ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS

in the Benguela Current Large Marine Ecosystem

Algoa to Amathole

REVISED DESCRIPTION

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

ALGOA TO AMATHOLE

Revised Description

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Algoa to Amathole (Formerly Offshore of Port Elizabeth)
Revised EBSA Description

General Information

Summary

This EBSA encompasses the likely biggest single collection of significant and special marine features in all of South Africa that also jointly support key ecological processes, including important land-sea connections. Complex ocean circulation occurs here, where the Agulhas Current leaves the coast, following the shelf break. This results in the formation of cold-water eddies, intrusions of Agulhas water onto the shelf and large offshore meanders of the Agulhas Current. Consequently, this EBSA includes spawning areas, nursery areas and key transport pathways for demersal and pelagic fish. In turn this supports a myriad of top predators, including shark and seabird breeding and foraging areas. Notably, the islands in Algoa Bay support the easternmost colony of Endangered African penguins and the largest colony of Cape Gannets in southern Africa. Given the regional oceanography, regionally Critically Endangered leatherback and regionally Near Threatened loggerhead turtles migrate through the EBSA between their nesting and foraging grounds, with hatchlings of both species also passing through during their dispersal from the nesting beaches. Green turtles have also been sighted in the area. Further, the EBSA includes 36 ecosystem types, 18 of which are threatened and a further seven that are Near Threatened. Sensitive features and species include submarine canyons, steep shelf edge, deep reefs, outer shelf and shelf edge gravels, and reef-building cold-water corals ranging in depth between 100 and 1000 m. It also contains several key biodiversity features, including: stromatolites; sites where coelocanths are present; a Critically Endangered localised endemic estuarine pipefish; several priority estuaries; rare ecosystem types of limited spatial extent; and a few existing coastal marine protected areas.
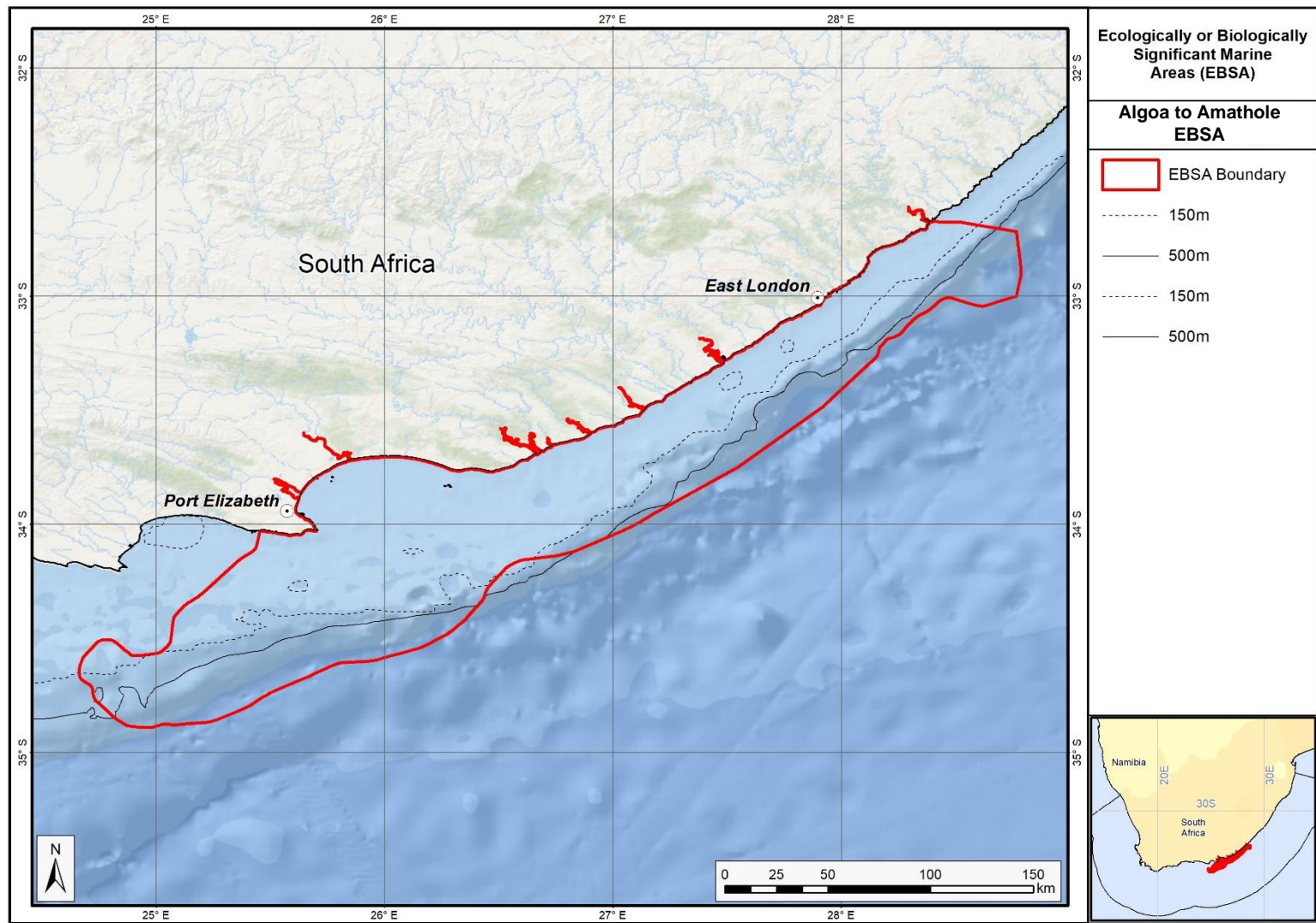
Introduction of the area

