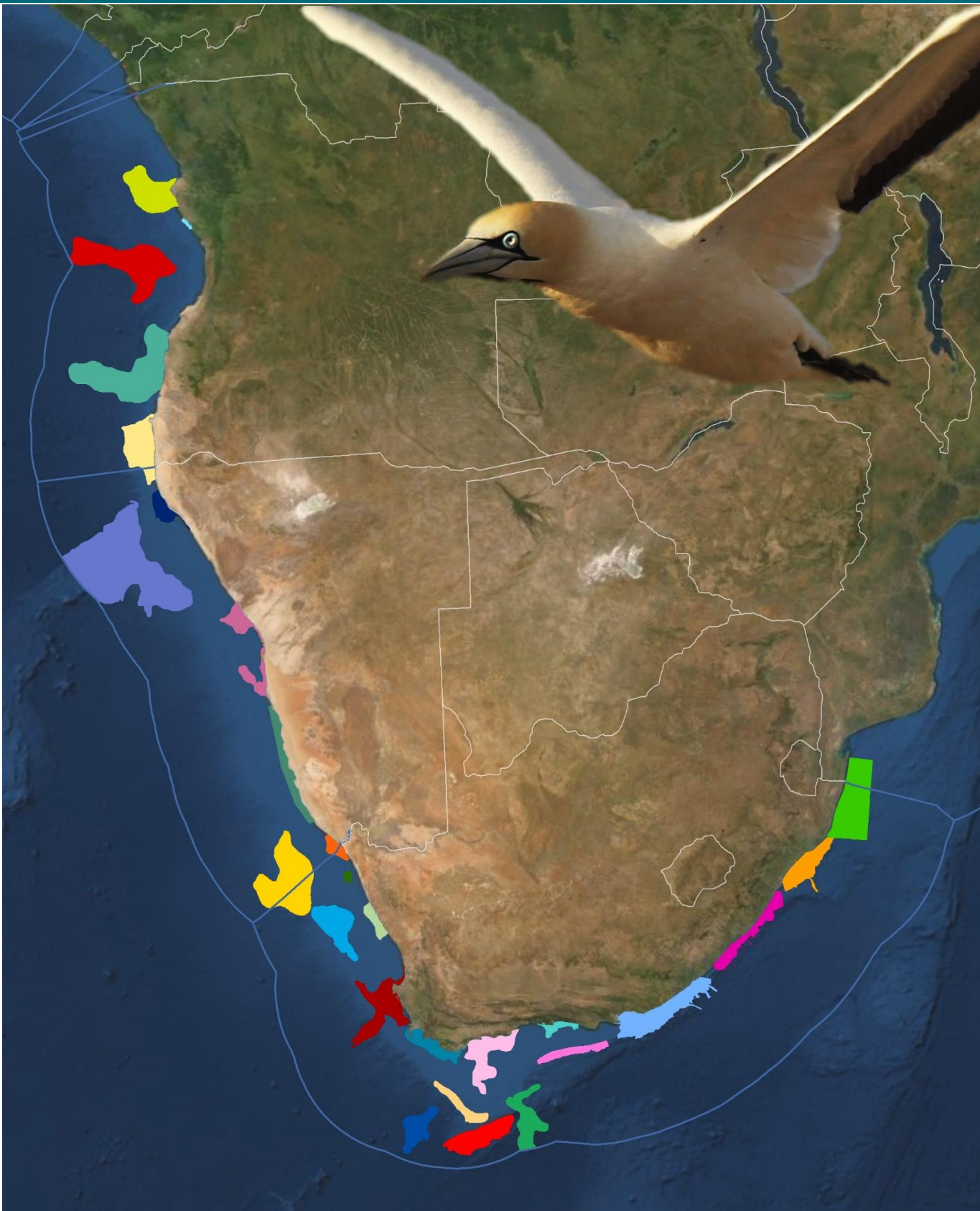


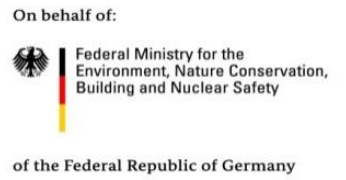
# ECOLOGICALLY OR BIOLOGICALLY SIGNIFICANT MARINE AREAS

in the Benguela Current Large Marine Ecosystem



**Mallory Escarpment and Trough**

REVISED DESCRIPTION



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

## MALLORY ESCARPMENT AND TROUGH

### Revised Description



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

## **Mallory Escarpment and Trough (Formerly Agulhas Slope and Seamounts)**

### *Revised EBSA Description*

#### **General Information**

##### **Summary**

The outer margin along the southern tip of the Agulhas Bank is a dynamic offshore area with high productivity and high pelagic and benthic habitat heterogeneity. The Agulhas and Southern Benguela ecoregions meet at this point, and sporadic shelf-edge upwelling enhances the productivity along the outer margin. The area is recognized as a spawning area for sardine, anchovy, horse mackerel and hake, and this apex area of the Agulhas Bank is recognized as a critical area for retention of spawning products. Eddies in this area help recirculate water inshore and link important nursery areas with spawning habitat on the shelf edge. Importantly, the EBSA includes the Mallory escarpment and trough segment of the Agulhas-Falkland Fracture Zone. This is a unique feature in the region, and certainly slopes as steep as this one (20°) are globally very rare. The area was identified as a priority through a national spatial plan because of high habitat diversity. Since the original description (of Agulhas Slope and Seamounts), the boundary has been refined and split into two EBSAs to better represent the underlying EBSA features. No ecological research has been conducted in this EBSA but is strongly recommended.

##### **Introduction of the area**

Mallory Escarpment and Trough includes the outer margin along the southern tip of the Agulhas Bank in South Africa, chiefly encompassing the key features of the Agulhas-Falkland Fracture Zone, including a slope as steep as 20° in some places (De Wet 2012). The Agulhas and Southern Benguela ecoregions (Sink et al., 2012) meet at this point, resulting in a dynamic offshore area with high pelagic and benthic habitat heterogeneity. Further, sporadic shelf-edge upwelling enhances the productivity along the outer margin (Lagabrielle, 2009, Roberson et al., 2017). The area is recognized as a spawning area for sardine, anchovy, horse mackerel and hake, and this apex of the Agulhas Bank is recognized as a critical area for retention of spawning products (Hutchings et al., 2002). Eddies in this area help recirculate water inshore and link important nursery areas with spawning habitat on the shelf edge. Leatherback turtles also frequent this area along their migrations (Harris et al., 2018). This area was identified as a priority through a national plan to identify focus areas for offshore protection (Sink et al., 2011) because it has relatively high habitat diversity and can meet multiple benthic and pelagic habitat conservation targets in a small area. It also contains regionally unique, globally very rare features.

