



SIOFA SC Workshop to progress future protected area designation (WS2024-PAD)
Virtual, 13 and 20 November 2024

WS2024-PAD-02

Consideration of High Seas Benthic Protected Areas within SIOFA Jurisdiction for Permanent Closure

Delegations of Australia, Cook Island, Japan and SIODFA¹

Document type	Workshop paper ✓
Distribution	Public ✓ Restricted ² <input type="checkbox"/> Closed session document ³ <input type="checkbox"/>
Abstract	<p>The purpose of this paper is to evaluate interim and voluntary BPAs within SIOFA jurisdiction against the SC2 agreed criteria (see Annex H of SC2 report) for consideration at the SIOFA SC Workshop to progress future protected area designation (WS-2024-PAD):</p> <p>Bioregional representation – The area is known to contain unusual, rare or distinct habitats or ecosystems that bottom fishing operations will disturb.</p> <p>Bioregional representation – 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.</p> <p>Geographic representation – The area proposed is known to contain unique or unusual geomorphological features that fishing operations may damage</p> <p>Biodiversity representation – The area is known to contain high diversity of ecosystems, habitats, communities or species, or has higher genetic diversity.</p> <p>Scientific interest – The area, excluding existing fishing grounds, has 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.</p> <p>The paper considered 12 BPAS: five that have a SIOFA interim status, and seven that are currently being voluntary and applied by Australia, the Cook Islands, Japan, Thailand, and SIODFA members.</p>

¹ Contributing Authors: Matthew Farthing, Stephen Brouwer, Panela Mauru, Trent Timmiss, Lyn Goldsworthy, Ross Shotton, Charles Heaphy and Takehiro Okuda.

² Restricted documents may contain confidential information. Please do not distribute restricted documents in any form without the explicit permission of the SIOFA Secretariat and the data owner(s)/provider(s).

³ Documents available only to members invited to closed sessions.

Recommendations

It is recommended that the workshop:

Note that all 12 features considered (namely the *Atlantis Bank, Banana, Bridle, Coral, East broken Ridge, Fools Flat, Gulden Draak, Mid-Indian Ridge, Middle of What, Rusky Knoll, Southern Indian Ridge and Walters Shoal* features) satisfy various criteria in the SC2 protocol used for protected area designation, including: (2b) Bioregional representation – Area is known to contain unique, rare or distinct, habitats or ecosystems that bottom fishing operations will disturb; (2c) Bioregional representation – 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; (3a) Geographic representation – The area proposed is known to contain unique or unusual geomorphological features that fishing operations may damage; 4b. Biodiversity representation – The area is known to contain high diversity of ecosystems, habitats, communities or species, or has higher genetic diversity; (5a) Scientific interest – The area, excluding existing fishing grounds, has 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.

Recall Article 4(c) of the Agreement which obliges Contracting Parties to apply the precautionary approach in accordance with the FAO Code of Conduct for Responsible Fisheries and the 1995 UN Fish Stocks Agreement, whereby the absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures.

Recommend to the SC that the following features within the SIOFA jurisdiction should be designated as protected areas with the following purposes:

1. **Atlantis Bank** for the purpose of protecting biodiversity
2. **Banana** for the purpose of the protection of its unique geographical representation
3. **Bridle** for the purpose of the protection of its unique geographical representation
4. **East Broken Ridge** for the purpose of the protection of its unique geographic representation
5. **Fools Flat** for the purposes of the protection of its bioregional and geographic representation and its biodiversity
6. **Gulden Draak** for the purpose of the protection of its bioregional representativeness
7. **Mid-Indian Ridge** for the purpose of the protection of its unique geographic representativeness
8. **Middle of What (MOW)** for the purpose of the protection of its bioregional representativeness
9. **Rusky Knoll** for the purpose of the protection of its bioregional representativeness

Recommend to the SC that the following features within the SIOFA jurisdiction should be closed to trawl fishing:

1. **Coral** for the purpose of the protection of its bioregional representativeness and its biodiversity
2. **Southern Indian Ridge (Del Caño Rise)** for the purpose of the protection of its bioregional and geographic representation and its biodiversity
3. **Walters Shoal** for the purpose of the protection of its biodiversity and bioregional representativeness

Consideration of High Seas Benthic Protected Areas within SIOFA Jurisdiction for Permanent Closure

Introduction

Following an initial set of meetings in February and April 2006, the Southern Indian Ocean Deepsea Fishers Association (SIODFA) agreed to prohibit trawling by their companies' vessels in 11 areas of the Southern Indian Ocean. The selection of these areas was based on information they had collected over the 10 years prior from applied marine-research surveys and from their own fishing operations. In 2016, two more areas were identified, and together 13 areas covering approximately 357,569 km² were included (Table 1).

