

SC-04-INFO-01

4th Meeting of the Southern Indian Ocean Fisheries Agreement (SIOFA) Scientific
Committee

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Expert review of SIODFA proposed Benthic Protected Areas

Relates to agenda item: 6

Working paper Info paper

Delegation of Australia

Abstract

In 2017 the Australian Government Department of Agriculture and Water Resources commissioned an expert review of the SIOFA Benthic Protected Areas proposed by the Southern Indian Ocean Deepsea Fishers Association in SC-01-INF-15. The review found that most of the SIODFA proposed areas met certain rationale and criteria in the protocol for protected areas designation (subsequently updated). The review made a number of expert recommendations relating to research and management requirements for individual protected areas in SIOFA. These can be used to inform the development of research and management plans for SIOFA protected areas.

REVIEW OF SIOFA PROPOSED BENTHIC PROTECTED AREAS

Report prepared for Australian Department of Agriculture and Water Resources
Lyn Goldsworthy AM

NOVEMBER 2017

Brief: to assess each of the Benthic Protected Areas outlined in section 3.1.4 “Voluntary Closures) of Australia’s BFIA against the Standard Protocols for Future Protected Areas Designation” as described in Annex H of the report of the second SIOFA Scientific Committee meeting held in March 2017 (or any amendment made by the Meeting of the Parties)

SUMMARY RECOMMENDATIONS

Most individual proposals appear to meet Protocol guidance with respect to the dimensions of the proposed Areas, based on information provided. Inclusion of both physical coordinates and map for each proposed area is recommended to ensure clarity.

The Protocol also requires that all available information be provided on social, cultural and economic aspects as well as an evaluation of adverse impacts on existing users. These elements were not addressed explicitly in the proposal as it was developed prior to the development of the Protocol. It would thus be useful to review available information related to these elements prior to finalising any proposal.

A number of research voyages to review Indian Ocean seamounts were initiated from 2015 and will continue through to 2020; the data collected from these voyages will provide valuable additional information and ground-truthing for several of these BPA proposals. (<https://www.iucn.org/theme/marine-and-polar/our-work/international-ocean-governance/conservation-seamounts-ecosystems/ffem-swio-project> for links to science outcomes.) Camera recordings from fishing vessels will also assist significantly in improving information.

<p><u>GOLDEN DRAAK</u></p>	<p><i>Further review of existing data and direct observation of the candidate site should be undertaken.</i></p> <p>This feature is located in the most extreme north-eastern part of the Agreement area. Thus it could be particularly important in terms of its contribution to regional representativeness by BPAs. It is recommended that existing fishing information is compiled and analysed, that evidence (including any anecdotal information) is provided to ground-truth the assumption that the area is biologically diverse and not much impacted from fishing, and that further information on habitat and species diversity is provided to support the designation of this specific Seamount.</p>
<p><u>RUSKY KNOLL</u></p>	<p><i>Based on the evidence provided it is likely that Risky Knoll would represent a significant habitat in the SIOFA Area. Further review of existing data and direct observation of the candidate site would strengthen the proposal.</i></p> <p>It would be useful to review the USSR/Ukrainian fishing data and some direct observation of the candidate area to check assumptions made concerning the health of the habitat would be useful. To ensure the achievement of bioregional representation, a broader study of habitats within the SIOFA Area should also be undertaken at some point in the future. This</p>
<p><u>FOOL'S FLAT</u></p>	<p><i>The data provided suggests this is an area containing unique and distinct species ecosystems and is worthy of protected status. Further review of existing data and direct observation of the candidate site would strengthen the proposal.</i></p> <p>A more thorough analysis of fishing data and direct observation should be undertaken to confirm the asserted minimal impact of past fishing. To ensure the achievement of bioregional representation, a broader study of habitats within the SIOFA Area will also be required at some point in the future.</p>

<p><u>EASTERN BROKEN RIDGE</u></p>	<p><i>Further review of existing data and direct observation of the candidate site should be undertaken.</i></p> <p>The geomorphological complexity is evident, but there is little data provided to confirm assertions that it is likely to be in pristine condition, particularly given the lack of clarity on whether there has been fishing in the past. A summary of any available historical data and more robust biological data to indicate naturalness or biodiversity is recommended to fulfil BPA criteria. Verification should be sought to confirm the assumption that the area has not been fished since 2006. Some direct observation of the candidate area to check assumptions made concerning the health of the habitat would be useful. Closing this area may also be useful as a reference site to monitor recovery/regeneration of any benthic communities that have been modified from earlier fishing.</p>
<p><u>SOUTHERN INDIAN RIDGE</u> (Del Caño Rise)</p>	<p><i>Convincing evidence is provided to suggest this is an area that has bioregional significance and worthy of BPA status.</i></p> <p>It would be useful to strengthen benthic biota data, particularly to improve understanding and identification of rare, unique or distinct benthic habitats in this area. The biological evidence supplied may also be out of date, so monitoring is recommended for the conditions of both the benthic and pelagic ecosystems in this area.</p>
<p><u>MID-INDIAN RIDGE</u></p>	<p><i>These seamounts are likely rare or unique, and could be damaged by bottom fishing, so this area is potentially fitting for a BPA under 3a) criteria.</i></p> <p>The evidence provided for protection of the seamounts was more compelling than the biological case for BPA status. These seamounts are likely rare or unique, and could be damaged by bottom fishing, so this area is potentially fitting for a BPA under 3a) criteria. SC documents support the claim that there are numerous seamounts in this area. Claims that the benthic biota would be damaged by deepwater fishing is supported by the scientific committee (SC-01-INFO-26). Biological surveys to assess the condition of the benthos (in order to evaluate the claim that the area is pristine), and search for any evidence of bycatch is necessary. Moreover, bioregional representation of the area is unclear: Although the geomorphology of the area is complex, more ecological data is needed to support the claim that the Mid-Indian Ridge is a complementary area to the PEI MPA and HIMI WHA.</p>
<p><u>ATLANTIS BANK</u></p>	<p><i>There is sufficient information to support the designation of Atlantis Ridge as a Protected Area for Biodiversity and as an Area of Special Scientific Interest.</i></p> <p>An explanation as to the discrepancy between the cited size of the feature (25km²) and the proposed BPA area of 8694km² is required.</p> <p>A desk-top compilation of publications from research undertaken within this area would be a useful adjunct to this proposal.</p>
<p><u>BRIDLE</u></p>	<p><i>Additional Information is required to confirm criteria for specific BPA status as well as to determine representative status.</i></p> <p>The proposal suggests the feature is 'near pristine' yet references heavy fishing as recent as year 2000 and limited trawling presumably in the more recent past. There is no specific data provided on the benthos, including recovery</p>

	<p>from the fishing, other than the figures provided. The nomination appears to be partly linked to the difficulty in trawling the feature. Additional Information is required to confirm criteria for specific BPA status as well as to determine representative status.</p>
<p><u>WALTERS' SHOAL</u></p>	<p><i>There is sufficient evidence to suggest this is an area of bioregional significance with a number of unusual, rare or diverse habitat/ecosystems and worthy of BPA status.</i></p> <p>It is reportedly near pristine although it is known to be fished. It would be useful to review the findings of the 2015 and 2016 IUCN research voyages to review any additional information on the biodiversity, habitat and ecosystems of the feature. (https://www.iucn.org/theme/marine-and-polar/our-work/international-ocean-governance/conservation-seamounts-ecosystems/ffem-swio-project/walters-shoal-expedition).</p>
<p><u>CORAL BPA</u></p>	<p><i>There is sufficient evidence to suggest this is an area of bioregional significance and biodiversity, with a number of unusual, rare or diverse habitat/ecosystems and worthy of BPA status.</i> This seafloor feature was well known to the industry as an area of particular coral abundance, and independently, Rogers & Taylor note that this seamount is highly unusual. However, this area is known to have been trawled in the past. To progress this BPA proposal, It is recommended that observations from the RV James Cook cruise in 2011 and any other evidence showing impact of fishing activity, including anecdotal reports, be reviewed expeditiously to confirm status and health of the habitat.</p>
<p><u>AGULHAS PLATEAU</u></p>	<p>This proposed area is outside of the SIOFA boundary and has now been withdrawn.</p>
<p><u>MOW</u></p>	<p><i>The ecological logic behind proposing this area is sound. A significant level of biological data appears to exist. However, as this is an area of fishing interest, an analysis of impact on existing/future fishing interests should be undertaken.</i></p>
<p><u>BANANA</u></p>	<p><i>Additional information is required to identify the specific location of the proposed BPA. Additional work is required to refine physical and biological characteristics of the proposed BPA. Some analysis of the impact of the previous trawling on the status of the vulnerable species and ecosystem would be useful. An analysis of existing fishing interest against the Protected area criteria would also be useful.</i></p>

INTRODUCTION

While the geology of seamounts in the Indian Ocean have been studied, the seamount fauna and ecosystems of the southern Indian Ocean remain poorly explored¹. The geological studies suggest that the seamount structures in this region exert an important influence on water circulation, including deeper circulation and possibly the formation of eddies and localised upwelling, which could be expected to generate unusual ecosystems. Mapping across the region is very poor.

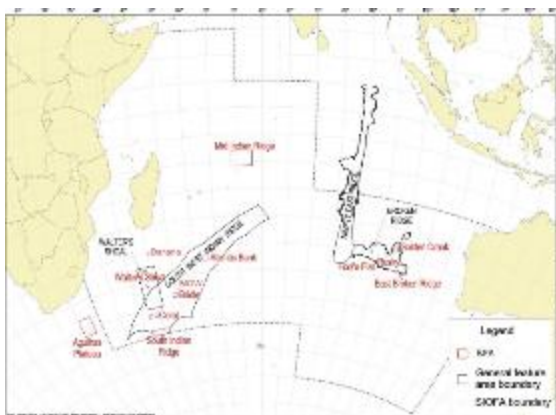
The Southern Indian Ocean Deepsea Fishers Association (SIODFA) presented a proposal to SIOFA SC-01 2016 for several **Benthic Protected Areas** (SC-01-INF-15 “SIODFA 2016. Southern Indian Ocean Deepsea Fisheries Association (SIODFA) Benthic Protected Areas in the Southern Indian Ocean. SIODFA Technical Report XVII 16/01.). A study of bathymetric databases and direct observation, augmented by commercial bathymetric databases, was used to determine inferred habitat and biodiversity information, and compiled and circulated as a FAO Circular (“FAO, Management of Demersal Fisheries Resources of the Southern Indian Ocean, Report of 4th and 5th Ad Hoc Meetings on Potential Management Initiatives of Deepwater Fisheries Operators in the Southern Indian Ocean, February 2006 and April 2006, compiled by Ross Shotton FAO Fisheries Circular No. 1020.”)