##### **Description of the location**

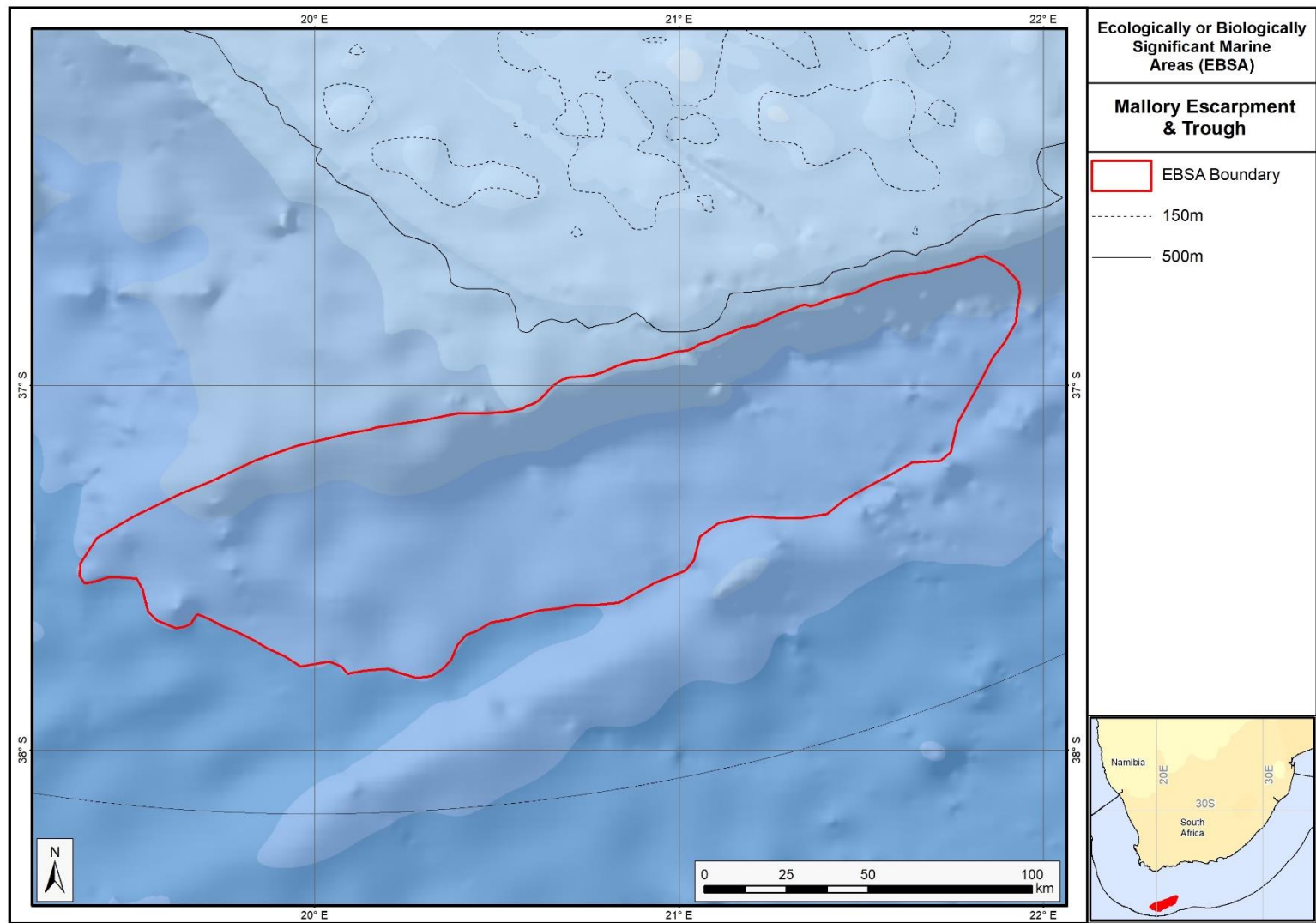
###### **EBSA Region**

Southern Indian Ocean

###### **Description of location**

The EBSA is at the apex of the Agulhas Bank at the southern tip of the continental shelf edge off southern Africa. It is directly south of Cape Infanta and Cape Agulhas in the Agulhas-Falkland Fracture Zone, and is entirely within South Africa's EEZ. It contains the Mallory escarpment and trough, and lies immediately west of the Shackleton Seamount Complex EBSA.





*Proposed revised boundaries of the Mallory Escarpment and Trough EBSA.*

## Area Details

### Feature description of the area

The area includes benthic and pelagic features, including: the shelf edge, a very steep slope and a trough as part of the Agulhas-Falkland Fracture Zone; shelf-edge driven upwelling; and fragile and sensitive habitat-forming species. Habitat diversity is thus particularly high for a location this far offshore. This dynamic area consequently supports numerous ecological processes, such as spawning and foraging, and comprises a rich diversity of both resident (e.g., benthic gorgonians) and transient (e.g., migrating leatherbacks) species.

The delineation of this EBSA was refined since its first description, based on the best available data (e.g., De Wet 2012; GEBCO Compilation Group 2019; Harris et al., 2014; Holness et al., 2014; Majiedt et al., 2013; Sink et al., 2012, 2019). It is now split into two EBSAs: one for the seamounts, and one for the escarpment and trough features. The revision was based on high selection frequency of sites in the two systematic biodiversity plans covering the area, tighter alignment to the benthic topography (from a new national dataset: De Wet 2012), presence of fragile and sensitive habitat-forming species, and new delineation of the constituent ecosystem types (Sink et al., 2019). Effectively, these new data helped to improve the precision of the EBSA boundary so that it better reflects the underlying features. 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 shelf edge, slope and trough have not been sampled, although *in-situ* research is recommended in this area. Nevertheless, there are various fisheries operating in the area, but some of the hard grounds represented in the EBSA are outside of the trawl footprint. Broadly speaking, there is relatively little pressure in this area at present, and the ecosystem types are in good ecological condition.