The objective of these benthic closures was to conserve benthic biodiversity over varied and wide-ranging locations of the Southern Indian Ocean where SIODFA's vessels operate. These closures were also thought to provide wider benefits considering deepwater fish distribution where species have been observed in historic catch or they occur in the areas or are expected to occur as the topography is such that they would be expected there but fishing effort has not been sufficient to reliably catch rare species.

The locations of the 13 Benthic Protected Areas (BPAs) including SIOFA recognised interim and SIOFA CCP voluntary BPAs. These span the Southern Indian Ocean covering 1900 nautical miles from north (13° S) to south (45° S) and almost 4000 nautical miles from east (28° E) to west (E101° 40' E) (Figure 1, Table 1). Twelve of these areas fall within the SIOFA jurisdiction.

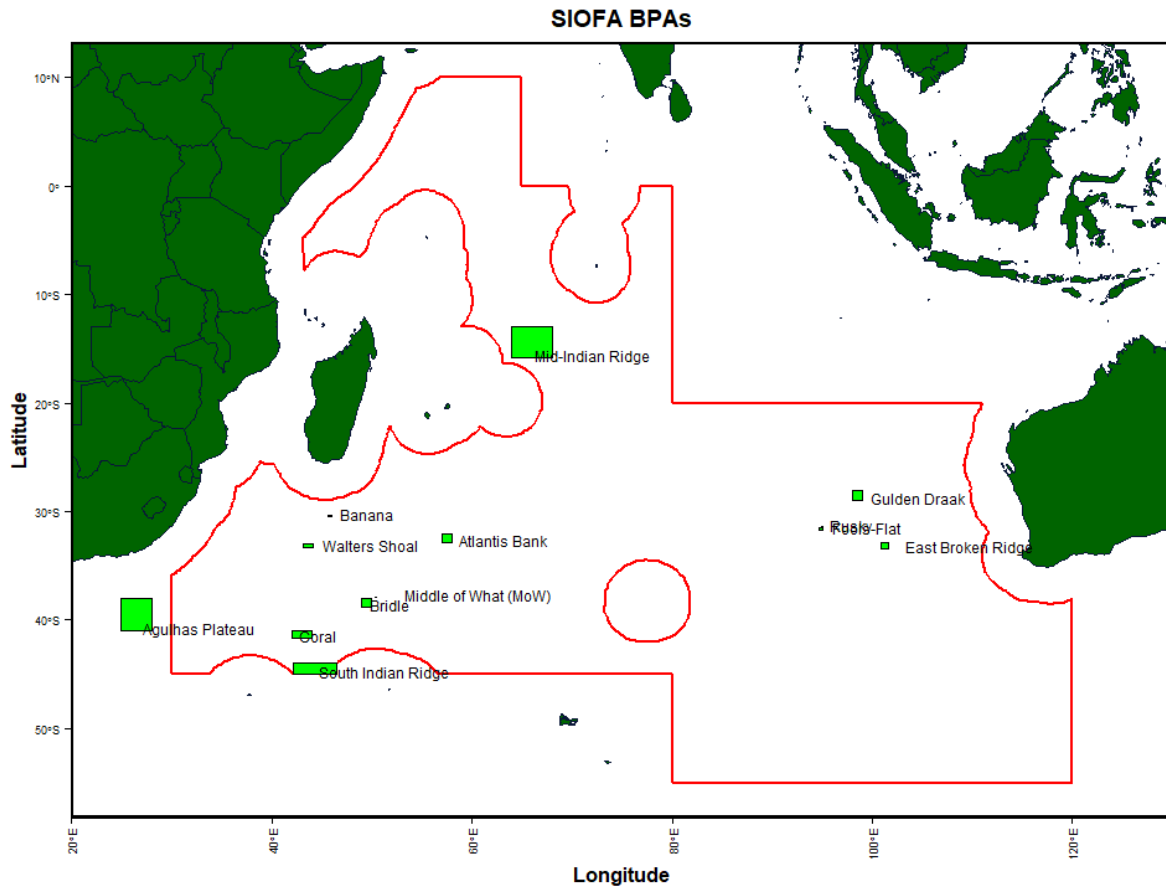


Figure 1: Locations of the SIOFA Benthic Protected Areas (BPAs) in the Southern Indian Ocean.

