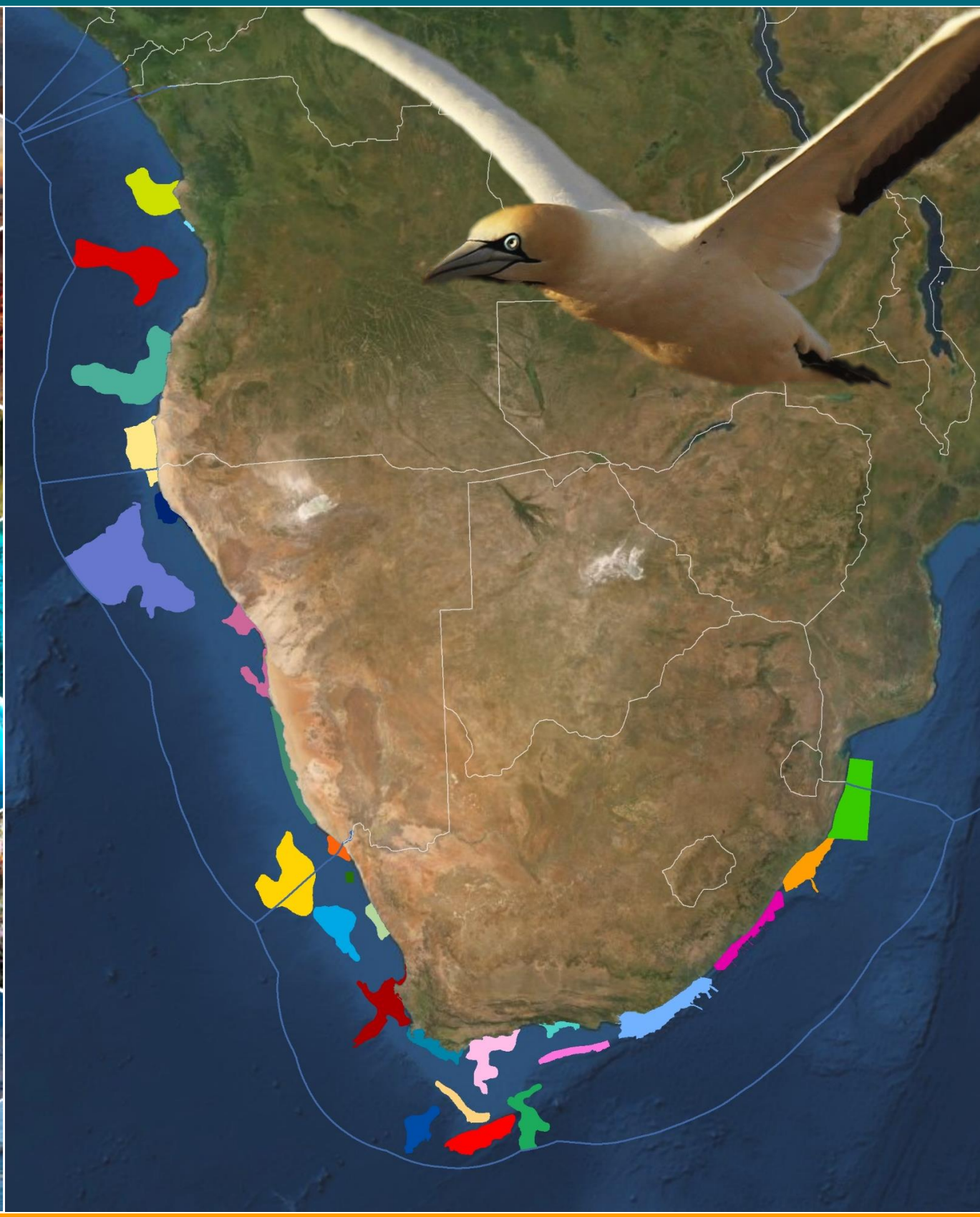
ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS

in the Benguela Current Large Marine Ecosystem



KwaZulu-Natal Bight and uThukela River

REVISED DESCRIPTION

Benguela CURRENT CONVENTION

MARISMA
Enabling Sustainable Ocean Use in the Benguela Current Region

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of:
Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
of the Federal Republic of Germany

