ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS

in the Benguela Current Large Marine Ecosystem

Tsitsikamma-Robberg

PROPOSED 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

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TSITSIKAMMA-ROBBERG

Proposed Description

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NELSON MANDELA UNIVERSITY

Tsitsikamma-Robberg

Proposed EBSA Description

Abstract

Tsitsikamma-Robberg is a coastal EBSA on the South African south coast. It includes Tsitsikamma MPA (South Africa's oldest MPA), Robberg MPA, Goukamma MPA, and part of the Garden Route Biosphere Reserve. It extends from the shore largely to the back of the middle shelf (-100 m isobath), with some extension onto the shallow outer shelf, and includes the extent of five estuaries, including Knysna. The protection afforded to the inshore reefs from these MPAs has contributed to a high diversity and abundance of species, including fragile, vulnerable, sensitive and slow-growing species, that in turn support many top predators. Numerous threatened species occur within this EBSA, including an Endangered endemic seahorse species and several Critically Endangered fish species, with the area also supporting important life-history stages of these threatened and other species. Several Critically Endangered and Endangered ecosystem types are also represented in the EBSA, which by implication support threatened biological communities. The area is mostly in good or fair ecological condition. However, Tsitsikamma MPA has recently been opened to recreational fishing in certain areas.

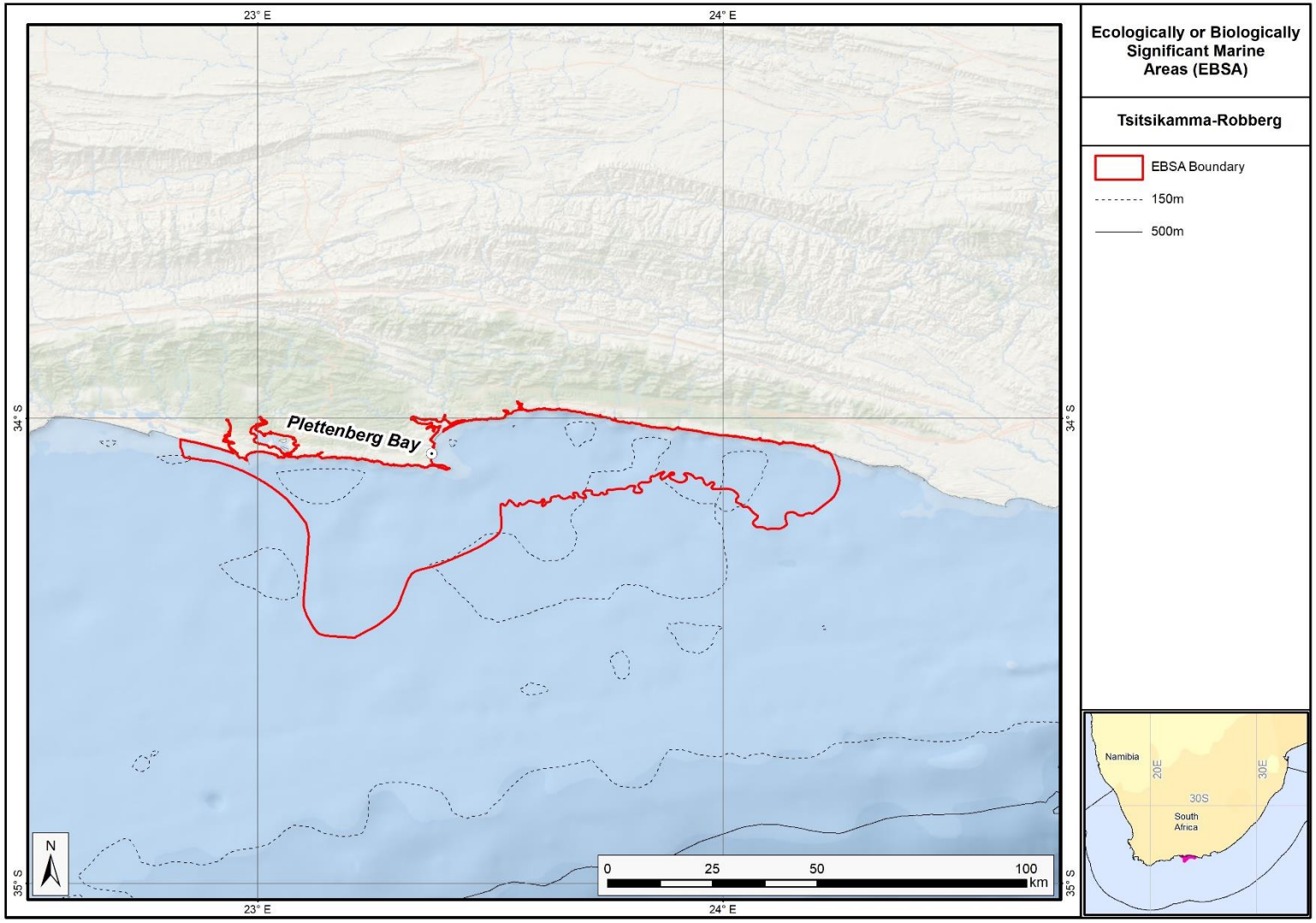
Introduction

Tsitsikamma-Robberg is a coastal EBSA that includes the Tsitsikamma, Robberg and Goukamma MPAs, and is bordered along most of its shore length by the Garden Route National Park. The EBSA also forms part of the Garden Route Biosphere Reserve. Fourteen estuaries open into this EBSA, with the Keurbooms, Groot, Sout, Knysna and Goukamma Estuaries included in the EBSA boundary. As a coastal EBSA, the depth range is relatively shallow, with most of the area covering the middle shelf. Depths are generally shallower than -100 m, although slightly deeper waters are contained in the western offshore extension. The EBSA contains important inshore reefs, vulnerable, fragile and sensitive species, and is also rich in top predators (sharks, cetaceans and marine mammals), some of which are threatened species. Inclusion of the Keurbooms and Knysna Estuaries in the EBSA means that it also contains two of only three estuaries in South Africa where the Knysna seahorse (*Hippocampus capensis*) is found: one of the two Endangered seahorse species globally. Given the diversity contained within the EBSA, there are many ecotourism operators (whale watching, fishing charters) and marine researchers working in this area. Notably, Tsitsikamma MPA is Africa's oldest marine reserve, and therefore, there is a lot of research on the reef and fish communities contained within it. The EBSA had a high selection frequency in a national systematic conservation plan, and was also identified as a key site in South Africa's protected area expansion strategy.