This EBSA spans the Eastern Cape shoreline in South Africa between Sardinia Bay MPA and Amathole MPA/Kei River mouth. It extends from the dune base to approximately the continental shelf break/slope, thus spanning a depth range of approximately 0-2000 m. It is important for both benthic and pelagic features, comprising an offshore area of high habitat complexity, and containing a myriad of unique and interesting biodiversity features. Benthic features include a large shelf-intersecting canyon (Sink et al., 2011), and rare seabed ecosystem types (Sink et al., 2012). The pelagic environment is characterised by complex ocean circulation patterns because the EBSA includes the point where the Agulhas Current leaves the coast, following the shelf break. This results in the formation of cold-water eddies, intrusions of Agulhas water onto the shelf, large offshore meanders of the Agulhas Current, and upwelling. This oceanography supports key ecological processes. Given the close proximity of the Eastern Cape universities, there is substantial ecological research and data available for this coastal area, and an extensive array of in-water devices for long-term ecological research within Algoa Bay.

Description of the location

EBSA Region

Southern Indian Ocean

Proposed revised boundaries of the Algoa to Amathole EBSA.

Description of location

This EBSA spans the Eastern Cape shoreline between Sardinia Bay MPA and Amathole MPA / Kei River mouth in South Africa. It extends from the dune base to approximately the continental shelf break, as far west as south of Cape St Francis, and also encompasses the functional zone of several priority estuaries. It lies entirely within South Africa's national jurisdiction.

Area Details

Feature description of the area

Algoa to Amathole EBSA is one of the most ecologically and biologically significant areas in South Africa. This area contains a myriad of rare, unique and diverse physical and biological features that are found on the seabed and in the overlying water column, that in turn support many key processes, including critical land-sea connections. The EBSA centres approximately around Algoa Bay, which also aligns with where the Agulhas Current leaves the coast, following the shelf break. This results in complex ocean circulation, including the formation of cold-water eddies, intrusions of Agulhas water onto the shelf, and large offshore meanders of the Agulhas Current; and productivity is enhanced by coastal upwelling (Goschen et al., 2015) and relatively rare surf diatom accumulations in the surf zone (Campbell & Bate 1988, Campbell 1996). Consequently, the area serves as spawning and/or nursery grounds for certain commercially-important demersal and pelagic fish species (Pattrick et al., 2016; Rishworth et al., 2015), squid (Downey-Breedt et al., 2016; Lipiński et al., 2016) sharks (Smale et al., 2015) and whales (Melly et al., in press); as transiting/foraging areas for seabirds, sharks, cetaceans (e.g., Koper et al., 2016; Melly et al., in press), and turtles; and forms part of the migration routes of loggerhead and leatherback turtles (Harris et al., 2018), with hatchlings of both species passing through the area during their dispersal. Green turtles, killer whales and coelocanths have also been sighted in the area. Notably, Algoa Bay hosts the largest groups of bottlenose dolphins (Bouveroux et al., 2018), largest colony of Endangered African penguins (Pichegru et al., 2010), and largest colony of Cape gannets (Crawford et al., 2007) in the world.