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## Other relevant website address or attached documents

*Summary of ecosystem types and threat status for the Mallery Escarpment and Trough EBSA. Data from Sink et al. (2019).*

Threat Status	Ecosystem Type	Area (km <sup>2</sup> )	Area (%)
Least Concern	Agulhas Basin Abyss	7799.9	59.7
	Cape Basin Abyss	357.1	2.7
	Southeast Atlantic Lower Slope	527.7	4.0
	Southeast Atlantic Mid Slope	3.0	0.0
	Southwest Indian Lower Slope	3487.2	26.7
	Southwest Indian Mid Slope	898.0	6.9
<b>Grand Total</b>		<b>13072.9</b>	<b>100.0</b>

## Assessment of the area against CBD EBSA criteria

C1: Uniqueness or rarity **High**

Justification

The steep slope (20°) of Mallery Trough is the steepest portion of the entire South African continental shelf. It is also the only trough system in the Benguela region, and slopes as steep as 20° are globally very rare.

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

Justification

The EBSA is recognized as a spawning area for small pelagic fish (sardine, anchovy, horse mackerel) and hake (Hutchings et al., 2002, Sink et al., 2011). This apex area of the Agulhas Bank is also recognized as a critical area for retention of spawning products. Eddies in this area help re-circulate water inshore and link important nursery areas with spawning habitat on the shelf edge. The shelf edge constitutes foraging area for offshore seabirds (Birdlife data, see references).

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

Justification

One of the pelagic ecosystem types in the area is characterised by elevated productivity and frequent fronts due to shelf edge upwelling (Lutjeharms et al., 2000, Lagabrielle 2009, Roberson et al., 2017). Consequently, regionally Critically Endangered leatherback turtles frequent this area (Petersen et al., 2009a; Harris et al., 2018), and the shelf edge is a feeding area for threatened seabirds such as albatross (Petersen et al., 2009b).

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

Justification

This area includes hard shelf edge and a very steep slope. These are likely to support fragile long-lived biota. Video images of the shelf edge show cold-water corals, gorgonians and large sponges (Sink et al., 2011). Vulnerable biota that use this area include long-lived seabirds, turtles and sharks, and the area has been identified by analyses aimed at identifying priority areas for reducing by-catch in the large pelagic fishery (Sink et al., 2011.)

**C5: Biological productivity High**

Justification

There is higher productivity here, which is related to the eastern limit of the Benguela upwelling on the outer shelf (Pelagic ecosystem type Ab3) and very frequent SST and chlorophyll fronts (Lutjeharms et al., 2000, Lagabrielle 2009, Sink et al., 2011, 2012, Roberson et al., 2017). Cool productive water is advected onto the shelf in this sheer zone through Agulhas Current–driven upwelling cells (Lutjeharms et al., 2000).

**C6: Biological diversity High**

Justification

This area has high pelagic and benthic habitat heterogeneity for an offshore site, comprising six ecosystem types at the confluence of the Indian and Atlantic Ocean basins. The very steep slope is also expected to host a rich diversity of species because it spans a very large depth range over a proportionately small area.

**C7: Naturalness High**

Justification

Rough grounds and strong currents already offer some protection from pressures to this area (Sink et al., 2011, 2012). Relatively lower levels of disturbance occur in this area (Sink et al., 2012), and most of the local hard areas fall outside of the hake trawl footprint (Sink et al., 2011). Across the EBSA, 55% is in good ecological condition, 45% fair, and <1% in poor ecological condition (Sink et al., 2019).

## Status of submission

The Agulhas Slope and Seamounts EBSA was recognized as meeting EBSA criteria by the Conference of the Parties. The revised Mallory Escarpment and Trough 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 Agulhas Slope and Seamounts EBSA and to the description, such that it is necessary to split the original EBSA into two, and revise the name of this EBSA to Mallory Escarpment and Trough to accurately reflect the constituent features. This also resulted in an upgrade in criterion 1 from medium to high because of the uniqueness of the geomorphic features. Additional references have been added and updates to the description were made. A supplementary table of the ecosystem types represented in the EBSA and their associated threat status was also included.