The reason this site was not part of the original list of EBSAs first proposed in the South Eastern Atlantic EBSA Identification Workshop in 2013 (UNEP/CBD/RW/EBSA/SEA/1/4) is because the value of the area was recognised only afterwards in a gap analysis.The significance of this site is largely underpinned by the inshore reefs. However, it also includes several other biodiversity features, such as critical linkages between land and sea via the five key estuaries, and important shore habitats that support critical life history stages of animals such as seals. Consequently, this site is proposed as a Type 2 EBSA (sensu Johnson et al., 2018).

EBSA Region

Southern Indian Ocean



Proposed boundary of the Tsitsikamma-Robberg EBSA.

Location

The Tsitsikamma-Robberg EBSA extends along the South African south coast from the eastern boundary of the Goukamma MPA, to about 8 km west of the Robberg Peninsula, and offshore by approximately 15-18 km, largely following the -100 m isobath. The western half of the EBSA has an offshore extension, roughly opposite the Knysna Estuary. It also includes the five largest estuaries in the EBSA: Keurbooms, Groot, Sout, Knysna and Goukamma. Tsitsikamma-Robberg is entirely within South Africa's national jurisdiction.

Feature description of the proposed area

The features contained within the EBSA are largely benthic, but several of the top predators are associated more with the pelagic environment. The EBSA status of this site is largely underpinned by the inshore reefs, and those in Tsitsikamma MPA have been protected since the 1964, making it the oldest marine reserve in Africa. These reefs comprise numerous fragile and sensitive species that are slow growing, including both habitat-forming reef species, as well as animals such as sparids. Echo-sounder and stereo-BRUV data show that reefs within the EBSA have high structural complexity (which tends to be associated with higher diversity and abundance of fish and), and in some places include boulder reefs that appear to be a unique ecosystem type in South Africa, supporting abundant carpenter, panga and giant octopus communities (Anthony Bernard, SAIAB, pers. comm.). As a result of the large, old, no-take reserves, species abundance and diversity in this EBSA's MPAs are much higher compared to that of the surrounding area. In turn, the area supports key populations of top predators, including Cape fur seals, sharks, seabirds and cetaceans by providing breeding and foraging habitat for them. There are several threatened species in this area, including top predators and species of commercial importance. There are also 19 ecosystem types in the EBSA (Harris et al., 2019; Sink et al., 2019), including 10 threatened ecosystem types (Sink et al., 2019), which by implication support biological communities that are also threatened.