Table 1: BPA Coordinates, Area and Area Feature Summaries. (*Note that Agulhas Plateau BPA falls outside of the SIOFA agreement area)

Benthic Protected Areas						
Area	Lat (S)	Long (E)	Lat (S)	Long (E)	Area (km ²)	Area Features
<i>Atlantis Bank</i>	32° 00'	57° 00'	32° 50'	58° 00'	8 694	This seamount was formed from an ancient island; extensive research has been conducted on this BPA by a number of agencies; it is the location of a productive fishery
<i>Banana</i>	30 20'	45° 40'	30° 30'	46° 00'	593	The Banana feature is a very rocky and isolated elevation north of Walters' Bank on the western boundary of the SIOFA Area, and reportedly exhibits hard corals. SIODFA (2016) note that this feature is thought to be a vulnerable ecosystem where fishing could have significant adverse impacts.
<i>Bridle</i>	38° 03'	49° 00'	38° 45'	50° 00'	6 788	An area of knolls and ridges in almost pristine condition; previously unmapped and undescribed.
<i>Coral</i>	41° 00'	42° 00'	41° 40'	44° 00'	12 376	A spreading centre with seamounts and ridges with depths from 4500 m to 180 m. Extensive coral beds, a near pristine area.
<i>East Broken Ridge</i>	32° 50'	100° 50'	33° 25'	101° 40'	5 037	A seamount rising to 1000 m, biologically pristine; its benthos and topography previously undescribed.
<i>Fools' Flat</i>	31° 30'	94° 40'	31° 40'	95° 00'	585	A deep-sea bank with numerous canyons incising its slopes; strong upwelling currents sustain extensive coral beds; in

						pristine condition, this is a previously unmapped area of the seabed.
<i>Gülden Draak</i>	28° 00'	98° 00'	29° 00'	99° 00'	10 867	A massive mid-ocean seamount in pristine biological condition.
<i>Mid-Indian Ridge</i>	13° 00'	64° 00'	15° 50'	68° 00'	135 688	An area of seamounts rising to 650 m; a tropical region in pristine biological condition.
<i>Middle of What (MOW)</i>	37° 54'	50° 23'	37° 56.5'	50° 27'	6 084	The location of the MOW seafloor feature is towards the southern end of the South Indian Ridge in waters forming a dynamic boundary region between sub-Antarctic and sub-tropical waters and has a deep summit (~900-1000m depth).
<i>Rusky Knoll</i>	31° 20'	94° 55'	31° 30'	95° 00'	147	A productive knoll located on extensive ridge; extensive black coral exists with the benthos in an almost pristine state.
<i>South Indian Ridge (North)</i>	44° 00'	40.878°	44 00'	46.544°	81 439	An area of seamounts adjacent to the CCAMLR region to the south; in pristine biological condition. This area is bounded to the east and west by the EEZs of South Africa and France.
<i>South Indian Ridge (South)</i>	45 00'	42.124°	45° 00'	45.711°		
<i>Walters Shoal</i>	33° 00'	43° 10'	33° 20'	44° 10'	3 443	An area of seamounts adjacent to the CCAMLR region to the south; in pristine biological condition. This area is bounded to the east and west by the EEZs of South Africa and France. This area, which rises from 4000 to within 10 m of the surface provides a habitat for a variety of whale species; the area is characterized by high biodiversity
<i>Agulhas Plateau*</i>	38° 00'	25° 00'	41° 00'	28° 00'	85 828	Region of seamounts north of the proposed South African Antarctic MPA; contiguous with the South African EEZ to the west. This BPA falls outside of the SIOFA area and is not considered further in this document.

SIODFA members have collected substantial bathymetric data on a major part of the Southern Indian Ocean. Large areas have been swathe mapped using an 11 KHz frequency sidescan sonar system a low frequency acoustic array with multiple transducers that map seafloor habitat. The system used for this programme was able to map with a wide swath and cover large bottom areas. The advantage of this type of system is that it can provide accurate bathymetry and also detect and distinguish between soft and hard sediments. Additional bathymetric databases have been built up from commercial vessel echo-sounder data using the commercial logging systems Seaplot TM and Piscatus TM.

Detailed bathymetric information is available for most of the fishable depths in the region. Using bathymetric, inferred habitat, and biodiversity information collected from operations in the area, SIODFA have agreed to 12 Benthic Protected Areas within the SIOFA area. These were selected to give a wide representative coverage of the diversity, geological structure, sediment overlays, bottom types and benthic habitat types in the Indian Ocean. Many features have hard substrates (which are suitable for attachment by sessile organisms such as sponges, corals and tunicates).

A number of principles underpinned SIODFA's selection of these areas:

- i. the existence, as indicated by acoustic mapping, of significant concentrations of deepwater corals;
- ii. the past detection of significant biological and/or geological features in research studies;

- iii. the existence of unusual biological characteristics that show that an area is of particular importance, e.g. to marine mammals;
- iv. the prior existence of little or no fishing interest, for most areas, but which may be damaged by new participants in the fishery, unaware of the existing benthic faunal characteristics; and
- v. choice of a range of bottom-types and seafloor features to ensure the selection of a maximum degree of habitat diversity; through assessing the complexity of the bathymetry and apparent diversity of the fauna and flora.