Ecologically or Biologically Significant Marine Areas in the Benguela Current Large Marine Ecosystem

KWAZULU-NATAL BIGHT AND UTHUKELA RIVER

Revised Description

Front cover image credits: ACEP, Linda Harris, Steve Benjamin, Geoff Spiby, Melanie Wells

NELSON MANDELA UNIVERSITY

KwaZulu-Natal Bight and uThukela River (Formerly Natal Bight)

Revised EBSA Description

General Information

Summary

The KwaZulu-Natal Bight and uThukela River is important for numerous ecological processes, including terrestrial-marine connectivity, larval retention, recruitment and provision of nursery and foraging areas. The area includes rare ecosystem types and supports some species known to exist in few localities. Cool productive water is advected onto the shelf through Agulhas-driven and wind-driven upwelling cells, and continental runoff from the large uThukela River is important for the delivery of detritus to the bight (which drives food webs), and maintenance of mud and other unconsolidated-sediment habitats. The turbid, nutrient-rich conditions are important for life-history phases (breeding, nursery and feeding) for crustaceans, demersal fish, migratory fish, turtles and sharks, some of which are threatened. Particularly vulnerable and fragile ecosystems and species include submarine canyons, cold-water corals and slow-growing sparids. This EBSA is particularly important for threatened ecosystem types. Of the 28 ecosystem types represented, 21 (75%) are threatened including one Critically Endangered, nine Endangered and 11 Vulnerable types, with a further three types that are Near Threatened.

Introduction of the area

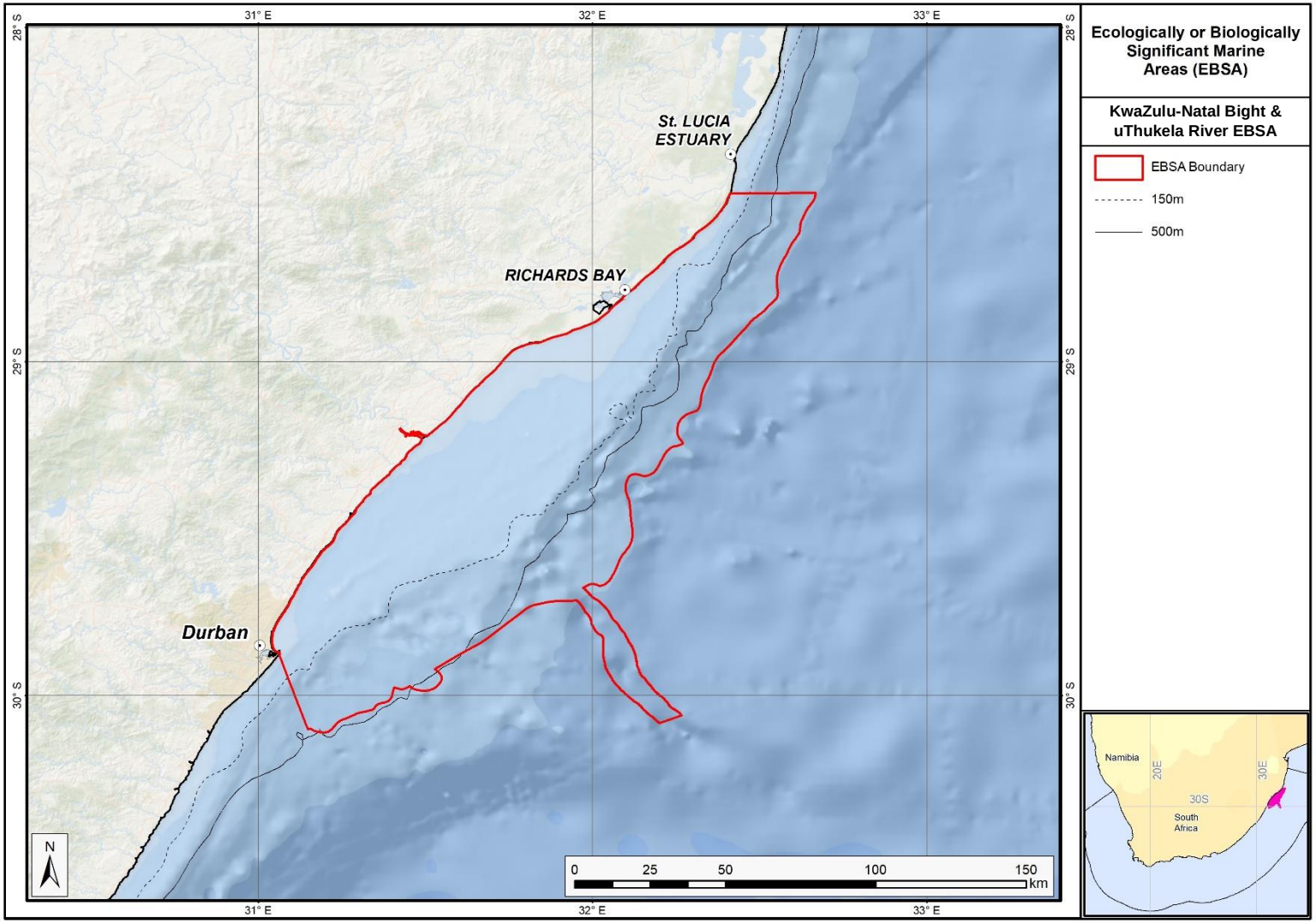
The KwaZulu-Natal Bight and uThukela River is important for numerous ecological processes, including terrestrial-marine connectivity, larval retention, recruitment and provision of nursery and foraging areas. The area incorporates rare ecosystem types and supports some species known to exist in only a few localities. The terrigenous sediments underpin many of the river-influenced marine ecosystem types, and associated, productive communities. The turbid, nutrient-rich conditions are important for life-history phases (breeding, nursery and feeding) for crustaceans, demersal fish, migratory fish, turtles and sharks. The EBSA also includes a canyon, and numerous threatened ecosystem types.