Given the abundant marine life in the area, and the large no-take reserve that serves as a pristine reference site, there is a long history of marine research in this area, and a thriving ecotourism industry, including Blue Flag boats and beaches. The EBSA had a high selection frequency in a national systematic conservation plan indicative that this is a key area in which biodiversity targets need to be met (Sink et al., 2011, 2012, SANBI unpublished results), and it is also recognised as a focus area for protected area expansion in South Africa. The broader area, including the terrestrial side, is similarly recognised for its key ecological value. Most of the EBSA is backed by the terrestrial Garden Route National Park, and it forms part of the much larger Garden Route Biosphere Reserve that was declared by UNESCO in 2017. It also includes the Tsitsikamma-Plettenberg Bay Important Bird and Biodiversity Area, within which at least 300 species of birds have been recorded (Marnewick et al., 2015). The EBSA boundary was delineated based on all the best available data (e.g., Harris et al., 2019; Holness et al., 2014; Majiedt et al., 2013; Sink et al., 2012, 2019).

Feature condition and future outlook of the proposed area

The EBSA is in good (37%) to fair (35%) ecological condition, with the remaining 28% in poor condition based on a national analysis of cumulative threats to the marine realm (Sink et al., 2012, 2019). Notably, the South African government recently opened sections of the previously no-take Tsitsikamma MPA for recreational fishing.

References

Edgar, G.J., Stuart-Smith, R.D., Willis, T.J., Kininmonth, S., Baker, S.C., Banks, S., Barrett, N.S., Becerro, M.A., Bernard, A.T., Berkhout, J., Buxton, C.D., Campbell, S.J., Cooper, A.T., Davey, M., Edgar, S.C., Forsterra, G., Galvan, D.E., Irigoyen, A.J., Kushner, D.J., Moura, R., Parnell, P.E., Shears, N.T., Soler, G., Strain, E.M., Thomson, R.J. 2014. Global conservation outcomes depend on marine protected areas with five key features. Nature, 506: 216-20.

Harris, L.R., Bessinger, M., Dayaram, A., Holness, S., Kirkman, S., Livingstone, T.-C., Lombard, A.T., Lück-Vogel, M., Pfaff, M., Sink, K.J., Skowno, A.L., Van Niekerk, L., 2019. Advancing land-sea integration for ecologically meaningful coastal conservation and management. Biological Conservation 237, 81-89.

Holness, S., Kirkman, S., Samaai, T., Wolf, T., Sink, K., Majiedt, P., Nsiangango, S., Kainge, P., Kilongo, K., Kathena, J., Harris, L.R., Lagabrielle, E., Kirchner, C., Chalmers, R., Lombard, A., 2014. Spatial Biodiversity Assessment and Spatial Management, including Marine Protected Areas. Final report for the Benguela Current Commission project BEH 09-01.

Huisamen, J., Kirkman, S.P., Watson, L.H., Cockcroft, V.G. and Pistorius, P.A., 2011. Recolonisation of the Robberg Peninsula (Plettenberg Bay, South Africa) by Cape fur seals. African Journal of Marine Science, 33(3): 453-461.

Johnson, D.E., Barrio Froján, C., Turner, P.J., Weaver, P., Gunn, V., Dunn, D.C., Halpin, P., Bax, N.J., Dunstan, P.K., 2018. Reviewing the EBSA process: Improving on success. Marine Policy 88, 75-85.

Lockyear, J.F., Hecht, T., Kaiser, H., Teske, P.R. 2006. The distribution and abundance of the endangered Knysna seahorse *Hippocampus capensis* (Pisces: Syngnathidae) in South African estuaries. African Journal of Aquatic Science, 31: 275-283.

Majiedt, P., Holness, S., Sink, K., Oosthuizen, A., P., C., 2013. Systematic Marine Biodiversity Plan for the West Coast of South Africa. South African National Biodiversity Institute, Cape Town, South Africa.

Marnewick, M.D., Retief, E.F., Theron, N.T., Wright, D.R., Andersonm T.A. 2015. Important Bird and Biodiversity Areas of South Africa. Johannesburg: BirdLife South Africa.

Sink, K.J., Attwood, C.G., Lombard, A.T., Grantham, H., Leslie, R., Samaai, T., Kerwath, S., Majiedt, P., Fairweather, T., Hutchings, L., van der Lingen, C., Atkinson, L.J., Wilkinson, S., Holness, S., Wolf, T. 2011. Spatial planning to identify focus areas for offshore biodiversity protection in South Africa. Unpublished Report. Cape Town: South African National Biodiversity Institute.