These criteria have been used to evaluate the BPAs and are presented in Table 2. Initially SIOFA members voluntarily agreed to prohibit their vessels from demersal trawling in these areas. This has become a requirement for vessels from Australis, the Cook Islands and Thailand where bottom and mid-water trawling are prohibited to ensure there is no risk of accidental contact between trawl gear and the seafloor. To ensure compliance with these trawling restrictions, these vessels are continuously monitored, using VMS, to verify their compliance.

The BPA boundaries have been specifically determined to exclude large areas of abyssal plains that are unlikely to be significantly threatened by trawl fishing as they are too deep, provide little, if any, habitat for commercially targeted fish species and/or because the topography indicates that it has little apparent vulnerability to demersal trawling. For those BPAs that have been previously fished, valuable, often unique, information on the species composition of the associated fish and invertebrate fauna exists.

Table 2: List of Proposed Benthic Protected Areas and their physical characteristics (Modified from SIODFA 2016). ✓ = observed or recorded; L = likely to occur due to the presence of species often caught in association record in the catch data.

Physical Characteristics / Relevant Criteria	Area											
	<i>Atlantis Bank</i>	<i>Banana</i>	<i>Bridle</i>	<i>Coral</i>	<i>East Broken Ridge</i>	<i>Fools' Flat</i>	<i>Gülden Draak</i>	<i>Mid-Indian Ridge</i>	<i>Middle of What (MOW)</i>	<i>Rusky Knoll</i>	<i>South Indian Ridge</i>	<i>Walters Shoal</i>
Plateau						✓	✓					✓
Canyons					✓			✓				✓
Corals	✓	✓		✓	✓	✓		✓	✓	✓		✓
Knoll or Seamount	✓		✓	✓	✓			✓		✓	✓	
Known to have been trawled	✓	✓	✓	✓		✓			✓	✓		✓
Believed to be unfished					✓		✓	✓			✓	
Oceanographic data exists	✓		✓	✓	✓	✓	✓		✓	✓		✓
Biological data exists	✓		✓	✓	✓	✓	✓		✓	✓		✓
USSR / Ukrainian fishing data exists	✓		✓	✓	✓	✓	✓			✓		✓
Other fishing data exists		✓	✓	✓		✓		✓	✓			✓
VME indicator taxa recorded	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
Deepsea elasmobranchs observed	✓	L	L		L	L	L		✓	L	L	L
Endemic species recorded	✓			✓		✓			✓			✓
Commercially fished species observed	✓	✓	✓			✓	✓		✓	✓	✓	✓

Australia, the Cook Islands and Thailand have made a licence condition of their high seas fishing permits prohibiting their vessels from fishing within any of these BPAs, and Japan, whose industry is a SIODFA member, voluntarily avoid fishing in these areas. At the 4th Meeting of the Parties in 2017, Australia signalled its intention to review these BPAs against the SIOFA standard protocol for future protected area designation. Australia (in consultation with Cook Islands and SIODFA) submitted 12 individual proposals for designation as BPAs to the third meeting of the SIOFA SC in 2017. As of 2024, five of these BPAs have been designated as Interim Protected Areas (IPAs) by SIOFA and bottom fishing is prohibited within these areas by CMM-01.

Table 3: Current protection status of the 12 SIODFA Benthic Protected Areas within the SIOFA jurisdiction as per SIOFA CMM-01 (2023). Agulhas Plateau BPA excluded because it is outside SIOFA jurisdiction.

SIODFA BPA	Current status
<i>Atlantis Bank</i>	Current interim protected area in SIOFA CMM-01 (2023)
<i>Coral</i>	
<i>Fools' Flat</i>	
<i>Middle of What (MOW)</i>	
<i>Walters Shoal</i>	
<i>Banana</i>	Voluntary BPA implemented by Australia, Cook islands, Japan and Thailand
<i>Bridle</i>	
<i>East Broken Ridge</i>	
<i>Gülden Draak</i>	
<i>Mid-Indian Ridge</i>	
<i>Rusky</i>	
<i>South Indian Ridge</i>	

This proposal represents a summary of relevant information and includes any updated information from SC-01-INFO-15 and 12 working papers previously submitted by Australia to the third meeting of the SC in 2017 (SC3 working papers 01-12). This proposal has used the criteria and proposed template adopted in the SIOFA Standard Protocol for Protected Area Designation (SIOFA 2017). This paper should be read in conjunction with those papers.