Since the original description and delineation, the boundary of the EBSA has been revised to improve accuracy and better represent the underlying features based on the best available data (e.g., GEBCO Compilation Group 2019; Harris et al., 2014; Holness et al., 2014; Majiedt et al., 2013; Sink et al., 2012, 2019). Importantly, the lower reaches of the uThukela River are now included because it is the key driver of the system, particularly for the river-influenced marine ecosystem types. It is the conduit for sediment delivery to the near- and offshore ecosystems of the KwaZulu-Natal Bight, and provides the critical link between land and sea that underpins this EBSA. In fact, it was considered such an important addition that it prompted a name change for this EBSA, from Natal Bight to KwaZulu-Natal Bight and uThukela River. Further, recent research in the area has, *inter alia,* improved knowledge of the seabed composition, and thus the extent of the mud habitats and the bight itself is now better understood and mapped, allowing a more accurate delineation of the EBSA. New fine-scale mapping of the coast (Harris et al., 2019) also allowed a more accuracte coastal boundary to be delineated. It is presented as a Type 2 EBSA because it contains “spatially stable features whose individual positions are known, but a number of individual cases are being grouped” (sensu Johnson et al., 2018).

Description of the location

EBSA Region

Southern Indian Ocean



Proposed revised boundaries of the KwaZulu-Natal Bight and uThukela River EBSA.

Description of location

East coast of South Africa, extending from Maphelane to Durban, from the shore to -2000 m, including the Thukela Banks, the KwaZulu-Natal Bight nursery area, the shelf edge and upper bathyal zone. The area is entirely within South Africa's EEZ.