The new delineation of this EBSA to include priority estuaries, now includes breeding sites of the Critically Endangered, and locally endemic pipefish: *Syngnathus watermeyeri* (Vorwerk et al., 2007). These estuaries, together with the extension to include the coastal areas, also better represents some critical ecological processes that support the important offshore features. For example, these include key linkages among spawning, post-hatch and nursery areas commercially important fish species that span the surf zone to nearshore and the shelf (Pattrick et al., 2016). Many of the fish in the area also use the estuaries for part of their life-histories. The EBSA thus contains the following Important Bird Areas: 1. Algoa Bay Islands: Addo Elephant National Park; 2. Swartkops Estuary - Redhouse and Chatty Saltpans; and is adjacent to the Woody Cape Section: Addo Elephant National Park IBA.

Habitat diversity is also high within the EBSA. There are 36 ecosystem types represented (Sink et al., 2019), with benthic features including stromatolites, canyons, steep shelf edge, deep reefs, outer shelf and shelf edge gravels, and reef-building cold-water corals ranging in depth between -100 and -1000 m. There is also growing research (with interesting results) into marine biochemistry, microbiology, and potential pharmaceuticals and natural products from the biota in Algoa Bay and surrounds (e.g., Matobole et al., 2017; Ntozonke et al., 2017; Waterworth et al., 2017), as well as research into the recently discovered stromatolites on the shore (Perissinotto et al., 2014).

There has been substantial research in the area since the EBSA was first proposed, which has contributed significantly to identifying the features that are present, their extent and importance. The boundary of this EBSA was refined to align with initiatives to expand South Africa's MPA network, and better represent the underlying features comprising the EBSA to improve precision in the delineation, including: the canyons, rocky ridge, fragile and sensitive habitat-forming species, other key species, and key (threatened) habitats. This was 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). New fine-scale mapping of the coast (Harris et al., 2019) also allowed a more accuracte coastal boundary to be delineated. Further, the new boundary includes more of the existing coastal MPAs in the region. 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).

Feature conditions and future outlook of the proposed area

The South African National Biodiversity Assessment 2011, 2018 (Sink et al., 2012, 2019) indicated declining conditions overall in this area (based on pressure data and an ecosystem-pressure matrix) with conditions ranging from fair to poor across this broad area. Key pressures include commercial demersal trawl and longline fisheries, a midwater trawl fishery, linefishing, trap fisheries for rock lobster, shark fisheries and mining (prospecting and mining) activities. Red tides have also become more common in recent years, some of which have been toxic (Pitcher et al., 2014). However, a large portion of Algoa Bay has been proclaimed as a marine protected area, which will serve as a marine extension to the existing terrestrial Greater Addo Elephant National Park. The Amathole Offshore MPA has also come into effect, in addition to the several small existing coastal MPAs included in the new boundary. Research is ongoing in this area.

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Summary of ecosystem types and threat status for the Algoa to Amathole EBSA. Data from Sink et al. (2019).