Results

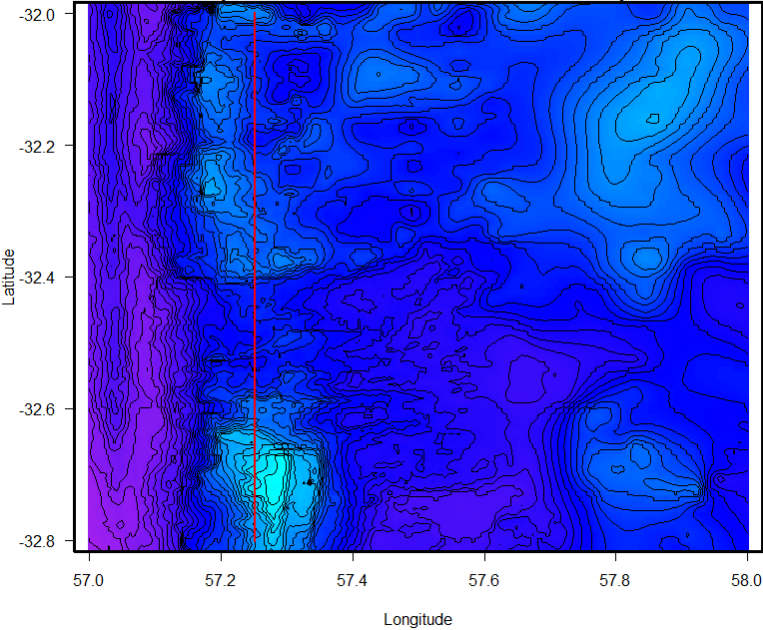
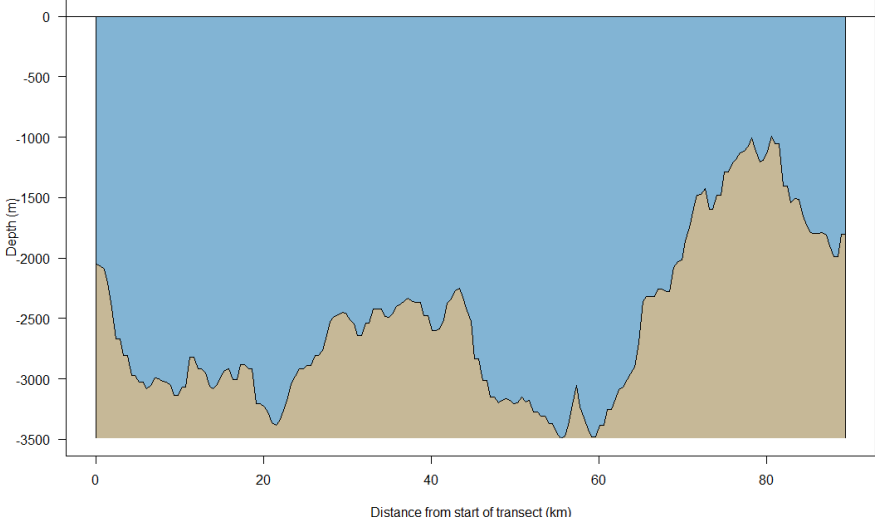
A summary of the various SIOFA Standard Protocol for Protected Area Designation criteria (SIOFA 2017) satisfied by each of the 12 proposed protected areas is shown in Table 4.

Table 4: Summary of various criteria in the SIOFA standard protocol for future protected area designation for the 12 features proposed as “Benthic Protected Areas”.

Criteria in SIOFA protocol	Features (SIOFA Benthic Protected Areas)											
	Atlantis Bank	Banana	Bridle	Coral	East broken Ridge	Fools Flat	Gulden Draak	Mid-Indian Ridge	Middle of What (MOW)	Rusky Knoll	Southern Indian Ridge	Walter Shoal
2b. Bioregional representation				✓		✓			✓	✓	✓	✓
2c. Bioregional representation							✓					
3a. Geographic representation		✓	✓		✓	✓	✓	✓			✓	
4b. Biodiversity representation	✓			✓		✓					✓	✓
5a. Scientific interest	✓			✓								✓

A detailed description of the proponents, geography, objectives, criteria, socio-cultural interest, risks, review periods and monitoring/research needs for each of the 12 proposed features for protected area designation is presented using the template from the SIOFA Standard Protocol for Protected Area Designation in Tables 5 - 17 .