Sink, K., Holness, S., Harris, L., Majiedt, P., Atkinson, L., Robinson, T., Kirkman, S., Hutchings, L., Leslie, R., Lamberth, S., Kerwath, S., von der Heyden, S., Lombard, A., Attwood, C., Branch, G., Fairweather, T., Taljaard, S., Weerts, S., Cowley, P., Awad, A., Halpern, B., Grantham, H., Wolf, T. 2012. National Biodiversity Assessment 2011: Technical Report. Volume 4: Marine and Coastal Component. South African National Biodiversity Institute, Pretoria.

Sink, K.J., van der Bank, M.G., Majiedt, P.A., Harris, L.R., Atkinson, L., Karenyi, N., Kirkman, S. (eds) 2019. National Biodiversity Assessment 2018 Technical Report Volume 4: Marine Realm. South African National Biodiversity Institute, Pretoria. http://hdl.handle.net/20.500.12143/6372.

Whittington, P.A., Crawford, R.J.M., Martin, A.P., Randall, R.M., Brown, M., Ryan, P.G., Dyer, B.M., Harrison, K.H.B., Huisamen, J., Makhado, A.B., Upfold, L., Waller, L.J., Witteveen, M. 2016. Recent Trends of the Kelp Gull (*Larus dominicanus*) in South Africa. Waterbirds, 39: 99-113.

Wood, A.D., Brouwer, S.L., Cowley, P.D., Harrison, T.D. 2000. An updated check list of the ichthyofaunal species assemblage of the Tsitsikamma National Park, South Africa. Koedoe, 43: 13.

Other relevant website address or attached documents

Summary of ecosystem types and threat status for the Tsitsikamma-Robberg EBSA. Data from Sink et al. (2019).

Threat Status	Ecosystem Type	Area (km^2)	Area (%)
Endangered	Agulhas Bays - West	118.8	4.5
	Agulhas Sheltered Rocky Shore	0.3	0.0
Vulnerable	Agulhas Exposed Rocky Shore	26.0	1.0
	Agulhas Inner Shelf Reef Sand Mosaic	178.2	6.7
	Agulhas Mid Shelf Reef Complex	12.1	0.5
	Agulhas Sandy Outer Shelf	14.8	0.6
	Agulhas Very Exposed Rocky Shore	0.8	0.0
	Warm Temperate Estuarine Bay	30.1	1.1
	Warm Temperate Large Temporarily Closed Estuary	3.1	0.1
	Warm Temperate Predominantly Open Estuary	16.6	0.6
Near Threatened	Agulhas Boulder Shore	0.1	0.0
	Agulhas Mixed Shore	9.2	0.3
	Agulhas Sandy Mid Shelf	1636.0	61.9
Least Concern	Agulhas Dissipative-Intermediate Sandy Shore	8.5	0.3
	Agulhas Inner Shelf Reef Complex	17.7	0.7
	Agulhas Intermediate Sandy Shore	2.6	0.1
	Agulhas Outer Shelf Reef Coarse Sediment Mosaic	566.6	21.4
	Warm Temperate Small Fluvially Dominated Estuary	0.7	0.0
	Warm Temperate Small Temporarily Closed Estuary	1.5	0.1
Grand Total		**2643.6**	**100.0**

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.	Medium
Explanation for ranking The uniqueness of the area is largely driven by the effect of Africa's oldest MPA, providing a reference site for ecological research. Other rare features include presence of Endangered humpback dolphins, the tombolo at Robberg Peninsula, and some endemic species, such as the Knysna seahorse (Lockyear et al., 2006) and African Black Osytercatcher (Marnewick et al., 2015). There is a boulder reef present in the EBSA that appears to be a unique ecosystem type in South Africa (Anthony Bernard, SAIAB, pers. comm.). The site also had a high selection frequency, meaning that the area is important for meeting biodiversity feature targets.		