The SIODFA/FAO discussions established **two objectives in creating protected areas in the southern Indian Ocean Selection:**

- (a) the protection of areas of particular benthic biodiversity to ensure that such areas were sustained in a state that was as close as possible to that existing before the start of trawl fishing operations in the area; and
- (b), providing direction to others, within the fishing industry and in other economic sectors, that areas had been selected for protection.

SIODFA used the following selection criteria to determine benthic protected area candidates:

- a) **Geographical extent** – broad spread was considered desirable;
- b) **Representation of seabed morphology** – areas for protection should include seamounts, banks, spreading ridge structures, abyssal plain, canyons, structural complexity of the seabed slope edges;
- c) **Previous exposure to fishing activity** – Proposed areas were considered from the perspective as to whether they had been trawled extensively, experienced limited trawling activity, very limited (minor) trawling activity, or no previous fishing activity;
- d) **Existence of previous knowledge concerning the proposed area**, including if the area was known but unexplored, or known to contain new seabed features;
- e) **Existence and availability of biological data**, including catch composition data, bycatch data from trawling, both ichthyofauna and benthic and pelagic invertebrates, acoustic images of corals and benthic biota, anecdotal observations and related information, and the existence of other sources of information.



¹ See Rogers, A.D. (2012). *An Ecosystem Approach to Management of Seamounts in the Southern Indian Ocean: Volume 1 – Overview of Seamount Ecosystems and Biodiversity*. Gland, Switzerland, IUCN, for an history of scientific exploration in the region.

Sources of information drawn on for these determinations included acoustic survey data, bathymetric data, geologic and geophysical studies, biologic studies of the slope of Walters' Shoal and Agulhas Bank, plankton studies, observations from fishing vessels, fishing data and anecdotal data collected by vessel skippers.

The 2017 SC-SIOFA established a Standard Protocol to assist the development of future protected areas designation. (Report of the Second Meeting of the Scientific Committee of the Southern Indian Ocean Fisheries Agreement (SIOFA), Annex H, La Réunion 13 – 17 March 2017.)

Rationale for consideration of a proposed protected area included:

1. **VME encounter**
2. **Bioregional representation** – including existence of unique, rare or distinct habitats or ecosystems that fishing operations will disturb and/or are deemed to be desirable and acceptable, or higher degree of naturalness because of the lack of or low level of human-induced disturbance or degradation.
3. **Geographic and/or unique representation** – existence of unique or unusual geomorphological features that fishing operations may damage.
4. **Biodiversity representation** – existence of unique, rare species, populations or communities, high diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity, or a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile or with slow recovery.
5. **Scientific Interest** – a history of scientific research associated with understanding ecosystem and biodiversity processes in the SIOFA region, and fishing activities would compromise current and future research.
6. **Ecosystem hotspot, threatened species** – evidence that the area is of special importance for life history stages of species and/or threatened species.

Guidance was also given on the dimensions of the proposed Area:

- a. As far as practicable, include continuous depth.
- b. Based on seafloor features such as geomorphic features
- c. Orientated to account for inclusion of connectivity corridors and biological dispersal patterns within and across closures.
- d. Boundary lines should be simple.
- e. Set to minimise socio-economic costs.

The Protocol also required that all available information be provided, including ecological, environmental, social, cultural and economic aspects, an evaluation of adverse impacts on existing users, and consideration of existing closures.

In this report, the SIOFA-proposed benthic protected areas were considered against the rationale and principles of the Protocol, using the following headings:

1. Rationale for protected area designation
2. Area dimensions
3. Available data
4. Prior fishing history
5. Other information relating to social, cultural or economic aspects of the proposal, including evaluation of adverse impacts on existing users.

GOLDEN DRAAK

1. RATIONALE FOR PROTECTED AREA DESIGNATION (based on information provided)

- Bioregional Representativeness- area with a comparatively higher degree of naturalness because of the lack of or low level of human-induced disturbance or degradation, as an example considering historical fishing activities.
- Information provided suggests that this may also be an area of high biodiversity. There is also reference to low bottom water temperatures but no further information provided.

Golden Draak is a mid-ocean seamount of considerable size and consisting of a large igneous broken ridge and plateau rising from 4000 m to 1100/1000 m. It has 300 metres (984 feet) of sediment on top of it and has extensive sea floor landslides, some of which can go on for several kilometres. It is assumed to be biologically pristine because of its distance to (other) fishing locations.

Commercial fishes found in this area include several oreo species. No information is included on other biologic species.

This feature is located in the most extreme north-eastern part of the Agreement area. Thus it could be particularly important in terms of its contribution to regional representativeness by BPAs.

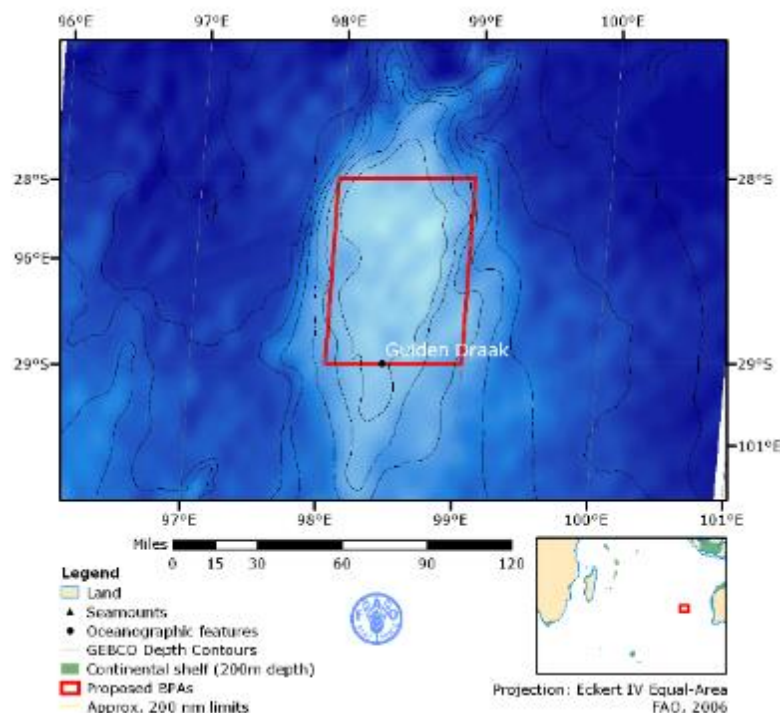
2. AREA DIMENSIONS

Total BPA area: 10,867 km².

Coordinates: 28°00'S-98°00'W : 29°00'S-99°00'E.

Bathymetry: 0-100 m 0 km²; 101-300 m 0 km²; 301-700 m 0 km²; 701-1000 m 3.6 km²; 1001-1500 m 9290 km² ; > 1500 m 1573.4 km² .

Figure 1: Gulden Draak Benthic Protected Area.



3. AVAILABLE DATA

- The proposal notes that oceanographic and biological data exists but does not provide references.
- The proposal notes that USSR/Ukrainian fishing data is available.

- Bathymetry is illustrated in Figure 2: Bathymetry of the Gulden Draak Seafloor Feature.
- Ocean Drilling Program Leg 183 explored the origin and evolution of the Kerguelen Plateau and Broken Ridge province in the southern Indian Ocean (Frey et al. 2000).
- High resolution gravity modelling of the seamount was undertaken by Scripps Institution and published in 2014 (Sandwell et al. 2014).
- Detailed sea-floor maps made during the search for the missing Malaysia Airlines Flight MH370 included Golden Draak Seamount (see <http://www.dailymail.co.uk/sciencetech/article-4709356/MH370-search-data-unveils-fishing-hotspots-ancient-geological-movements.html#ixzz4tBxWQWsj>).

4. FISHED STATUS

The proposal assumes that the seamount has been rarely fished and thus is biologically pristine. However, it also notes that 'some commercial log book information and acoustic records (presumably from USSR/Ukrainian fishing operations, and potentially the F.Vs. *Will Watch*, *Nikko Maru*, *Southern Champion* and *Austral Leader*) are available for this region'. It is assumed that no fishing has occurred in the past 15 years.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not considered explicitly.

6. RECOMMENDATION

Further review of existing data and direct observation of the candidate site be undertaken.

From the bathymetry data, the Golden Draak Seamount could be expected to be biologically diverse. However, an investigation of ecosystem health and representativeness of its habitats would be required to assess accuracy of this assumption and its relevance for protected area status.

In addition it is assumed that Golden Draak has not been much impacted from fishing because fishing operations have not recently occurred. Some indication of when fishing ceased and more recent evidence of the recovery would be useful.

Some discussion of other seamounts in the vicinity of Golden Draak and any particularly important features of the Golden Draak feature would also be useful to test for representativeness. Additional information of the relevance of the low bottom water temperatures found on the feature would be also be useful.

The proposal is within the area dimension guidelines of the SIOFA Protocol.

It is recommended that existing fishing information is compiled and analysed, that evidence (including any anecdotal information) is provided to ground-truth the assumption that the area is biologically diverse and not much impacted from fishing, and that further information on habitat and species diversity is provided to support the designation of this specific Seamount.