Area Details

Feature description of the area

The area is characterized by extensive alluvial deposits forming banks, primarily off the uThukela River but also off the Mgeni River to a lesser degree (see Sink et al., 2011). The seafloor is thus sedimentary in nature but varies in the degree to which it is consolidated. The banks are productive in terms of benthic and deposit feeeders, an attribute typical of such features. Cool, productive water is advected onto the shelf through Agulhas-driven and wind-driven upwelling cells, and continental runoff from the large uThukela River is important for the delivery of detritus to the bight (which drives food webs), and maintenance of mud and other unconsolidated-sediment habitats. The turbid, nutrient-rich conditions are important for life-history phases (breeding, nursery and feeding) for crustaceans, demersal fish, migratory fish, turtles and sharks. Some of these species are threatened (turtles, scalloped hammerhead) or overexploited (sparids and sciaenids), and the deep reef and palaeo-shoreline habitats are considered important for the recovery of overexploited deep-reef fish species. Other particularly vulnerable and fragile ecosystems and species include submarine canyons, cold-water corals and slow-growing sparids. One Critically Endangered and nine Endangered ecosystem types occur in this area and a further 11 are Vulnerable (Sink et al., 2019). The Thukela Banks have been identified as a priority area by two different systematic biodiversity plans, a national plan to identify focus areas for offshore protection (Sink et al., 2011) and a fine-scale provincial plan for the province of KwaZulu-Natal (Harris et al., 2011).

Feature conditions and future outlook of the proposed area

The National Biodiversity Assessment 2011, 2018 (Sink et al., 2012, 2019) indicated declining condition overall in the original EBSA (based on pressure data and an ecosystem-pressure matrix) with conditions ranging from fair to poor across the overall area. An updated assessment (Sink et al., 2019) on the new delineation shows ecological condition ranges from good to poor across the EBSA, with condition generally worse closer to the shore. Key pressures include the crustacean trawl fishery, a line fishery targeting sparids and sciaenids, and there are emerging mining and petroleum applications. A submarine cable has recently been laid in the area. Research on a number of the aforementioned aspects has been undertaken (but not all published) by the Oceanographic Research Institute in Durban. There is planned research in the area through the African Coelacanth Ecosystem Program Phase III.

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Summary of ecosystem types and threat status for the KwaZulu-Natal Bight and uThukela River EBSA. Data from Sink et al. (2019).

Threat Status	Ecosystem Type	Area (km^2)	Area (%)
Critically Endangered	Subtropical Estuarine Bay	0.1	0.0
Endangered	Durnford Inner Shelf Reef Complex	460.5	4.3
	Natal Bight Deep Shelf Edge	1654.6	15.6
	Natal Bight Mid Shelf Reef Complex	23.0	0.2
	Natal Bight Mid Shelf Reef Sand Mosaic	534.7	5.0
	Natal Bight Sandy Inner Shelf	145.9	1.4
	Subtropical Estuarine Lake	1.7	0.0
	Subtropical Large Fluvially Dominated Estuary	13.0	0.1
	Subtropical Large Temporarily Closed Estuary	1.0	0.0
	Subtropical Predominantly Open Estuary	2.7	0.0
Vulnerable	Durnford Mid Shelf Reef Complex	431.8	4.1
	Natal Bight Muddy Inner Shelf	328.7	3.1
	Natal Bight Muddy Shelf Edge	400.6	3.8
	Natal Bight Outer Shelf Coarse Sediment Reef Mosaic	647.8	6.1
	Natal Mixed Shore	13.9	0.1
	Natal-Delagoa Reflective Sandy Shore	5.7	0.1
	St Lucia Sandy Mid Shelf	496.0	4.7
	Subtropical Small Temporarily Closed Estuary	0.5	0.0
	uThukela Mid Shelf Coarse Sediment Reef Mosaic	789.4	7.4
	uThukela Mid Shelf Mud Coarse Sediment Mosaic	1348.7	12.7
	uThukela Outer Shelf Muddy Reef Mosaic	531.8	5.0
Near Threatened	Natal Exposed Rocky Shore	0.7	0.0
	Natal-Delagoa Intermediate Sandy Shore	23.3	0.2
	uThukela Canyon	417.8	3.9
Least Concern	Natal-Delagoa Dissipative-Intermediate Sandy Shore	12.2	0.1
	Southwest Indian Mid Slope	0.8	0.0
	Southwest Indian Upper Slope	2281.4	21.5
	St Lucia Sandy Inner Shelf	31.6	0.3
Grand Total		**10599.8**	**100.0**