Special importance for life-history stages of species	Areas that is required for a population to survive and thrive.	High
Explanation for ranking As an IBA, the site supports many breeding bird species, e.g., White-breasted Cormorants, Caspian Terns and White-fronted Plovers, and is also a notably important breeding site (1% or more of the congregatory population threshold) for Kelp Gulls, (Endangered) Cape Cormorants, and (endemic) African Black Oystercatchers (Marnewick et al., 2015). In fact, the Keurbooms Estuary mouth is the largest breeding colony of Kelp gulls on the South African south coast, and one of the largest in the country (Whittington et al., 2015). The EBSA supports a Southern right whale breeding area, and a breeding colony of Cape fur seals at Robberg (Huisamen et al., 2011). During the latter pupping season, white sharks are known to be drawn to the area to forage on the young seals. The EBSA also includes the Keurbooms and Knysna Estuaries, which are two of only three estuaries in which Endangered, endemic Knysna seahorses live (Lockyear et al., 2006).		
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.	High
Explanation for ranking One of the key attributes of this EBSA is its importance for threatened species. These include (among others): Critically Endangered Seventy-four Seabream, Critically Endangered Dageraad, Endangered Knysna seahorses, Endangered humpback dolphins, Endangered White Steenbras, Endangered Cape Cormorants, Vulnerable white sharks. Near Threatened Roman Seabream and Near Threatened African Clawless Otters are also present. These species are top predators, iconic species, or commercially important species that have been overexploited outside of the MPAs in this area. Given that ecosystem types are frequently used as a surrogate for biodiversity, South Africa places key importance on its national ecosystem type map for biodiversity planning and assessment (Sink et al., 2012). Tsitsikamma-Robberg includes two Endangered and eight Vulnerable ecosystem types (Sink et al., 2019). By implication, these habitats each support biological communities that are likely threatened as well.		
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.	High
Explanation for ranking The area contains vulnerable inshore reefs that include sensitive, fragile and vulnerable habitat-forming species. Further, some of the top predator and some sparid populations are also vulnerable to population impacts because the species are slow growing and late maturing.		

Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.	Medium
Explanation for ranking Time-averaged MODIS Aqua data on chlorophyll concentration (NASA Giovanni Portal: https://giovanni.gsfc.nasa.gov) shows that productivity inside Tsitiskamma-Robberg is higher compared to that of the surrounding area, particularly close to the shore. Local productivity is also higher because of the no-take MPAs supporting high abundances of biota, especially fish (Edgar et al., 2014), and thus contributing to more productive biological communities.		
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.	High
Explanation for ranking The focus area includes representation of 19 different ecosystem types, each likely supporting their own biological communities. There is also high diversity of fish and sharks (Wood et al., 2000) in the EBSA, and it includes the Tsitsikamma-Plettenberg Bay Important Bird and Biodiversity Area, within which at least 300 species of birds have been recorded (Marnewick et al., 2015).		
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.	Medium
Explanation for ranking The EBSA is predominantly in good (37%) or fair (35%) ecological condition as per a national cumulative threat assessment of pressures on South Africa's marine environment (Sink et al., 2019). This is partly because the area includes three MPAs, the largest of which is an old (proclaimed in 1964) no-take reserve, and the adjacent hinterland (although not part of the EBSA) mostly comprises the Garden Route National Park, and more recently (2017), the Garden Route Biosphere Reserve.		

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 revised description

Motivation for Submission

The Robberg-Tsitsikamma area was highlighted in a recent expert and systematic review of gaps in the EBSA network. The area also has high selection frequency in spatial assessments (Sink et al., 2011;

Unpublished data linked to Majiedt et al., 2013; Holness et al., 2014) and contains threatened ecosystem types identified in the National Biodiversity Assessment 2011 (Sink et al., 2012). Initial draft EBSA boundaries were determined, and these were then evaluated against the EBSA criteria. Once it was determined that the area would meet EBSA criteria a formal boundary delineation and evaluation process was undertaken. The delineation process included an initial stakeholder review, a technical mapping process and then an expert review workshop where boundary delineation options were discussed. The boundaries were revised a final time to accommodate the latest NBA 2018 assessment results and the review workshop discussion. The delineation processe used a combination of Systematic Conservation Planning and Multi-Criteria Analysis methods. The features used in the analysis were:

- Irreplaceable and near irreplaceable (i.e. very high selection frequency) sites which relate closely to the EBSA criteria of "Uniqueness and rarity" from the offshore prioritisation process (Sink et al., 2011), the Systematic Conservation Planning process undertaken for Majiedt et al. (2013) and the additional unpublished analysis for the broader BCLME region by Holness et al. (2014).
- 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). Fine-scale coastal mapping was also included (Harris et al., 2019).
- Areas of high relative naturalness identified in the National Biodiversity Assessment 2011, 2018 (Sink et al., 2012, 2019), the West Coast (Majiedt et al., 2013) and the BCLME spatial assessments (Holness et al., 2014) were included in the analysis. Both pelagic and benthic and coastal condition were incorporated.
- Distributions of known fragile, vulnerable and sensitive habitat-forming species were included (Unpublished SANBI and SAEON data).

The multi-criteria analysis resulted 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.