RUSKY

1. RATIONALE FOR PROTECTED AREA DESIGNATION (based on information provided)

- Bioregional Representation - area is known to contain unique, rare or distinct, habitats or ecosystems (extensive black coral (*Antipatharia*) coverage that bottom fishing operations will disturb.

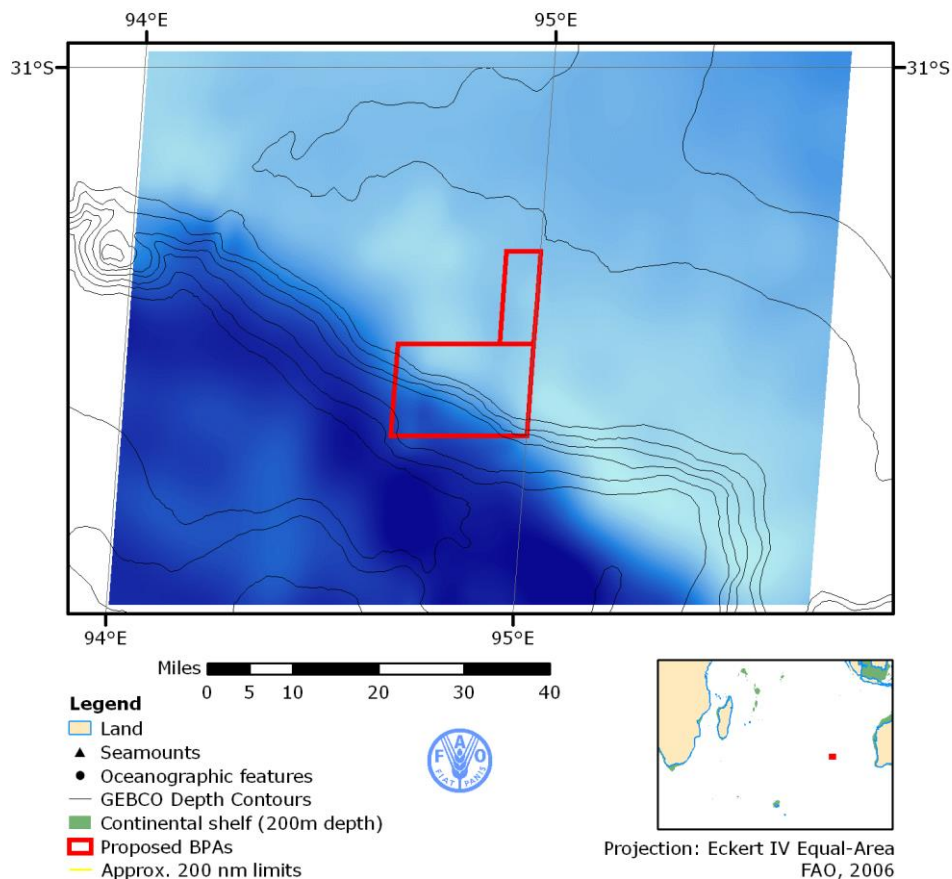
The proposed Rusky protected area is described as a productive knoll located on an extensive ridge with rocky extrusions and extensive black coral (*Antipatharia*) coverage, reportedly in 'almost pristine state'. This expanse of black coral is vulnerable to bycatch from deepwater fishing operations (SC-01-INFO-26).

2. AREA DIMENSIONS

Total BPA area: 146.6 km².

Coordinates: 31°20'N-94°55'W ; 31°30'S-95°00'E.

Bathymetry: 0-100 m 0 km²; 101-300 m 0 km²; 301-700 m 0.5 km²; 701-1000 m 2.4 km²; 1001-1500 m 143.4 km²; > 1500 m 0.3 km².



3. AVAILABLE DATA

- Oceanographic and biological data is referenced as available.
- USSR/Ukrainian fishing data is referenced as available.
- Bathymetric images, Swath sidescan image showing black corals and Echo footage of aggregations of fish (claimed to be small alfonso and boarfish) are provided.

- Cook Islands submitted SC-01-INFO-16 'Biological data from orange roughy spawning stocks in the Southwest Indian Ocean' and SC-01-INFO-15 'Acoustic abundance indexes for orange roughy and alfonsino in the Indian Ocean (SIOFA) from industry acoustics 2004 – 2008' to SIOFA SC-01 in 2016. These papers cite acoustic survey data drawn from surveys carried out from 2004 to 2015 with calibrated Simrad ES60 echosounders, as well as biological samples.
- No independent research can be identified / is cited.

Maps and Figures provided:

Figure 4: Swath Sidescan Image of Rusky Knoll.

Figure 5: Regional Bathymetry, Rusky Knoll Benthic Protected Area.

Figure 6: Bathymetry of Rusky BPA.

Figure 6(sic): Small alfonsino (*Berys splendens*) and boarfish (*Pseudopentaceros* spp.) schools on the top and the ledges around Rusky knoll. (Credit, G. Patchell, Sealord Group).

4. FISHED STATUS

Fishing on the Rusky proposed benthic protected area is restricted to one or two tracks on the feature in the depth range 400 – 500 m (SC-01-INFO-26). Hence, it is assumed that most of the feature has not have been affected by demersal trawling. It is reported that there has been past fishing by USSR/Ukrainian vessels across the flats about the Broken Ridge area.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not considered explicitly.

6. RECOMMENDATION

Further review of existing data and direct observation of the candidate site be undertaken.

Black coral coverage is evident from the sidescan image, but more robust data on the condition of the benthic ecosystem would strengthen our understanding of the importance of this site. Biological reports show that orange roughy (including spawning orange roughy) are present (SC-01-INFO-16). From best scientific knowledge, it is expected that deepwater fishing operations would result in coral bycatch – a key criteria for 2a) protection status (SC-01-INFO-26).

The proposal is within the area dimensions guidelines of the SIOFA Protocol.

It would also be useful to review the USSR/Ukrainian fishing data from the perspective of possible impact..

Based on the evidence provided it is likely that Rusky Knoll would represent a significant bioregionally representative habitat in the SIOFA Area. Some direct observation of the candidate area to check assumptions made concerning the health of the habitat following past fishing would be useful.

To ensure the achievement of bioregional representation, a broader study of habitats within the SIOFA Area should also be undertaken at some point in the future.

FOOL'S FLAT

1. RATIONALE FOR PROTECTED AREA DESIGNATION (based on information provided)

- Bioregional Representation - area is known to contain unique, rare or distinct habitats or ecosystems that fishing operations will disturb and that are deemed to be desirable and acceptable; Area is known to contain unique, rare or distinct, habitats or ecosystems that bottom fishing operations will disturb.
- Geographic representation - unique/unusual geomorphology.
- Biodiversity - High diversity of ecosystems, habitats or species/genetic diversity (brain and black coral).

Fool's Flat is a deep-sea bank with numerous canyons incising its slopes, found on the southern side of Broken Ridge Plateau to the south of the Rusky Knoll BPA. It exhibits bathymetric complexity, with a range of depths (990 – 4000 m) combined with an upwelling system of cold water that provides a broad range of habitats. These include significant stands of brain and black coral on the southern rim of the ridge, which have elevations of 20 – 30 m and can be seen with sidescan sonar (Figure 7). When these have been observed on vessel echo sounders they look like aggregations of fish. It is assumed to be in pristine condition.

2. AREA DIMENSIONS

Total BPA area: 585 km².

Coordinates: 31°30'N-94°40'W : 31°40'S-95°00'E.

Bathymetry: 0-100 m 0 km²; 101-300 m 0 m²; 301-700 m 0 km²; 701-1000 m 1.7 km²; 1001-1500 m 299.7 km²; > 1500 m 283.9 km².

Location map not provided.

3. AVAILABLE DATA

- Oceanographic and biological data is cited as available. At least two fishing vessels are noted as thought to have collected data in the past and knowledge of the presence of fish fauna in this area that would help in defining the ecology of the feature. The data is not provided.
- USSR/Ukrainian fishing data is cited as available. It is unclear whether this is the data noted above.
- Bathymetric data, Sidescan images showing coral beds, and a single temperature/salinity profile showing an upwelling in November, 1996, are provided.
- No independent research can be identified/is cited.

Maps and Figures provided include:

- Figure 7: Swath Sidescan Image of Fool's Flat.
- Figure 8: Bathymetry of Fool's Flat
- Figure 9: Sidescan Image showing coral beds on Fool's Flat.
- Figure 10: Bathythermograph Temperature Profile, Fool's Flat, November 1996. 0 – 12,500 m.

4. FISHED STATUS

The proposal notes that the only trawl shots known to have been undertaken on the site have been on the flat sedimented bottom at around 1000 m.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not explicitly considered.

6. RECOMMENDATION

Further review of existing data and direct observation of the candidate site be undertaken.

The data provided suggests this is an area containing unique and distinct species ecosystems and is worthy of protected status. A research survey on the vertical distribution, and condition of the deep-water corals and other species and habitats would strengthen knowledge and understanding of the site. More robust oceanographic data, for example of the upwellings over time, would provide additional information concerning the assumed unique habitat.

Fishing data should also be provided in more detail, including information on the reports of trawling in the area, and any information on coral bycatch. An analysis of the Russian/Ukrainian fishing data and any other fishing data available would provide confirmation of the assertion that trawl shots have been limited to the flat sedimented bottom.