Table 5: Protected area designation proposal for Atlantis Bank

<p>Name</p>	<p>Atlantis Bank</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: 32°00'S - 57°00'W : 32°50'S - 58°00'E Area: 8,694 km²</p> <p style="text-align: center;">BPA - Atlantis Bank (Current interim in CMM-01)</p>  <p style="text-align: center;">Figure 2: Bathymetry of Atlantis Bank</p> <p style="text-align: center;">BPA - Atlantis Bank (cross section profile)</p>  <p style="text-align: center;">Figure 3: Cross section of depth profile of Atlantis Bank</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The protection of potential VMEs; • the protection of biodiversity; and • protection of an area of special scientific interest.

<p>Criteria that the protected area meets</p>	<p><u>This proposed area meets the following criteria:</u></p> <ul style="list-style-type: none"> • 4b. Biodiversity representation – The area is known to contain high diversity of ecosystems, habitats, communities or species, or has higher genetic diversity. • 5a. Scientific interest – The area, excluding existing fishing grounds, has 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. <p><u>Feature description</u></p> <p>This tectonic guyot seamount covers an area of approximately 8694 km² and is in sub-tropical waters (Rogers et al. 2012). The guyot rises from 4000 m to a depth of 700 m below the surface. The summit measures at least 25km². 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 (Baines et al. 2003; 2007).</p> <p>There have been extensive tectonic studies since the 1950s, including as a drilling site within the Ocean Drilling Programme, with several marine expeditions including 1987 Woods Hole Oceanographic Institute (WHOI) survey using JOIDES <i>Resolution</i> (Dick et al. 1991), seismic studies led by Cambridge University in the 1980s-1990s, the 1997 WHOI survey using JOIDES <i>Resolution</i> and the 2009 International expedition using RSS <i>James Clark Ross</i>.</p> <p><u>Biodiversity representation</u></p> <p>The benthic habitats support a very diverse deep-sea fauna (Rogers et al. 2012). This includes diverse coral gardens and complex sea-cliff deep-sea communities characterised by large anemones, large sponges and octocorals. The large Paragorgia colonies are unique. Rock outcrops, particularly along the edges of the summit host large stylasterid colonies, including the echinoid <i>Dermechinus horridus</i>. Spines of these urchins form substratum for infauna around the outcroppings. The eastern side of the seamount comprises rocky/boulder slopes with glass sponges and octocorals. The western side has rock buttresses flanking rock-slide features hosting rich benthic communities of large, armchair-sized sponges, glass sponges, anemones and sea spider predators. Large populations of lobsters, crabs, sharks, sea fans, siphonophores, orange roughy and big-eye dory have been reported from surveys (Rogers & Taylor 2012). These scientific surveys have identified new species and endemism (e.g. Taylor and Rodgers 2017).</p> <p>JAMSTEC (2000) made observations on/near-bottom and/or mesopelagic communities at depths from 750 to 5365 m. Among other results, JAMSTEC reported on the vertical stratification of crow shark (<i>Etmopterus pusillus</i>), Gilchrist’s orange roughy (<i>Hoplostethus gilchristi</i>) and the big-eye dory (<i>Allocytus verrucosus</i>). They also found a number of deepwater chondrichthyans species (including <i>Etmopterus pusillus</i> and <i>Pseudotriakis microdon</i>) but not all were able to be identified. This bank has provided a significant mid-water trawl fishery for alfoncino and reportedly, catches of 1000 t have been taken; small catches of orange roughy have also been taken (G. Patchell, pers. comm. 2018).</p> <p>Acoustic studies of zooplankton and micronekton over seamounts indicate that seamounts focus trophic resources owing to the interaction of pelagic</p>
--	---