Assessment of the area against CBD EBSA criteria

C1: Uniqueness or rarity **Medium**

Justification

Endemic and rare species include: Spotted legskate (*Anacanthobatis marmoratus*), Porcupine stingray (*Urogymnus asperrimus*); the Bearded Goby (*Taenioides jacksoni*) is also endemic (Haupt 2010, Livingston et al., 2012). There are rare gravel and mud ecosystem types in the area, as well as a submarine canyon of limited extent (Sink et al., 2012). There is also a unique demersal fish community near the Thukela Banks (Fennesey 2016), and it is the only portion of the South African east coast that has a relatively wide shelf area.

C2: Special importance for life-history stages of species **High**

Justification

The KwaZulu-Natal Bight and uThukela River supports important life-history stages for a myriad of species. These functions include serving as a migration corridor for fish (e.g., Geelbek – *Atractoscion aequidens*, White stumpnose – *Rhabdosargus holubi*, Shad - *Pomatomus saltatrix*, Dusky kob - *Argynosomus japonicas* (Vulnerable), and Garrick – *Lichia amia*). It is also part of the migration route and spawning area for sardine – *Sardinops sagax*; many shark and fish species also spawn in the KwaZulu-Natal Bight (e.g., Bull shark – *Carcharhinus leucas*, Sand tiger shark – *Carcharias taurus*, Black musselcracker – *Cymatoceps nasutus*, and King mackerel – *Scomber japonicas*). The KwaZulu-Natal Bight and uThukela River is also an important nursery area for sharks and fish (e.g., Scalloped hammerhead – *Sphyrna lewini* (EN), Slinger – *Chrysoblephus puniceus*, Black musselcracker – *Cymatoceps nasutus*), and an important feeding and migration area for Critically Endangered leatherback turtles (*Dermochelys coriacea*; Haupt 2010, Harris et al., 2011, Vogt 2011, Sink et al., 2011, Ezemvelo KZN Wildlife 2012; Harris et al., 2018). There are also critical linkages between the Thukela Bank prawn-trawling ground and the estuarine nursery areas, emphasising the area's role in ecosystem connectivity and supporting recruitment of many commercially important species (Scharler et al., 2016).

C3: Importance for threatened, endangered or declining species and/or habitats **High**

Justification

The KwaZulu-Natal Bight and uThukela River contains many threatened species, including: the Critically Endangered Seventy-four (*Polysteganus undulosus*), leatherbacks (*Dermochelys coriacea*) and hawksbills (*Eretmochelys imbricata*); Endangered Scalloped hammerhead (*Sphyrna lewini*), great hammerhead (*Sphyrna mokarran*), dageraad (*Chrysoblephus christiceps*), red stumpnose (*Chrysoblephus gibbiceps*), and green turtles (*Chelonia mydas*); and Vulnerable Flapnose houndshark (*Scylliogaleus quecketti*), porcupine stingray (*Urogymnus asperrimus*), dusky kob (*Argynosomus japonicas*), bearded goby (*Taenioides jacksoni*), and Natal shyshark (*Haploblepharus kistnasamyi*). There are also endemic sparids of conservation concern: *Polysteganus coeruleopunctatus*, as well as Near Threatened loggerheads (*Caretta caretta*). There are 20 threatened ecosystem types, including nine Endangered types, and 11 Vulnerable types (Sink et al., 2019).

C4: Vulnerability, fragility, sensitivity, or slow recovery **Medium**

Justification

The KwaZulu-Natal Bight and uThukela River contains features and species that are slow growing, fragile, and sensitive to disturbance, e.g., submarine canyons, shelf edge, deep reefs and cold-water corals (Sink et al., 2011, 2012).