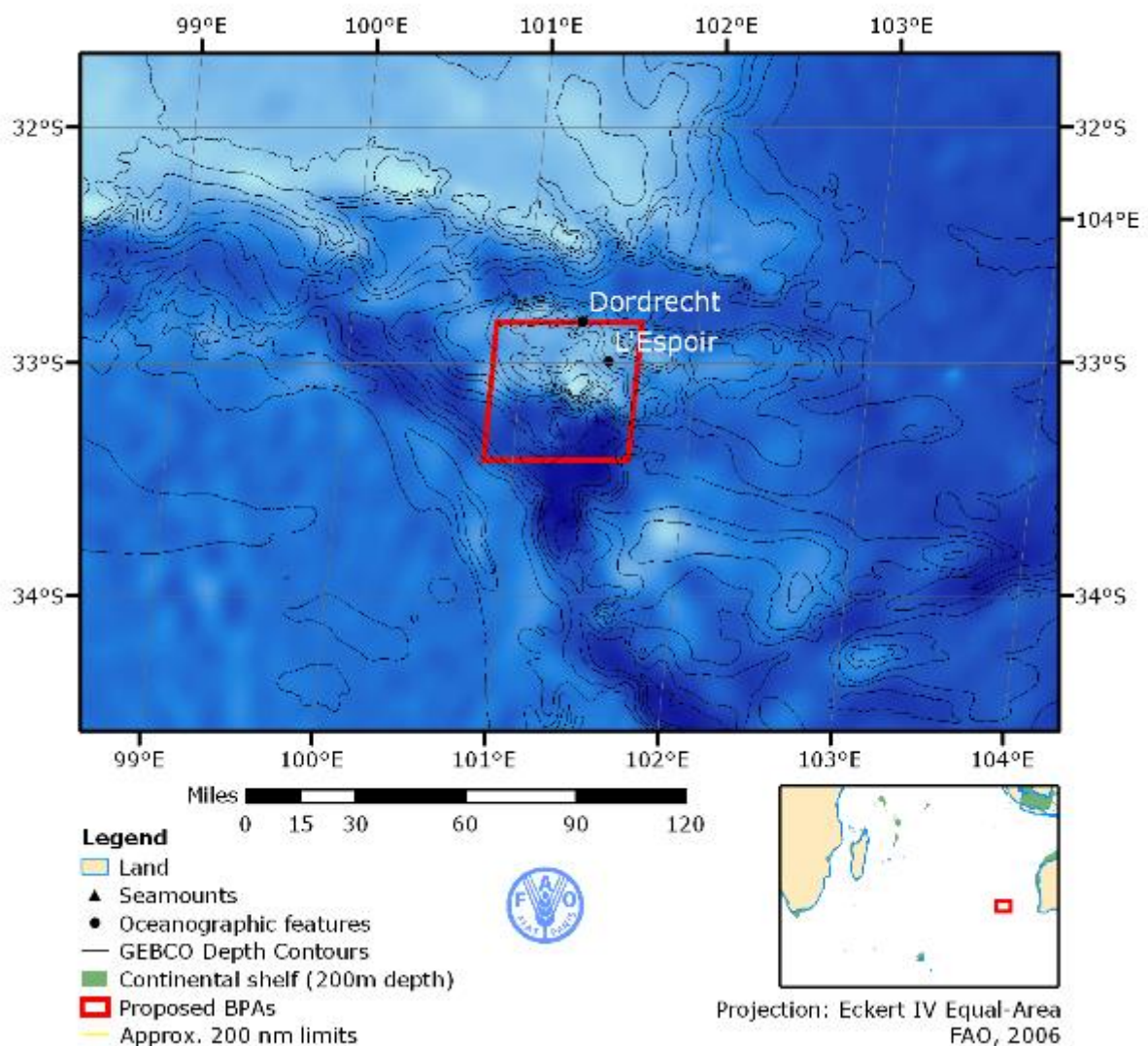
Based on the evidence provided it is likely that the Fool's Flat site would represent a significant habitat in the SIOFA Area. A more thorough analysis of fishing data and direct observation should be undertaken to confirm the asserted minimum impact of past fishing. To ensure the achievement of bioregional representation, a broader study of habitats within the SIOFA Area will be required at some point.

EASTERN BROKEN RIDGE

1. RATIONALE FOR PROTECTED AREA DESIGNATION (based on information provided)

- Geographic and/or Unique Representation - the area proposed is known to contain unique or unusual geomorphological features that fishing operations may damage.

This area is described as a guyot located on the eastern end of Broken Ridge and is characterised by numerous slips and canyons extending down the sides. It rises from 3000 m to a depth of 1060 m. The proposal suggests it has not been previously described, has not been trawled on and is thus assumed to be biologically pristine. It is assumed to have aggregations of deep water biota. There are some indications that this feature may have been above sea level at some time in the past. The valley system is stated as 'unique'.



2. AREA DIMENSIONS

Total BPA area: 5034.1 km².

Coordinates: 32°50'N-100°50'W : 33°25'S-101°40'E.

Bathymetry: 0-100 m 0 km²; 101-300 m 0 km²; 301-700 m 0 km²; 701-1000 m 0 km²; 1001-1500 m 97.50 km²; > 1500 m 4936.6 km².

3. AVAILABLE DATA

- Oceanographic data and some biological data is cited but not referenced.
- USSR/Ukrainian fishing data is cited but not provided.
- Bathymetric surveys, swathe sidescan of the entire ridge system, a single temperature/salinity profile from November 1996, is submitted.
- No independent research has been identified/cited for this site.

Maps and Figures provided

- Figure 11: Regional Bathymetry of East Broken Ridge.
- Figure 12: Swathe sidescan image of the guyot east of Broken Ridge.
- Figure 13: Bathymetry of Seamount to the east of Broken Ridge (60-mile view).
- Figure 14: Temperature Profile in spring near the Broken Ridge Eastern Seamount.

4. FISHED STATUS

It is not known to have been trawled recently. However, USSR/Ukrainian fishing data is cited as existing. The report says that searches for fish aggregations have been undertaken, but only for one day. The seamount is reported to have suitable environmental conditions for the deepwater species of fish that typically occur in the area.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not considered explicitly

6. RECOMMENDATION

Further review of existing data and direct observation of the candidate site be undertaken.

The geomorphological complexity is evident and likely worthy of protection status, but there is little data provided to confirm assertions that it is likely to be in pristine condition, particularly given the lack of clarity on whether there has been fishing in the past. A summary of any available historical data and more robust biological data to indicate naturalness or biodiversity is recommended to fulfil BPA criteria.

Verification should be sought to confirm the assumption that the area has not been fished since 2006. Some direct observation of the candidate area to check assumptions made concerning the health of the habitat would be useful. Closing this area may also be useful as a reference site to monitor recovery/regeneration of any benthic communities that have been modified from earlier fishing.

SOUTHERN INDIAN RIDGE (Del Caño Rise)

1. RATIONALE FOR PROTECTED AREA DESIGNATION (based on information provided)

- Bioregional Representation - unique, rare or distinct habitats that fishing operations will disturb.
- Geographic Representation - unique/ unusual geomorphology.
- Biodiversity - high diversity of ecosystems, habitats or species/ genetic diversity.

An area of seamounts adjacent to the CCAMLR region to the south and bounded to the east and west by the EEZs of South Africa and France. The zone comprises the northern flank of the west-east orientated Del Caño Rise such that the southern limit, around 45°S is along the ridge of this rise. The southern boundary abuts the CCAMLR-managed zone to the south and lies between the South African EEZ around Prince Edward and Marion Islands to the west and the French EEZ surrounding Crozet Island to the east. The estimated points of contact with the EEZ areas are: 44°S, 40.878°E; 44°S; 46.544°E; 45°S, 42.124°E; 45°S, 45.711°E.

It is reportedly in pristine biological condition. The Del Caño Rise has diverse and complex bathymetry and may be a major factor in affecting productivity of this region of the Southwest Indian Ocean. The 2000 m Rise lies between the plateaus that ascend to the Prince Edward to the west and the Crozet Island groups to the east and is just southeast of the Southwest Indian Ridge, a seafloor feature that includes a series of transform faults and associated fracture zones that may host hydrothermal vent communities. Rare species have been reported foraging in these regions, and it is documented to be a driving area in the productivity of the Southwest Indian Ocean. Benthic habitats are assumed to include hydrothermal vents and associated life.

Currently the Prince Edward and Crozet Islands are protected as a nature reserve to safeguard the millions of birds and mammals that breed there every year. The Prince Edward Islands alone support almost half of the global population of wandering albatross. However, the waters around the islands, including the highly productive Del Caño Rise region and the waters overlying the Southwest Indian Ridge, provide essential feeding grounds for these animals. It is reported that there has been collaboration between South African and French governments, NGOs and scientists to protect the waters around the Prince Edward and Crozet Islands.

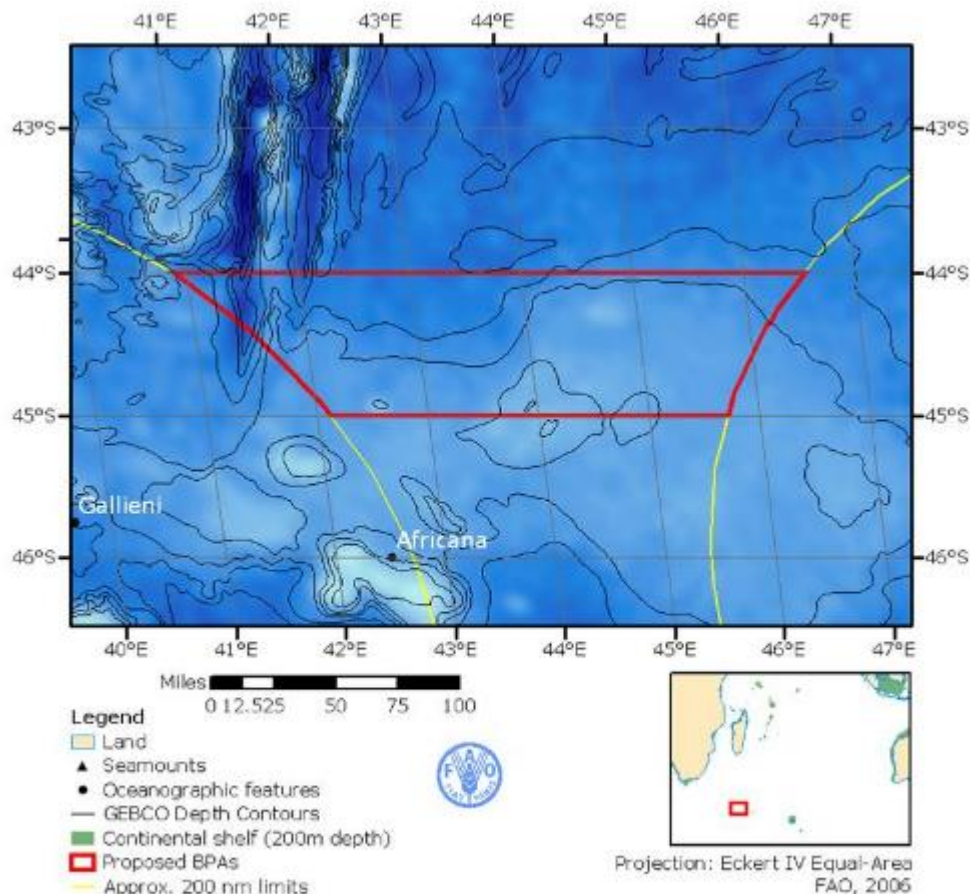
The role this area plays in the pelagic ecosystem, as well as its potential to have unique benthic habitats that fishing operations would disturb is why it is most fitting to 2b) criteria for BPA status.