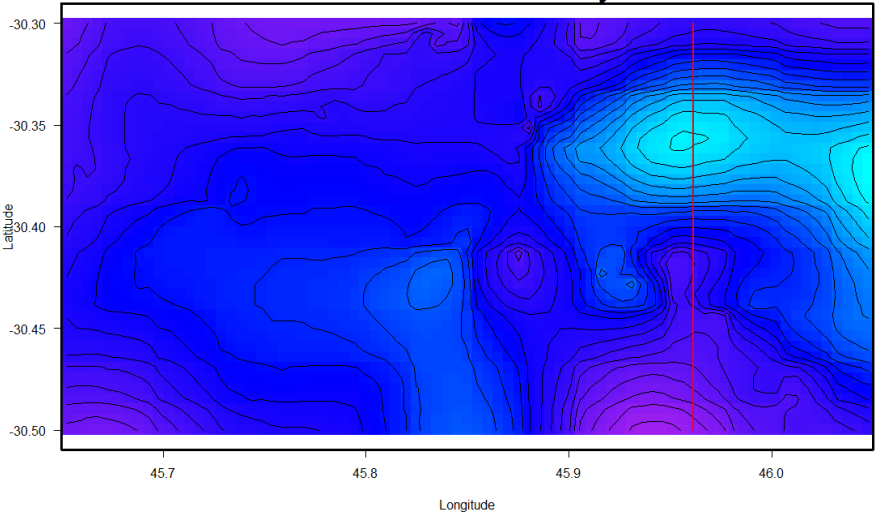
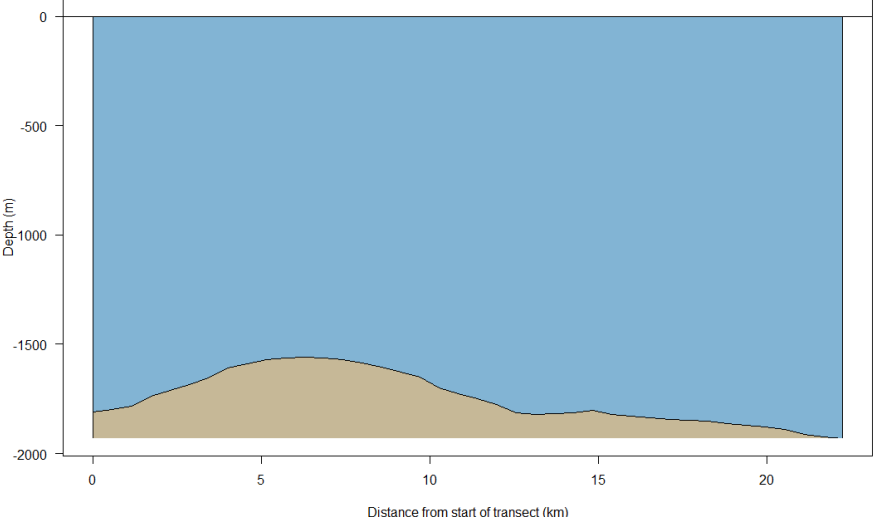
	<p>communities with the topography and local physical oceanography. Rogers et al. (2012) found evidence of trophic focusing on the Atlantis Seamount, leading to higher biological productivity than in the surrounding pelagic waters.</p> <p><u>Scientific interest</u></p> <p>It has been extensively studied (e.g. Baines et al. 2002, 2007; JAMSTEC 2000; Rogers et al. 2012; Taylor and Rogers 2017) and is reportedly the first tectonic guyot ever studied with ultraslow- spreading ridges (Baines et al. 2003). It has a unique paleontological record and has been a drilling site within the Ocean Drilling Programme (ODP) (Dick et al. 1991). It has been studied as part of the International Ocean Discovery Program’s ‘Expedition 360’ (MacLeod et al. 2017).</p> <p>The feature was studied as part of the IUCN (2013) Seamounts Project: An Ecosystem Approach to Management of Seamounts in the Southern Indian Ocean.</p> <p><u>Fishing history</u></p> <p>There are areas that can be fished on Atlantis using bottom trawls and about 60 tows are reported to have been made on this feature (SIODFA 2016). Videos have shown abandoned trawls on the bottom, presumably from Soviet-era fishing (R. Shotton, pers. comm. 2018). Most of the sea floor is reportedly untouched by bottom trawling (SIODFA 2016). There are many ancient sea-stacks, boulders, rockslides, and gravel beds that make the bottom rugged and difficult to bottom trawl (SIODFA 2016).</p> <p>Romanov (2003) provides a summary and review of Russian and Ukrainian scientific and commercial fishing operations on the deepwater ridges of the southern Indian Ocean.</p> <p><u>Other supporting information</u></p> <p>SIODFA has closed this location to fishing by vessels that are members of its association because of the historical and scientific interest.</p> <p>It is listed as an Ecologically and Biologically Significant Area (EBSA) by the Convention of Biological Diversity (CBD) based on the following criteria:</p> <ul style="list-style-type: none"> • C1 Uniqueness or rarity (High ranking). • C2: Special importance for the life-history stages of species (Medium rank) • C4: Vulnerability, fragility, sensitivity, or slow recovery (High rank) • C5: Biological productivity (Medium rank) • C6: Biological diversity (High rank) • C7: Naturalness (Medium rank) <p>The area is identified by UNESCO as a priority site of Outstanding Universal Value (OUV) for protection through a listing equivalent to World Heritage Listing (see Freestone et al. 2016). It is proposed to satisfy World Heritage Criteria VIII (major stages in earth’s history and geological processes), IX (significant ecological and biological processes in the evolution of ecosystems, communities of plant and animals), X (significant biological diversity and threatened species of OUV).</p>
<p>Social, cultural and economic interests</p>	<p>Some historical fishing data are available (e.g. Romanov 2003), which may assist with understanding any social, cultural and/or economic costs associated with designating this as a protected area. The area is the location of a productive fishery. It is possible that designation could have adverse social, cultural or</p>

	economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded small.
Risks to the proposed area	Fishing within this proposed area with all gears could detrimentally impact the biodiversity and scientific interest of this area. SIOFA should consider permanent closure to all fishing.
Review periods	The proposal documents and provides information to support a closure. It is recommended that this designation be reviewed at least every 10 years, or more frequently if new information becomes available that enhances or degrades the justification for its protection.
Outline of monitoring and/or research needed	A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation. Non-extractive research activities such as ROV monitoring of the area would be beneficial.

