

**Template for Submission of Scientific Information
to Describe Areas meeting Scientific Criteria for
Ecologically or Biologically Significant Marine Areas**

Title/Name of the area: Orange River Estuary and adjacent Marine Area (Inshore Orange Cone Region) on the SA – Namibia border

Presented by

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Abstract (*in less than 150 words*)

The Orange River Mouth is a transboundary RAMSAR site under consideration as a Protected Area by SA and Namibia. The Orange is South Africa's major river in terms of run-off to the marine environment. The estuary is biodiversity-rich but modified. The coastal area includes a critically endangered habitat type (Namaqua Sandy Inshore). The marine environment experiences slow, variable currents, and weaker winds making it potentially favourable for reproduction of pelagic species. Further, given the proven importance of Thukela River outflow for fish recruitment at the Thukela Banks (a comparable shallow, fine sediment environment), a similar ecological dependence for the inshore Orange Cone is likely. Comparable estuary/inshore habitats are not encountered for 300km south (Olifants River) and over 1000 km north (Kunene). In summary, it is considered to be highly relevant in terms of: 'Importance for life history stages of species', "threatened endangered or declining species and/or habitats", and biodiversity.

Introduction

(To include: feature type(s) presented, geographic description, depth range, oceanography, general information data reported, availability of models)

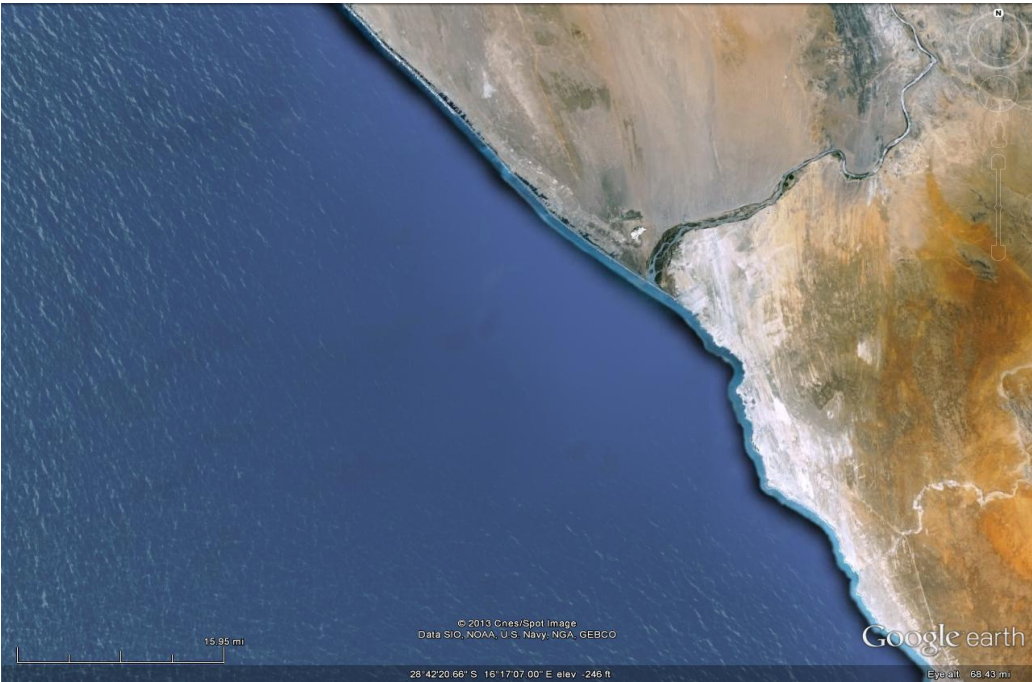
The focus area occurs on the coastal boundary of SA and Namibia. The Orange River estuary extends approximately 10km from the sea in a hydrological sense although estuarine dependent species migrate much further upstream. The estuary is substantially modified but under rehabilitation. Boundaries of the marine area that is ecologically coupled to the estuary are not accurately known but could be extensive: seasonally and inter-annually the marine habitat affected by freshwater outflow varies from a few km to hundreds of km in the longshore direction during floods, particularly southwards (Shillington et al. 1990). This proposal would select the area 30km north and south of the Orange River, extending to approximately 60km offshore. Marine and coastal habitat types represented in the focus area include Namaqua Sandy Inshore, Namaqua Sandy Inner Shelf and Namaqua Muddy Inner Shelf habitat types (Sink et al. 2012). The associated pelagic environment is characterized by upwelling giving rise to cold waters with high productivity/chlorophyll levels (Lagabrielle 2009). However, the winds in the focus area are weaker than to the north or south of the area, leading to lesser upwelling (Boyd, 1988).