2. AREA DIMENSIONS

Total BPA area: 81,439 km².

Coordinates: 44°00'N-44°00'W : 40°55'S-46°30'E.

Bathymetry: 0-100 m 0 km²; 101-300 m 0 km²; 301-700 m 28 km²; 701-1000 m 53 km²; 1001-1500 m 5775 km²; > 1500 m 75583 km².



3. AVAILABLE DATA

- Biological surveys, particularly of the pelagic ecosystem near the Del Caño rise are cited.
- Lombard et al. (2004) have prepared habitat maps for this area, and has suggested this is area as generally thick to very thick sediment. The relevant zones are: i. shelf of mounts and rises 200 – 500 m ii. upper slope 500 – 1800 m iii. lower slope 1800 – 3500 m.
- Lombard et al. (2006) imply that the area of the Del Caño Rise will be subject to the Antarctic Circumpolar Current flowing from west to east. Further, as this current crosses the Southwest Indian Ridge it creates meso-scale eddies. These authors also note that increased chlorophyll concentrations are periodically observed downstream of the region of the islands delineated by the 1800m isobath, i.e. the upper-lower slope division resulting in an area of high zooplankton biomass.
- Gon & Heemstra (1990) provide distribution data for seven fishes that can be expected to inhabit this area (Table 4). It is reported that Patagonian toothfish (*Dissostichus eleginoides*) may be available to trawl in this benthic protected area.
- Lombard et al. (2006) note that the southern region of this BPA, along the ridge of the Del Caño Rise provides a movement and foraging axis for seabirds, specifically white-chinned petrels (*Procellaria aequinoctialis*), wandering albatrosses and sooty *Phoebetria fiscal* and note the importance of co-management of such areas. They also note the importance of nesting the proposed Prince Edward Island marine protected area within a broader management framework in the wider region. These authors also map the Del Caño ridge as a foraging area for southern elephant seals.

Maps and Figures provided

- Figure 15: Southern Indian Ridge Benthic Protected Area.
- Table 4: Fishes expected to be encountered in the Del Canso Rise Area.

4. FISHED STATUS

It is believed to be untrawled.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not explicitly considered.

6. RECOMMENDATION

Convincing evidence is provided to suggest this is an area that has bioregional significance and worthy of BPA status. It would be useful to strengthen benthic biota data, particularly to improve understanding and identification of rare, unique or distinct benthic habitats in this area. The biological evidence supplied may also be out of date, so monitoring is recommended for the conditions of both the benthic and pelagic ecosystems in this area.

MID-INDIAN RIDGE

1. RATIONALE FOR PROTECTED AREA DESIGNATION (based on information provided)

- Geographic or Unique Representation - unique geomorphology, geographic representation.

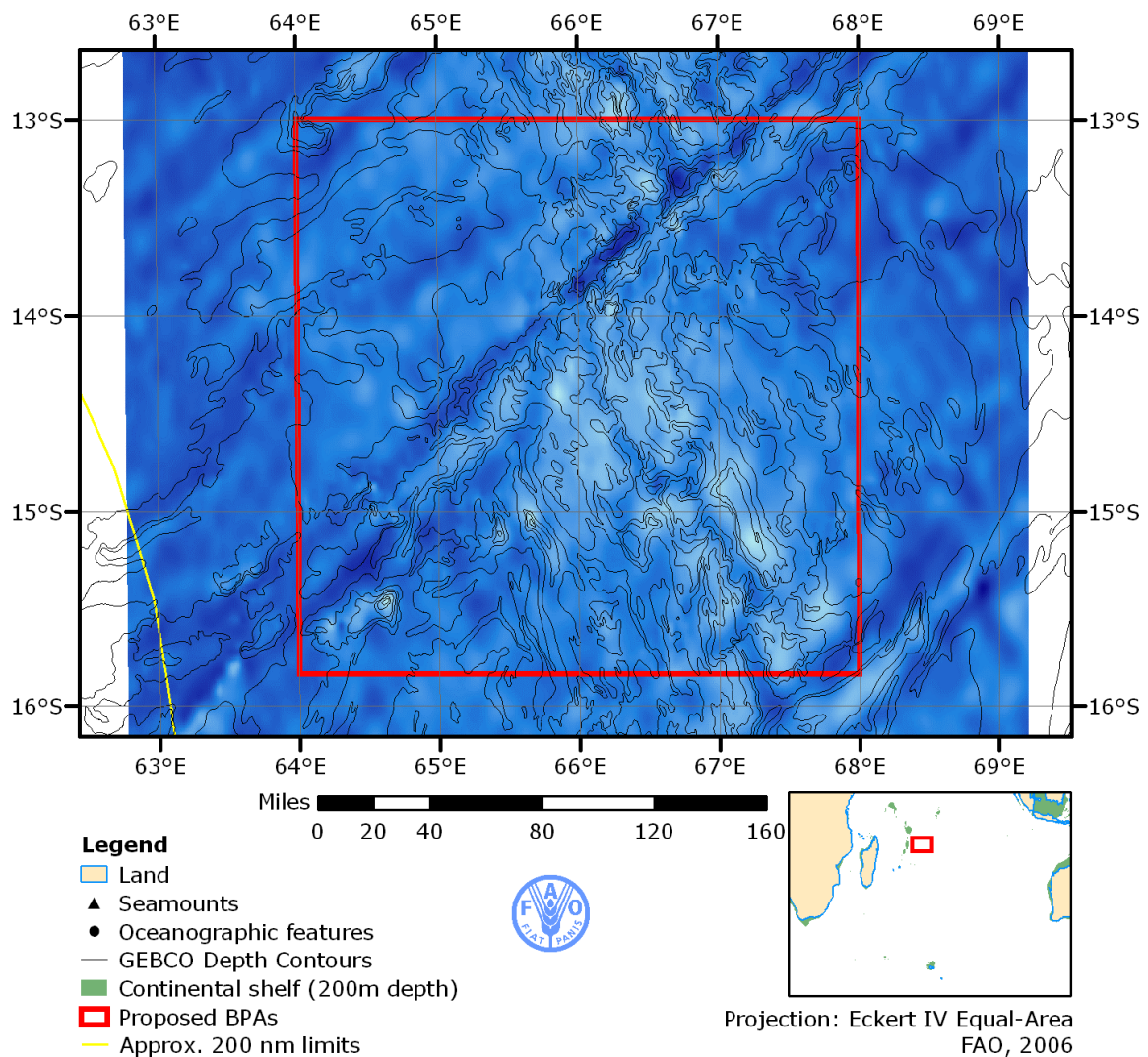
The mid-Indian Ridge lies to the northeast of Mauritius and has been described as 'Triple Junction' as the Australian, African and Indian tectonic plates meet in this area. It is an area of a series of 990 (SC-01-INFO26) seamounts rising to 650 m in warm waters. Specific hills occur in the region of 15°39' S, 64°14'E. It is assumed to be biologically pristine and an area where corals are vulnerable to bycatch from deepwater fishing operations (SC-01-INFO-26). The benthic protected area is proposed as representative of the tropical bioregion of the Southern Indian Ocean, complementing the PEI MPA and HIMI World Heritage Area.

2. AREA DIMENSIONS

Total BPA area: 135688 km².

Coordinates: 13°00'N-64°00'W : 15°50'S-68°00'E.

Bathymetry: 0-100 m 0 km²; 101-300 m 0 km²; 301-700 m 0 km²; 701-1000 m 0 km²; 1001-1500 m 6 km²; > 1500 m 135688 km².



3. AVAILABLE DATA

- No oceanographic or biological data is reported to exist.
- Bathymetric data is submitted.
- Bathymetric data and SC documents support the claim that there are numerous seamounts in this area.
- Claims that the benthic biota would be damaged by deepwater fishing is supported by the scientific committee (SC-01-INFO-26). This is more compelling than the biological case for BPA status. These seamounts are likely rare or unique, and could be damaged by bottom fishing, so this area is potentially fitting for a BPA under 3a) criteria.

Maps and Figures provided

- Figure 16: Bathymetry of the Mid-Indian Ridge Bio-region.
- Figure 12: Swathe sidescan image of the guyot east of Broken Ridge.

4. FISHED STATUS

It is not known to have been trawled, although some fishing data is reported to exist.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not explicitly considered.

6. RECOMMENDATION

These seamounts are likely rare or unique, and could be damaged by bottom fishing, so this area is potentially fitting for a BPA under 3a) criteria.

The evidence provided for protection of the seamounts as geographically significant is more compelling than the biological case for BPA status. SC documents support the claim that there are numerous seamounts in this area. Claims that the benthic biota would be damaged by deepwater fishing is supported by the scientific committee (SC-01-INFO-26). Biological surveys to assess the condition of the benthos (to evaluate the claim that the area is pristine), and search for any evidence of bycatch would further strengthen this proposal. Bioregional representation of the area is unclear: although the geomorphology of the area is complex, more ecological data is needed to support the claim that the Mid-Indian Ridge is a complementary area to the PEI MPA and HIMI WHA.