C5: Biological productivity **High**

Justification

The KwaZulu-Natal Bight and uThukela River contains Indian Ocean water, with high but variable chlorophyll-a levels associated with very frequent SST and chlorophyll-a fronts (Lagabrielle 2009, Roberson et al., 2017). This pelagic habitat (Cb3) is characterised by cool productive water that has been advected onto the shelf in this sheer-zone through Agulhas Current-driven upwelling cells (Lutjeharms et al., 2000, Lutjeharms et al., 2000). Upwelling in the KwaZulu-Natal Bight is largely wind-driven (Roberts & Nieuwenhuys, 2016). Further, it has recently been discovered that substantial inputs of (mainly terrigenous) detritus from the uThukela River drive food webs in the KwaZulu-Natal Bight and uThukela River, particularly of the benthic communities which dominate the local food webs (Scharler et al., 2016).

C6: Biological diversity **High**

Justification

There is high habitat heterogeneity in the KwaZulu-Natal Bight and uThukela River EBSA, with 27 ecosystem types represented (Sink et al., 2019) and new evidence of diverse demersal fish communities in the area (Fennessey 2016).

C7: Naturalness **Medium**

Justification

Half (52%) of the area is in poor ecological condition, however, there is still 48% of the EBSA that is in good (15%) or fair (33%) ecological condition (Sink et al., 2019).

Status of submission

The Natal Bight EBSA was recognized as meeting EBSA criteria by the Conference of the Parties. The revised name, description and boundaries still need to be submitted to COP for approval.