Threat Status	Ecosystem Type	Area (km²)	Area (%)
Endangered	Kei Fluvial Fan	40.8	0.2
	Kei Reef Complex	93.0	0.5
Vulnerable	Agulhas Bays - East	1003.0	5.1
	Agulhas Coarse Sediment Shelf Edge	1221.5	6.2
	Agulhas Exposed Rocky Shore	6.2	0.0
	Agulhas Exposed-Stromatolite Rocky Shore	3.6	0.0
	Agulhas Inner Shelf Reef Sand Mosaic	373.3	1.9
	Agulhas Island Shore	3.0	0.0
	Agulhas Mid Shelf Reef Complex	35.1	0.2
	Agulhas Sandy Inner Shelf	411.4	2.1
	Agulhas Sandy Outer Shelf	4525.8	23.0
	Agulhas Stromatolite Mixed Shore	4.0	0.0
	Agulhas Upper Canyons	102.0	0.5
	Agulhas Very Exposed Rocky Shore	0.4	0.0
	Amathole Hard Shelf Edge	468.7	2.4
	Warm Temperate Large Fluvially Dominated Estuary	5.7	0.0
	Warm Temperate Large Temporarily Closed Estuary	9.0	0.0
	Warm Temperate Predominantly Open Estuary	76.5	0.4
Near Threatened	Agulhas Boulder Shore	0.6	0.0
	Agulhas Dissipative Sandy Shore	1.5	0.0
	Agulhas Mid Shelf Reef Sand Mosaic	396.0	2.0
	Agulhas Mixed Shore	60.4	0.3
	Agulhas Sandy Mid Shelf	3615.3	18.4
	Agulhas Very Exposed-Stromatolite Rocky Shore	0.2	0.0
	Amathole Lace Corals	131.7	0.7
Least Concern	Agulhas Dissipative-Intermediate Sandy Shore	50.5	0.3
	Agulhas Intermediate Sandy Shore	0.8	0.0
	Agulhas Lower Canyons	1152.5	5.9
	Natal Deep Shelf Edge	370.7	1.9
	Natal Pondoland Lower Canyons	612.7	3.1
	Pondoland Mid Shelf Coarse Sediment Reef Mosaic(B)	1316.4	6.7
	Pondoland Shelf Edge Gravel Reef Mosaic	261.8	1.3
	Southwest Indian Mid Slope	2128.7	10.8
	Southwest Indian Upper Slope	1172.7	6.0
	Warm Temperate Small Temporarily Closed Estuary	3.6	0.0
N/A	Warm Temperate Micro-estuary	0.5	0.0
Grand Total		**19659.6**	**100.0**

Assessment of the area against CBD EBSA criteria

C1: Uniqueness or rarity **High**

Justification

Rare ecosystem types in this region include outer shelf mixed sediments, canyons and stromatolites (Sink et al., 2019), and relatively rare – nationally and globally – surf diatom accumulations (Campbell

1996, Campbell & Bate 1988). This site includes a large canyon that intersects with the shelf (Sink et al., 2011). It also contains a Critically Endangered localised endemic estuarine pipefish, and sites where coelocanths are present.

C2: Special importance for life-history stages of species **High**
Justification
This area includes breeding and foraging areas for African penguins and Cape gannets (Sink et al., 2011). BirdLife International data also indicate importance for damara terns, kelp gulls and roseate terns, with three IBAs within or adjacent to the EBSA. Species that have shown spawning activity in this area include (among others) kingklip, squid, sparids, sardine, anchovy, kob and hake (Hutchings et al., 2002, Sink et al., 2011; Mhlongo et al., 2015, Downey-Breedt et al., 2016; Lipiński et al., 2016; Pattrick et al., 2016). This is considered an area of crucial importance for the eggs and larvae spawned upstream to enter the Agulhas Bank nursery area (Hutchings et al., 2002). Algoa to Amathole is also particularly important for mussel larvae (Weidberg et al., 2015) and spiny lobsters (Santos et al., 2014). This area is also important as a nursery area for sharks (Smale et al., 2015) and whales (Melly et al., in press), and as transiting/foraging areas for seabirds, sharks, cetaceans (e.g., Koper et al., 2016; Melly et al., in press), and turtles (Harris et al., 2018).

C3: Importance for threatened, endangered or declining species and/or habitats **High**
Justification
This EBSA includes areas important for the survival of several IUCN Red-listed species, including the African penguin *Spheniscus demersus* (Endangered on the IUCN Red List) and the Cape Gannet *Morus capensis* (Vulnerable on the IUCN Red List). This area is also used by green, loggerhead, and leatherback turtles (respectively listed as Endangered, Near Threatened and Critically Endangered on the IUCN global redlist for the South West Indian Ocean region; Petersen et al., 2009, Harris et al., 2018).