ATLANTIS BANK

1. RATIONALE FOR PROTECTED AREA DESIGNATION (based on information provided)

- Biodiversity – high diversity of ecosystems, habitats or species/ genetic diversity.
- Area of Special Scientific Interest – fossil island.

This tectonic guyot seamount covers an area of approximately 25 km² and is in sub-tropical waters. The Guyot has slowly subsided beneath the surface to a depth of 700 m. It has been extensively studied and is reportedly the first tectonic guyot ever studied to consider geology of ultraslow-spreading ridges. It has a unique paleontological record and has been the drilling site within the Ocean Drilling Programme (ODP). It is an ancient fossil island with 11-million-year-old fossil beaches and lagoons, a submerged headland, 'sea cliffs', limestone ripple 'beaches' lithified as rock, gabbro, fossil sea-stacks, fossilized corals, clams, snails and sea urchin spines in the limestone, oolitic limestone.

The benthic habitats include a high diversity of species, especially corals and coral associates. Several analyses are reportedly underway. Preliminary results for, for example, ophiuroids, indicate 50% of the species are reportedly new to science. The guyot is particularly notable for large stylasterid and Paragorgia colonies and *Euplectella* spp. (c.f.) colonised by a new species of *Spongiacaris* (Rogers & Taylor (2012)). Submersible dives have reported large populations of lobsters, crabs, sharks, sea fans, siphonophores, sponges, orange roughy and big-eye dory. There are also populations of pelagic armourhead (*Pseudopentaceros wheeleri*) which do not occur elsewhere on the South West Indian Ridge as far as is known.

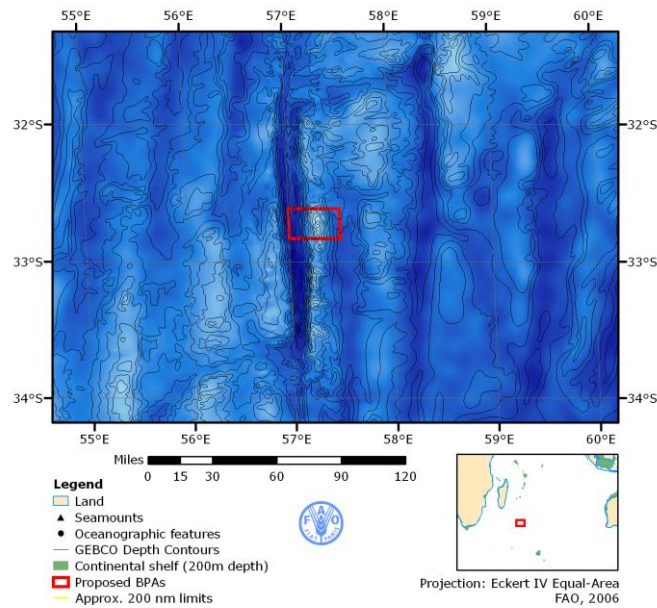
2. AREA DIMENSIONS

Total BPA area: 8,694 km².

Coordinates: 32⁰⁰'N-57⁰⁰'W : 32⁵⁰'S-58⁰⁰'E.

Bathymetry: 0-300m 0 km²; 300-700m 1 km²; 700-1000m 36 km²; 1000-1500m 82 km²; > 1500m 8,575 km².

Note that the feature itself is cited as being approximately 25km²; some explanation as to the discrepancy between that and the proposed BPA area of 8694km² is required.



3. AVAILABLE DATA

- The proposal notes that oceanographic and biologic data is available, and cites some peer-reviewed studies.
- The proposal notes that Russian and Ukrainian fishing data is also available.
- The benthic habitats have been studied by UK, France, Australia and the USA (Publications cited and several publicly available).
- The SIODFA paper cites Baines et al. (2003) as reporting on the mechanisms that gave rise to the 120-km ridge of which Atlantis Bank is part. (Full citation not located).
- The SIODFA proposal cites Jamstec (2000) as reporting the results of observations on near-bottom and/or mesopelagic communities in depths from 750 to 5365 m. He reported on the vertical stratification of crow shark (*Etmopterus pusillus*), Gilchrist's orange roughy (*Hoplostethus gilchristi*) and the big-eye dory (*Allocyttus verrucosus*). (Full citation not located)
- There have been extensive tectonic studies since 1950s. Drilling site within the Ocean Drilling programme, with several marine expeditions including 1987 WHOI survey using JOIDES Resolution, seismic studies led by Cambridge University in the 1980s-1990s, the 1997 WHOI survey using JOIDES Resolution) and the 1998 International expedition using RSS James Clark Ross. (Several publications cited and publicly available).
- A.D. Rogers from Department of Zoology, University of Oxford, UK, proposed the area for *Ecologically or Biologically Significant Marine Area* status.
- IUCN (2013) Seamounts Project: An Ecosystem Approach to Management of Seamounts in the Southern Indian Ocean. Gland, Switzerland: IUCN. 60 pp, reports on two research voyages to the South West Indian Ridge, which included Atlantis Bank, Coral Seamount and Middle of What Seamount.
- See <https://www.iucn.org/theme/marine-and-polar/our-work/international-ocean-governance/conservation-seamounts-ecosystems/ffem-swio-project> for links to science outcomes from 2015–2020 project.

Maps and Figures provided:

- Figure 17: Bathymetry of Atlantis Bank Benthic Protected Area.
- Figure 18: Map of Atlantis seamount (Source: Lily Muller, University of Oxford - see www.wshoi.edu/oceanus/viewArticle.do?id=2389&archives=true).
- Figure 19: Swathe Mapping Illustration of Atlantis Bank.

- Figure 20: Second image of bathymetry of Atlantis Bank – Narrow Beam Bathymetry Contour interval: 5 metres (Source: Cruise JR31).
- Figure 21: Bathymetry of Atlantis Bank Atlantis II Fracture Zone and South West Indian Ridge. (Source: Woods Hole Oceanographic Institute; Henry J.B. Dick, Christopher J. Maclead, Paul T. Robinson, Simon Allerton and Maurice A Tivey. Data collected by RRS James Clark Ross – 1998 Cruise JR31 operated by BAS).

4. FISHED STATUS

There have been a number of bottom trawl shots on this Bank, but with limited success because of the rugged nature of the bottom. There are many ancient sea-stacks, boulders, rock slides, and gravel beds that make it difficult to bottom trawl. Figure 19 shows the bathymetry and structure of the Bank with locations that have been trawled marked with black lines.

There is evidence of gear effects upon the bottom in some areas. The seamount includes cliff habitats characterised by large anemones, large sponges, and octocorals. Large *Paragorgia* colonies are particularly notable. This is also the only seamount on which large concentrations of armourhead were observed during two recent cruises and also during Russian fishing on the South West Indian Ridge.

This bank has provided a significant mid-water trawl fishery for alfonsino and reportedly, catches of 1000 t have been taken; small catches of orange roughy have also been taken. There are areas that can be fished on Atlantis using bottom trawls and about 60 tows are known to have been made on this feature. Despite this, most of the sea floor appears to have been untouched by bottom trawling; indeed roughy 'marks' have been observed on unfishable areas. SIODFA has proposed to establish this bank as a benthic protected area because of the historical and scientific interest.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not considered explicitly.

6. RECOMMENDATION

There is sufficient information to support the designation of Atlantis Ridge as a Protected Area for Biodiversity and as an Area of Special Scientific Interest.

Some explanation as to the discrepancy between the cited size of the feature (25km²) and the proposed BPA area of 8694km² is required.

A desk-top compilation of publications from research undertaken within this area would be a useful contribution to this proposal.

BRIDLE

1. RATIONALE FOR PROTECTED AREA DESIGNATION (based on information provided)

- Geographic or Unique Representation – unique/unusual geomorphology.

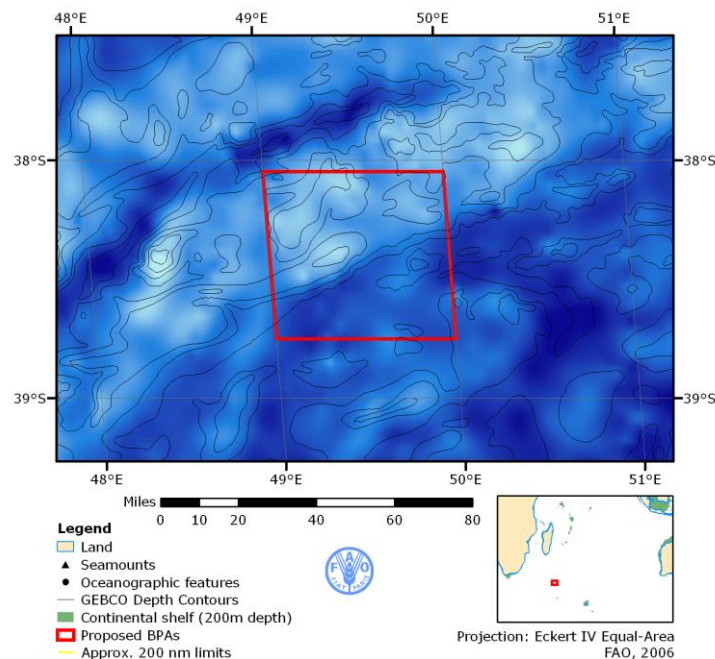
Located in the central region of the Southwest Indian Ridge, this proposed BPA contains a number of knolls and ridges between 900 and 1500 m in depth, and is surrounded by a substantial area of sediment at 1500 – 2500 m. It supports an abundance of brain corals, particularly in the southern part of the feature. The heavy sedimentation from surface productivity in many areas suggests high productivity in the water column and potentially the benthos. The proposal reports that this is an area previous unmapped and undescribed, and suggests that it is ‘almost pristine condition’ despite reported heavy fishing in the past. There are five historically significant spawning stocks of orange roughly within 50 miles of the BPA and populations of bluenose warehou (Antarctic butterfish, *Hyperoglyphe antarctica*) in the surface waters above the feature.