COP Decision

dec-COP-12-DEC-22

End of proposed EBSA revised description

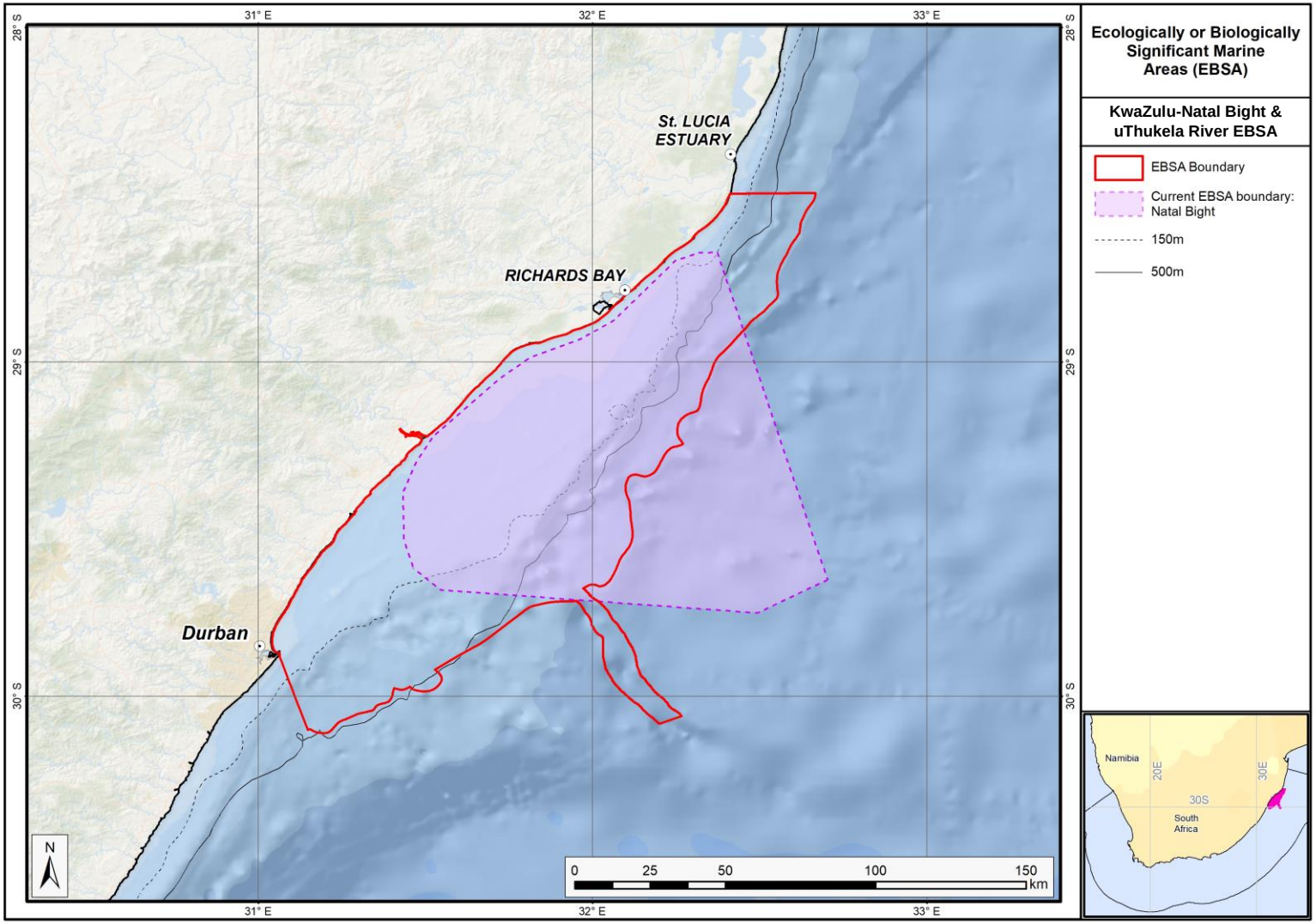
Motivation for Revisions

Some technical revisions and updates to the description were made based on recent research. A supplementary table of the habitats represented in the EBSA and their associated threat status was also included. A criteria level change was made on Criterion 5: Biological productivity and Criterion 6: Biological diversity, with ranks respectively upgraded from Medium to High, and Low to Medium. This was based on new research for productivity (Scharler et al., 2016) and demersal fish diversity (Fennessey 2016). Further, empirical evidence from the National Biodiversity Assessment (Sink et al., 2012, 2019) showed that a rank of Low for Criterion 7: Naturalness was not justified for this EBSA, and thus the rank was upgraded to Medium.

The main change is that the boundary of this EBSA has been slightly adjusted to focus the EBSA more closely on the key biodiversity features that underly its EBSA status. In particular, this includes adding the lower reaches of the uThukela River, which provides the critical link between land and sea in delivering sediment to the near- and offshore ecosystems comprising the Natal Bight. The delineation process included an initial stakeholder review which identified the need to update boundaries, a technical mapping process and then an expert review workshop where boundary delineation options were finalised. The delineation process used a combination of Systematic Conservation Planning and Multi-Criteria Analysis methods. The features used in the analysis were:

- The key KwaZulu-Natal Bight ecosystems (i.e. those shelf and inshore types dominated by sediment inputs) were focussed on (Sink et al., 2019).
- Irreplaceable and near irreplaceable (i.e. very high selection frequency) sites, as well as focus areas identified in the national SCP analysis undertaken as part of Majiedt et al. (2013) and focus areas for offshore protection (Sink et al., 2011) were included.
- Key physical features (especially canyons) identified from the latest GEBCO data (GEBCO Compilation Group 2019), global benthic geomorphology mapping (www.bluehabitats.org, Harris et al., 2014) and the National Biodiversity Assessment 2011, 2018 (Sink et al., 2012, 2019) were incorporated.
- Delineations and threat status of consitituent ecosystem types in the area were included in the analysis and used to refine the boundary of the EBSA (Sink et al., 2019).
- Areas of high relative naturalness of benthic and coastal systems and pelagic systems identified in the National Biodiversity Assessment 2011, 2018 (Sink et al., 2012, 2019) were included in the analysis.
- Distributions of known fragile, vulnerable and sensitive habitat-forming species were included (Unpublished SANBI and SAEON data).
- The coastal boundary was refined to be more accurate based on new data (Harris et al., 2019).

The multi-criteria analysis resulted in a value surface. The cut-off value used to determine the extent of the EBSA was based on expert input and quantitative analysis of effective inclusion of the above features. This entailed taking an iterative parameter calibration-based approach whereby the spatial efficiency of the inclusion of the targeted features was evaluated. The approach aimed to identify a cut-off that most efficiently included prioritised features while minimizing the inclusion of impacted areas. The final boundaries shown in the map were validated in a national workshop.



The proposed revised boundaries for the KwaZulu-Natal Bight and uThukela River EBSA in relation to the original boundaries of the Natal Bight EBSA.