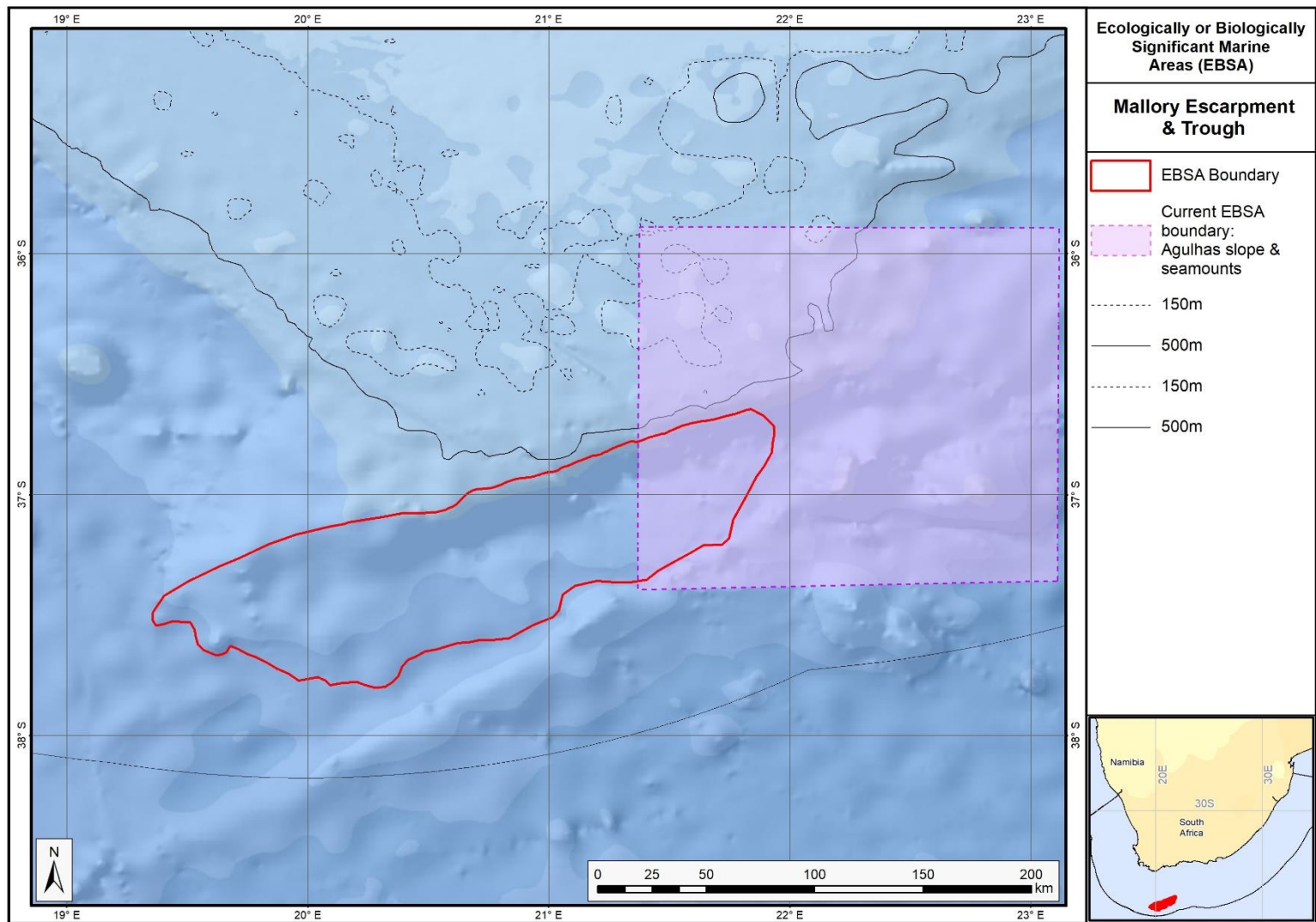
An important change has been the significant delineation change of this EBSA to focus the EBSA more closely on the key biodiversity features in this area that support its EBSA status. The delineation process included an initial stakeholder review which identified the need to update boundaries, a technical mapping process and then an expert review workshop where boundary delineation options were reviewed, revised and 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 (i.e. the seamounts, escarpment and trough) identified from the latest GEBCO data (GEBCO Compilation Group 2019), global benthic geomorphology mapping ([www.bluehabitats.org](http://www.bluehabitats.org), Harris et al., 2014), new national bathymetric data (De Wet 2012), the National Biodiversity Assessment 2011, 2018 (Sink et al., 2012, 2019) and BCC spatial mapping project (Holness et al., 2014) were incorporated.
- 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 constituent ecosystem types in the area were included in the analysis and used to refine the boundary of the EBSA.
- 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 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.



*The proposed revised boundaries for the Mollery Escarpment and Trough EBSA in relation to the original Agulhas Slope and Seamounts EBSA.*