2. AREA DIMENSIONS

Total BPA area: 6,788 km².

Coordinates: 38°03'N-49°00'W : 38°45'S-50° 00'E.

Bathymetry: 01-100 m 0 km²; 100-300 m 0 km²; 300-700 m 0 km²; 700-1000 m 0 km²; 1000-1500 m 130 km² ; >1500 m 6,658 km².



3. AVAILABLE DATA

- The proposal notes that oceanographic and biologic data are available.
- The proposal notes that Russian and Ukrainian fishing data as well as other fishing data are also available.
- No independent research has been identified/cited for this site.

Maps and Figures provided:

- Figure 22: General bathymetry of Bridle Benthic Protected Area region.
- Figure 23: Habitat assessment, Bridle Benthic Protected Area region.
- Figure 24: Habitat assessment bottom image, Bridle Benthic Protected Area region.
- Figure 25: Bathymetry of the Bridle Benthic Protected Area region.

4. FISHED STATUS

This site is known to have been trawled although the proposal suggests that there has been only limited trawl effort in the region associated with small catches of orange roughy and oreo dories. However it then references heavy fishing in the past with reports of 18 boats fishing the feature in one day and 36 boats fishing the feature during the 2000 fishing season. It cites the existence of USSR/Ukrainian fishing data as well as other fishing data. Commercial estimates of past catches on this feature are reported to have been in the range of 5000 – 10,000 t with current biomass around 10%-20% of the initial unfished biomass², and possibly lower (5%) on associated ridges. It is reported to be difficult to trawl.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not explicitly considered.

6. RECOMMENDATION

Additional Information is required to confirm criteria for specific BPA status as well as to determine representative status.

The proposal suggests the feature is 'near pristine' yet references heavy fishing as recent as year 2000 and limited trawling presumably in the more recent past. There is no specific data provided on the benthos, including recovery from the fishing, other than the figures provided. The nomination appears to be partly linked to the difficulty in trawling the feature. Additional Information is required to confirm criteria for specific BPA status as well as to determine representative status.

² Fished species included in this estimate not clear in the proposal

WALTERS' SHOAL

1. RATIONALE FOR PROTECTED AREA DESIGNATION (based on information provided)

- Bioregional Representativeness - unusual, rare or diverse habitat/ecosystems that benthic fishing operations will disturb.
- Scientific Interest - important for whale sightings.

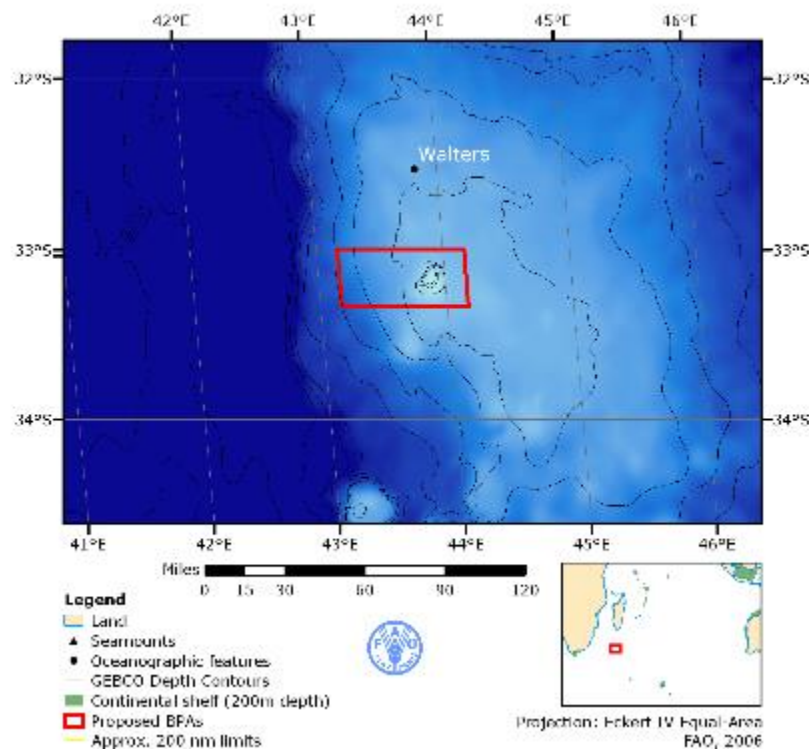
This feature is located near the southern end of the Madagascar Ridge and consists of a spreading plateau with canyons. Seamounts and ridges with depths rising 4500 m to within 1800 m of the surface (The summary information provided in Table 3 notes the depths as 4000 m to 10 m). It is characterised by high biodiversity and contains extensive coral beds, and is reportedly near pristine. It provides a habitat for a variety of whale species.

2. AREA DIMENSIONS

Total BPA Area: 3,443 km².

Coordinates: 33° 00'N-43° 10'W : 33° 20'S -44°10'E.

Bathymetry: 01-100 m 88 km²; 100-300 m 104 km²; 300-700 m 557 km²; 700-1000 m 1,980 km²; 1000-1500 m 670 km²; >1500 m 42 km².



3. AVAILABLE DATA

- The proposal notes that oceanographic and biologic data are available.
- The proposal notes that Russian and Ukrainian fishing data as well as other fishing data are also available.
- More studies have been undertaken on Walters' Shoal than other seamounts in the region; it is readily accessible from land and there is strong fisheries interest. It was sampled during the Indian Ocean expedition of 1964 by R/V *Anton Bruun*, and then by the R/V *Vityaz*. SIODFA proposal states that these studies discovered a new endemic sub-species of crinoid, *Comanthus*

wahlbergi tenuibrachia (Clark 1972. Full citation not provided) in the shallow waters of the shoal, an endemic ispod, *Jaeropsis waltervadi* (Kensley 1975), and several crustaceans, including an endemic species of alpheid shrimp. *Alpheus waltervadi* (Kensley (1981. Full citation not provided.)

- Benthic and water-column faunal collections have continued to be undertaken in the area. The proposal cites: Parin, Nesis, Sagaidachny & Shcherbachev (1993), Detinova & Sagaidachny (1994), based on work undertaken in the 1980s by three vessels that operated from Walters' Shoal north to Socotra Island; Ledoyer (1994); Geinrikh (1995).
- Collette and Parin (1991) described the fish fauna from 400 m depth to the surface on the shoal at approximately 15 m and identified 20 species, several of which were potentially endemic undescribed species.
- An endemic species of rock lobster, *Palinurus barbarae*, was reported following the landing of the species from commercial fishing vessels (Groeneveld et al. 2006).
- Rogers (2012) lists several other studies.
- The IUCN undertook a research voyage in 2016 on the shallows of the Madagascar Ridge MAD-Ridge 2016 Expedition, South-West Indian Ocean to analyse the hydrodynamics, hydrology and trophic levels (first and intermediate), and in April 2017 undertook a 36 day research trip to Walters' Shoal to obtain information on the benthic component and "water column", and the pelagic and avian fauna. The voyage included video recordings. (see <https://www.iucn.org/theme/marine-and-polar/our-work/international-ocean-governance/conservation-seamounts-ecosystems/ffem-swio-project/walters-shoal-expedition> for links to this project).

Maps and Figures provided:

- Figure 26: General bathymetry of general region of Walters' Shoal.
- Figure 27: Bathymetry of Walters' Shoal (courtesy of IUCN).

4. FISHED STATUS

The feature is known to have been trawled on the western side in the past and bottom fished in the shallow areas. Lobster fishing has also been reported in shallow 10-12 m areas of sandy bottom.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not explicitly considered.

6. RECOMMENDATION

There is sufficient evidence to suggest this is an area of bioregional significance with a number of unusual, rare or diverse habitat/ecosystems and worthy of BPA status.

- It is reportedly near pristine although it is known to be fished. It would be useful to review the detailed findings of the 2016 IUCN research voyages to check the status of the habitat and to review any additional information on the biodiversity and ecosystems of the feature. (see <https://www.iucn.org/theme/marine-and-polar/our-work/international-ocean-governance/conservation-seamounts-ecosystems/ffem-swio-project/walters-shoal-expedition> for links to this project).

CORAL BPA

1. RATIONALE FOR PROTECTED AREA DESIGNATION (based on information provided)

- Bioregional Representativeness – rare or diverse habitat/ecosystems that fishing operations will disturb.
- Biodiversity – high diversity of ecosystems, habitats or species/genetic diversity.

This benthic feature is characterised by extensive deepwater coral along both sides of a spreading centre with seamounts and ridges with depths from 6000 m to 180 m. It is located in sub-Antarctic waters and reportedly near pristine. Intact cold-water corals have been observed at around 1000 m, largely comprising a largely intact dead coral framework and high densities of associated fauna including a range of corals, glass sponges, crustaceans, and echinoderms. In shallower waters, coral gardens of Scleractinia, possibly *Lophelia pertusa*, and Octocorallia are reported. The coral framework at 1000 m is comprised of *Solenosmilia variabilis*.