Location

(Indicate the geographic location of the area/feature. This should include a location map. It should state if the area is within or outside national jurisdiction, or straddling both.)

The estuary is located at 29 deg S and forms the coastal boundary of SA and Namibia, which continues seaward in a SW direction. The estuary extends approximately 10km upstream. The proposed focus area is the area 30km north and south of the Orange River, extending to 100m or approximately 60km offshore, although the area to over 100km offshore still has characteristics of the Orange Cone Marine environment. (Boyd 1998, Boyd and Largier, 2001). This area straddles marine areas within both SA and Namibian jurisdiction.

Overview of the marine area and the estuary, indicating the SA-Namibia boundary; followed by an aerial photograph of the estuary:



Feature description of the proposed area

(This should include information about the characteristics of the feature to be proposed, e.g. in terms of physical description (water column feature, benthic feature, or both), biological communities, role in ecosystem function, and then refer to the data/information that is available to support the proposal and whether models are available in the absence of data. This needs to be supported where possible with maps, models, reference to analysis, or the level of research in the area)

Because of a lack of research the boundaries of the marine zone that is ecologically coupled to the estuary are not accurately known, but they could be extensive. Indeed, the marine habitat affected by freshwater outflow varies greatly both seasonally and inter-annually, from a few km to hundreds of km in the longshore direction (mainly southwards) during floods (Shillington et al. 1990). Marine and coastal habitat types represented in the proposed focus area (30km north and south of the Orange River, extending to approximately 60km offshore) include Namaqua Sandy Inshore, Namaqua Sandy Inner Shelf and Namaqua Muddy Inner Shelf habitat types (Sink et al. 2012). According to the classification of Lagabrielle (2009) the associated pelagic environment is characterized by upwelling giving rise to cold waters with high productivity/chlorophyll levels. However, the winds in the focus area are weaker than those which occur to the north or south of the area, leading to some stratification (Boyd 1988). Moreover, currents in the inshore region, and indeed over much of the Orange River Cone area, have slower velocities and speeds than occur further north or south, and movements in both upper and lower layers are dominated by diurnal and/or inertial motions (Largier and Boyd 2001). Generally, the conditions in the area are consistent with the criteria proposed by Parrish et al. (1983) for the reproduction of pelagic species.

The river and estuary have received substantial research attention over the last decade, but the adjacent marine environment much less so, apart from attention it received as part of LME associated research from 1995-2000. However, given the proven role of the Thukela River outflow for the recruitment of fish stocks in the adjacent marine area (the Thukela Banks on the east coast of South Africa) (Turpie and Lamberth 2010), a shallow and fine sediment coastal environment similar to that adjoining the Orange River mouth, it is logical to assume that a similar (although currently undescribed) ecological dependence on fresh water outflow is seasonally in place within 10-20km of the Orange River Estuary. Furthermore in terms of uniqueness of habitat (such as provides refuge for estuarine dependent or partially dependent fish, and birds), approximately similar estuary and adjacent inshore habitat are not encountered for over 300km further south to the Olifants River and over 1000 km further north, until the Kunene River. The fact that the estuary is a declared RAMSAR site is an important recognition of its importance to birds and well as other species.

Feature condition and future outlook of the proposed area

(Description of the current condition of the area – is this static, declining, improving, what are the particular vulnerabilities? Any planned research/programmes/investigations?)

The impact of reduced and altered flow at the estuary mouth and into the marine environment has had a negative impact on the estuarine habitat including the salt marsh, which was exacerbated by inappropriate developments associated with mining at the site. The impact of these changes on the marine environment off the coast is not known. However, the problem is to be both in terms of better formulating the flow regime as it will reach the mouth and the marine area, as well as rehabilitating the estuary and salt marsh area. In addition an estuary management plan is in an advanced stage, and protected area status for the estuary is well advanced too (van Niekerk and Turpie 2012). Regarding the marine and coastal habitats and biodiversity of the area, the coastline and inshore area to 30m is under considerable threat from mining impacts, and is currently unprotected (Sink et al. 2012).