There are 18 threatened ecosystem types, and a further seven Near Threatened ecosystem types. The threatened types include the Endangered Kei Fluvial Fan and Kei Reef Complex ecosystem types, and the Vulnerable Agulhas Bays - East, Agulhas Coarse Sediment Shelf Edge, Agulhas Exposed Rocky Shore, Agulhas Exposed-Stromatolite Rocky Shore, Agulhas Inner Shelf Reef Sand Mosaic, Agulhas Island Shore, Agulhas Mid Shelf Reef Complex, Agulhas Sandy Inner Shelf, Agulhas Sandy Outer Shelf, Agulhas Stromatolite Mixed Shore, Agulhas Upper Canyons, Agulhas Very Exposed Rocky Shore, Amathole Hard Shelf Edge, Warm Temperate Large Fluvially Dominated Estuary, Warm Temperate Large Temporarily Closed Estuary and Warm Temperate Predominantly Open Estuary ecosystem types.

C4: Vulnerability, fragility, sensitivity, or slow recovery **Medium**
Justification
This area includes submarine canyons, steep shelf edge, deep reefs and outer shelf and shelf edge gravels. These habitats may support fragile habitat-forming species. Cold-water corals (*Goniocorella dumosa, Solenosmilia variabilis*) have been recorded in the area (Sink et al., 2011) and are in the Iziko South African museum invertebrate collection.

C5: Biological productivity **High**

Justification

Productivity offshore of Port Elizabeth is medium to high, and very variable. Chlorophyll-a concentrations are also highly variable, associated with frequent SST and chlorophyll fronts on the steep outer shelf (Lagabrielle 2009, Sink et al., 2011, Roberson et al., 2017). Coastal upwelling may be driven, or at least enhanced, by the formation of Natal pulses (Goschen et al., 2015).

C6: Biological diversity **High**

Justification

There are 36 ecosystem types comprising this EBSA, including rocky, mixed and boulder shores, stromatolites, estuaries, beaches, bays, shelf, shelf edge, and canyons (Sink et al., 2019). The associated communities supported by these habitats are thus also diverse.

C7: Naturalness **Medium**

Justification

Although some areas are assessed as in poor condition (based on pressure data, see South Africa's National Biodiversity Assessment 2011, 2018; Sink et al., 2012, 2019), there are many examples of ecosystem types in good condition and include examples of features that may support fragile and vulnerable habitat forming species (Sink et al., 2012). Overall, 32% of the EBSA is in good ecological condition, 44% fair and 24% poor (Sink et al., 2019).

Status of submission

The Offshore of Port Elizabeth EBSA was recognized as meeting EBSA criteria by the Conference of the Parties. The revised Algoa to Amathole EBSA 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

Significant changes have been made to the delineation of the original Offshore of Port Elizabeth EBSA and to the description, such that it was necessary to split the EBSA into two, and revise the name of this one to Algoa to Amathole EBSA to accurately reflect the geographical location of the EBSA. Additional references have been added and significant updates to the description were made. A supplementary table of the habitats represented in the EBSA and their associated threat status was also included. Given the new extent and inclusion of additional features, criteria level changes were made to Criterion 1: Uniqueness or rarity and Criterion 7: Naturalness, respectively upgraded from medium to high, and low to medium.

An important change has been the significant revision of the EBSA boundaries to reflect the key biodiversity features in this area. 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:

- 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), the National Biodiversity Assessment 2011, 2018 (Sink et al., 2012, 2019) and BCC spatial mapping project (Holness et al., 2014) were incorporated. In addition, island-linked ecosystem types were included (Harris et al., 2019; Sink et al., 2019).
- Irreplaceable and near irreplaceable (i.e. very high selection frequency) sites, as well as focus areas identified in the Systematic Conservation Plans undertaken for the West Coast by Majiedt et al. (2013), offshore areas (Sink et al., 2011) and by Holness et al. (2014) 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.
- Areas important for threatened and special species were included. The priority areas and buffer distances around colonies were from Holness et al. (2014). Note that the full extent of the buffer was not necessarily included in the EBSA. Features included in the analysis were:
  - African Penguin colonies and a 20 km buffer.
  - Cape Cormorant and White Breasted Cormorant colonies and a 40 km buffer.
  - Gannet colonies with a 40 km buffer.
  - Seal Colonies and a 20 km buffer.
- Areas of high relative naturalness of benthic and coastal systems and pelagic systems identified in the National Biodiversity Assessment 2011 (Sink et al., 2012a) 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.
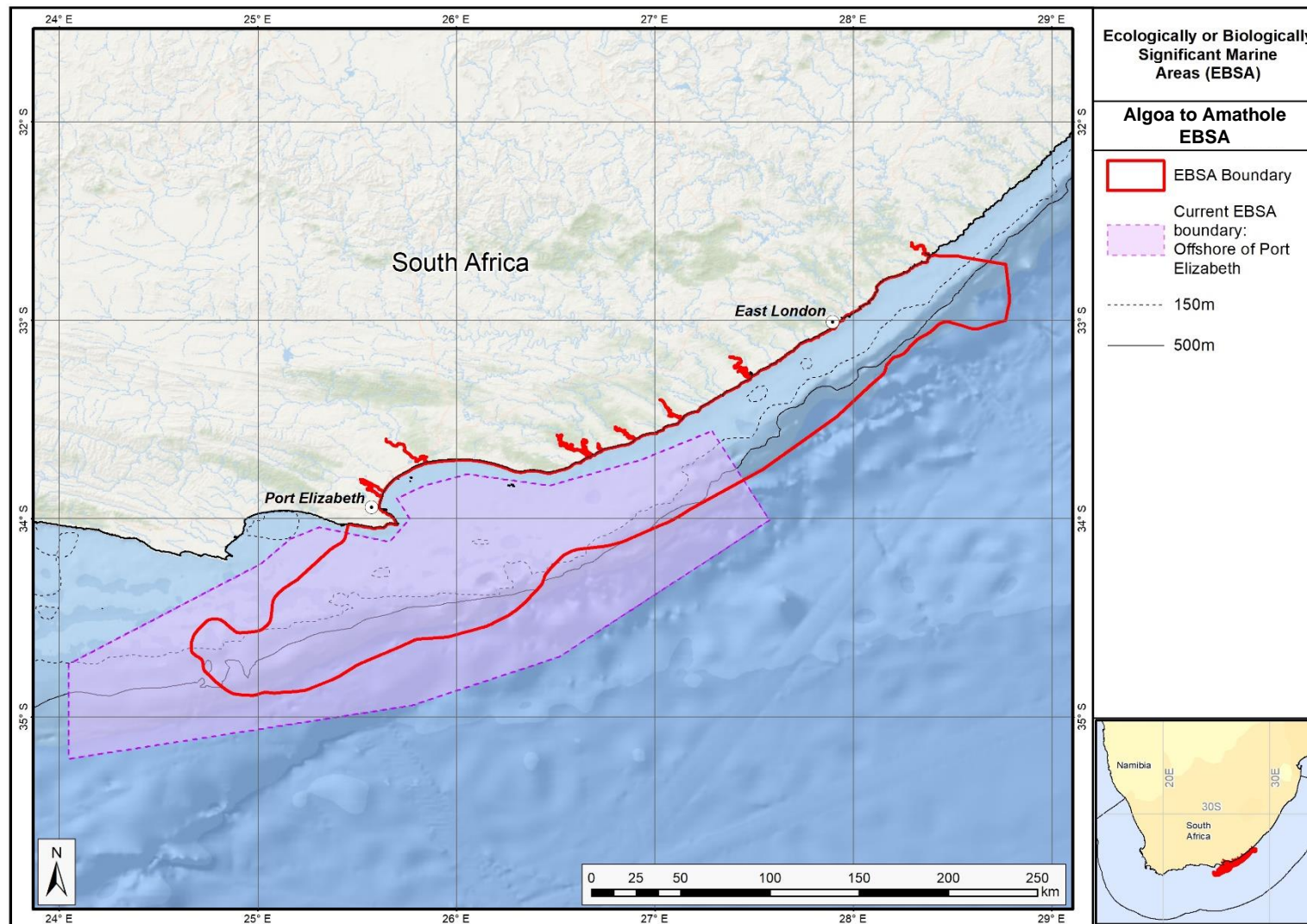
The proposed revised boundaries for the Algoa to Amathole EBSA in relation to the original Offshore of Port Elizabeth EBSA.