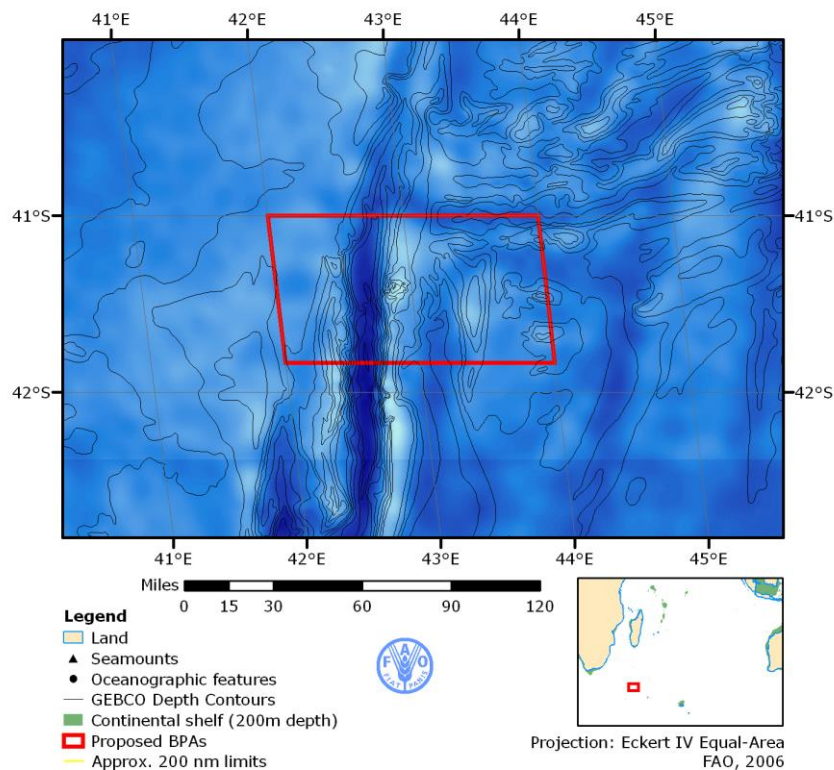
Vertical cliffs are seen on the western side of the seamount, colonised by dense communities of sponges, octocorals, brachiopods, and benthopelagic fish, sharks and octopus. Seabirds are very common over the seamount, particularly wandering albatross and white-chinned petrels. The water mass overlying the seamount is sub-Antarctic and hosts pelagic species completely different to those further north, including Antarctic myctophids, and pelagic grenadiers.

2. AREA DIMENSIONS

Total BPA Area: 12,376 km².

Coordinates: 41° 00'N-42° 00'W : 41° 40'S -44° 00E'.

Bathymetry: 01-100 m 0 km²; 100-300 m 8 km²; 300-700 m 34 km²; 700-1000 m 50 km²; 1000-1500 m 510 km² ; >1500 m 11,775 km².



3. AVAILABLE DATA

- The proposal notes that oceanographic and biologic data are available
- The proposal notes that Russian and Ukrainian fishing data as well as other fishing data are available.
- Observations were made of this seamount using a remotely operated vehicle, *Kiel 6000*, from the *R.V. James Cook* cruise JC66 in November-December 2011.
- Rogers (2014) notes that this is the only known example of a seamount with cold-water coral reef habitat lying in sub-Antarctic waters in the Southern Indian Ocean.
- This seafloor feature is well known to the industry as an area of particular coral abundance. Independently, Rogers & Taylor note that this seamount is highly unusual.

Maps and Figures provided:

- Figure 28: General bathymetry of Coral Sea floor feature.
- Figure 29: Swathe Sidescan Image Coral BPA.

4. FISHED STATUS

The area is known to have been trawled.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not explicitly considered.

6. RECOMMENDATION

There is sufficient evidence to suggest this is an area of bioregional significance and biodiversity, with a number of unusual, rare or diverse habitat/ecosystems and worthy of BPA status.

This area is known to have been trawled in the past, however. It is recommended that observations from the RV James Cook cruise in 2011 and any other evidence showing impact of fishing activity, including anecdotal reports, be reviewed expeditiously to confirm the status and health of the habitat,

AGULHAS PLATEAU

This proposed area is outside of the SIOFA boundary and has now been withdrawn.

MOW

1. **RATIONALE FOR PROTECTED AREA** (based on information provided)

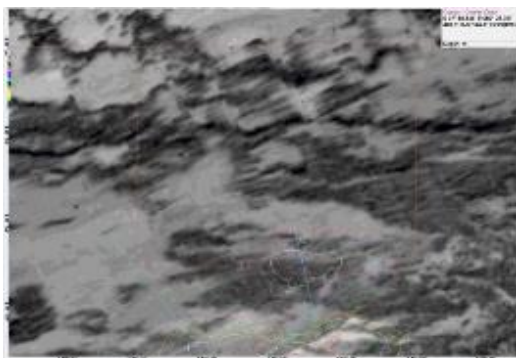
- Bioregional Representativeness – unique, rare or distinct habitat/ecosystems that benthic fishing operations will disturb.

The MOW seafloor feature is currently the only known example of a seamount with cold-water coral reef habitat lying in sub-Antarctic waters in the Southern Indian Ocean. The water mass overlying the seamount is Sub-Antarctic and hosts pelagic communities completely different to those found further north (i.e. north of the Sub-Antarctic and Sub-Tropical Fronts). Pelagic species include Antarctic myctophids (*Electrona* spp.) and also pelagic grenadiers (Macrouridae). The benthic fauna varies depending on depth on the seamount and also the substratum slope and composition. An intact cold water coral reef is located on the eastern flanks of the seamount at 1,000 m depth, largely consisting of dead coral framework with high densities of associated fauna including both sessile (corals, sponges) and mobile (squat lobsters, echinoderms) species. However, the distribution of these organisms was patchy. The main peak of the Middle of What sea floor feature contains degraded cold-water coral reef that Rogers believes has probably been heavily impacted by trawling. The main framework building species appears to be the Scleractinian coral *Solenosmilia variabilis*. Parasitic Volcanic Cones on the northern flanks of the seamount are comprised of a largely-intact coral framework and the surrounding areas, which were notably rugged in topography, comprised extensive coral garden habitat. There are also areas on the southwestern flank of the seamount that are also rugged and comprise coral garden habitat. Rogers reports that this locality can be associated with strong currents. Large numbers of lantern sharks (Etmopteridae) were observed on ROV dives around the northern Parasitic Cones.

Live colonies of the framework-building species are also present. The coral reef hosts high densities of a range of other coral species, particularly zoanthids and octocorals. Glass sponges also occur at high density. Mobile fauna include a variety of crustaceans, particularly squat lobsters, but also crinoids, sea stars and fish. Shark or ray eggs were also visible in areas attached to coral. Below the coral reef habitat lie dense sub-fossil beds of barnacle scutes. Other coral habitat is located on the upper slopes and summit of the seamount and comprises gardens and copses of coral including both octocorals and Scleractinia (possibly *Lophelia pertusa*). The western side of the seamount is much more rugged than the eastern side and in areas comprises vertical cliffs. These are colonised by dense communities of sponges, octocorals and brachiopods with mobile fauna including benthopelagic fish, sharks and also octopus.

2. **AREA DIMENSIONS**

- Total BPA Area: 33843km².
- Coordinates: 37° 54'N - 50° 23' W : 37° 56.4-50° 27' E
- Area is outlined on low resolution map as provided below.
- Bathymetry: > 1500m 33,843km².



Low Resolution of the MOW Benthic Protected Area

3. AVAILABLE DATA

- Oceanographic and biologic data cited as available.
- Fishing data cited as available.
- Rogers, in an unsuccessful submission to declare this area as an EBSA, reported that benthic data have been collected using direct observation by a remotely operated vehicle, the Kiel 6000, and also video grab, on R.V. James Cook cruise JC66 during November and December 2011.
- The area is also described in IUCN 2013.
- This feature was investigated by the cruise of the *R.F. Darwin*. (Rogers, A.D.& M.L. Taylor 2012. Benthic biodiversity of seamounts in the southwest Indian Ocean Cruise report – R/V *James Cook* 066 Southwest Indian Ocean Seamounts expedition – November 7th – December 21st, 2011. 235pp).
- See also <https://www.iucn.org/theme/marine-and-polar/our-work/international-ocean-governance/conservation-seamounts-ecosystems/ffem-swio-project> for links to science outcomes from 2015–2020 project.
-

Maps and Figures provided:

Figure 31: Low Resolution of the MOW Benthic Protected Area.

4. FISHED STATUS

The MOW seamount has generally been an important area for fishing in the past, and was targeted by vessels during the 2000-2001 period, but there has been limited fishing since then. It is reported that large parts of this feature are impossible to fish without loss of fishing gear, and less than 10% of the habitat is estimated to have been fished on.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not considered explicitly.

6. RECOMMENDATION

The ecological logic behind proposing this area is sound. A significant level of biologic data appears to exist. However, as this is an area of fishing interest, an analysis of impact on existing/future fishing interests should be undertaken. Coordinates should also be explicitly provided to define the area.

BANANA

1. SIOFA PA DESIGNATION CRITERIA WHICH BEST FITS (based on information provided)

- Geographic or Unique Representation – unique/unusual geomorphology.

The proposed Banana BPA is a very rocky isolated elevation north of Walters' Bank, exhibiting hard corals. While orange roughy are present, the ruggedness of the area makes it challenging to trawl successfully. The proposal notes that with new vessels arriving in the fishery it was thought this was a vulnerable ecosystem where fishing could have a significant adverse impact and thus worthy of BPA status.

2. AREA DIMENSIONS

Total BPA Area: 33843km².

Coordinates: 30° 20'N-45° 40'W : 30° 30'S-46°E.

Bathymetry: >1500m 33,84km².

No location or dimension map is provided.

3. AVAILABLE DATA

- No details on physical characteristics are provided other than the general description of ruggedness.
- No oceanographic or biological data are cited.
- Fishing data are cited as existing.
- Seamounts Project (2013). An Ecosystem Approach to Management of Seamounts in the Southern Indian Ocean. Gland, Switzerland: IUCN.
- See also <https://www.iucn.org/theme/marine-and-polar/our-work/international-ocean-governance/conservation-seamounts-ecosystems/ffem-swio-project> for links to science outcomes from 2015-2020 ongoing work.

Maps and Figures provided:

Figure 31: Bathymetry of the Banana seafloor feature.

4. FISHED STATUS

The proposal refers to the presence of orange roughy. Thirteen trawl shots have been attempted over the past decade, with most resulting in gear becoming stuck.

5. SOCIAL AND ECONOMIC CONSIDERATIONS

These issues are not explicitly considered.

6. RECOMMENDATION

Additional information is required to identify the specific location of the proposed BPA. Additional work is required to refine physical and biological characteristics of the proposed BPA. Some analysis of the impact of the previous trawling on the status of the vulnerable species and ecosystem would be useful. An analysis of existing fishing interest against the Protected area criteria would also be useful.

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