Sink et al. (2012) estimated the threat status of the ±54 coastal and inshore habitat types identified for South Africa by assessing the (weighted) cumulative impacts of various pressures (e.g. extractive resource use, pollution, development and others) on each habitat type. One of the habitat types that area associated with the focus area, namely Namaqua Sandy Inshore habitat, was shown to be Critically Endangered, implying that very little (<= 20%) of the total area of these habitat types is in natural/pristine condition, and it is expected that important components of biodiversity pattern have been lost and that ecological processes have been heavily modified. However, within the focus area, this habitat type was assessed to be in 'fair' condition.

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 proposed area for EBSA description may qualify on the basis of one or more of the criteria, and that the polygons 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)			
		No information	Low	Medium	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
<p><i>Explanation for ranking</i></p> <p>In terms of uniqueness of habitat (such as provides refuge for estuarine dependent or partially dependent fish, and birds), approximately similar estuary and adjacent inshore habitat are not encountered for over 300km further south to the Olifants River, and over 1000 km further north, until the Kunene River. The marine area is fed by the estuarine outflow and also has its own oceanographic characteristics, in terms of inertial currents and stratification, thus being “sheltered” from much of the Benguela System forcing .</p>					
Special importance for life-history stages of species	Areas that are required for a population to survive and thrive.				x
<p><i>Explanation for ranking</i></p> <p>Oceanographic conditions in the area are consistent with the criteria proposed by Parrish et al (1983) for the reproduction of pelagic species, and indeed the focus area is the northern margin the important West Coast Nursery Ground for pelagic fish species (Hutchings et al. 2002) with periodic pelagic spawning, and the estuary is an important nursery area for Kob species (van Niekerk and Turpie 2012). Furthermore, given the proven role of the Thukela River outflow for the recruitment of fish stocks in the adjacent marine area (the Thukela Banks on the east coast of South Africa) (Turpie and Lamberth 2010), a shallow and fine sediment coastal environment similar to that adjoining the Orange River mouth, it is logical to assume that a similar (although currently undescribed) ecological dependence on fresh water outflow is in place within 10-20km of the Orange River Estuary. This could then link with the marine environment further offshore with potentially similar habitat in terms of key variables, such as stratification.</p>					

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</i> One of the coastal habitat types associated with the focus area is in a Critically Endangered state, indicating that very few (< 20%) of remaining area of this habitat is in good (natural or pristine) condition (Sink et al. 2012). The condition of this habitat type in the focus area was assessed by Sink et al (2012) to be 'fair'.					
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</i> The estuarine salt marsh area is vulnerable and has been slow in showing recovery despite rehabilitation efforts. There has been a marked decline in certain fish stocks that were previously exploited in the region. Mining and habitat modification have been alleged to have an impact wrt these changes.					
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.			x	
<i>Explanation for ranking</i> The productivity of the marine area is ranked as medium, but the effects of fresh water and stratification may serve to concentrate such productivity.					
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.				x
<i>Explanation for ranking</i> The fact that the estuary is a declared RAMSAR site is an important recognition of its importance to birds and well as other species. In the estuary there are estuarine species such as pipefish, as well as marine and estuarine dependent marine species. The marine area would be the conduit supporting the estuaries bio-diversity for migratory marine and estuarine dependent species as well as marine pelagic and demersal species, including juvenile stages.					
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</i> The estuary is impacted as is the immediate coastal zone, but the estuary still provides many ecological services such as recruitment. The inner shelf area is largely in good condition (Sink et al 2012) but data is sparse, but there have been long term declines in fish catch. The coastal habitat is still in fair condition, also with some impacts by mining (Sink et al 2012)					

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	Medium	High
Add relevant criteria					
Explanation for ranking					

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.)

Boyd, A. J. 1988 – The Oceanography of the Namibian Shelf. PhD Thesis University of Cape Town. 190pp.

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Maps and Figures

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