ranking An assessment of ecological condition based on cumulative pressures within the EBSA showed that 100% of the benthic and pelagic area is in good ecological condition, suggesting that the whole EBSA area is (near) pristine (Holness et al., 2014).		

Status of submission

Area to be submitted to the Conference of the Parties for acknowledgement of meeting EBSA criteria once review process is finalized.

COP Decision

Not yet submitted.

End of proposed EBSA description

Motivation for Submission

To be developed.