*Proposal template compiled and updated from working paper: SC-03-06.3.2 (02)

Recommendation	Recommended for permanent closure due to the presence of unique habitats, VME indicator taxa, deepwater elasmobranchs and endemic species.
-----------------------	--

Table 6: Protected area designation proposal for Banana

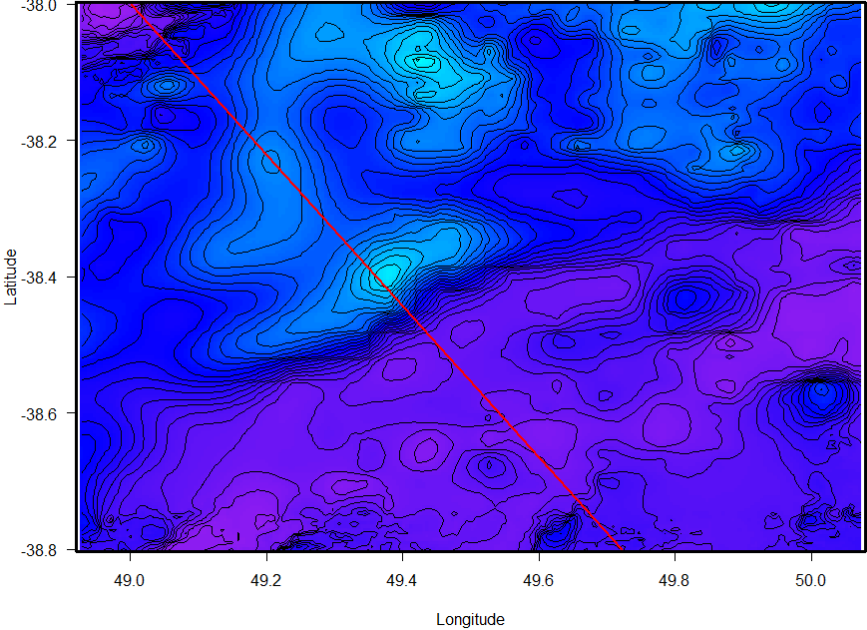
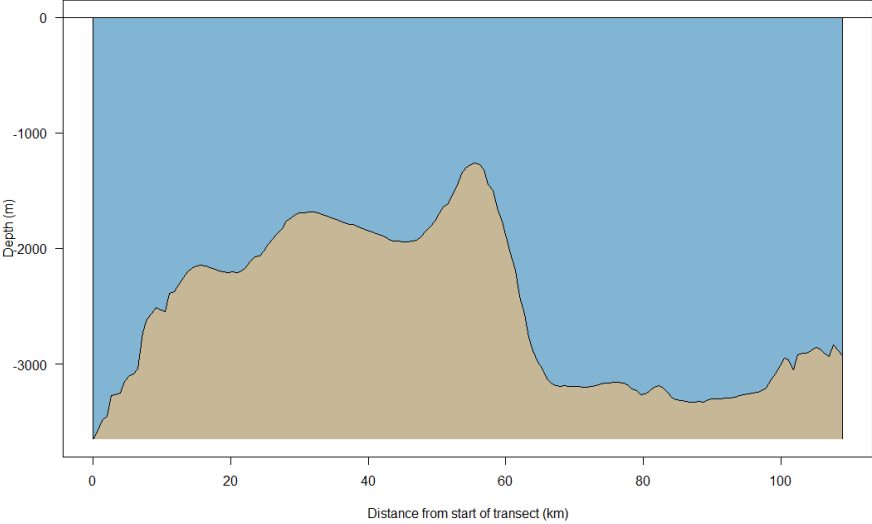
<p>Name</p>	<p>Banana</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: Latitude 30° 20' S, 45° 40' E and 30° 30' S and 46° 00' E. Area: 593 km²</p> <p style="text-align: center;">BPA - Banana Cook Islands voluntary</p>  <p style="text-align: center;">Figure 4: Bathymetry of Banana</p> <p style="text-align: center;">BPA - Banana (cross section profile)</p>  <p style="text-align: center;">Figure 5: Cross section of depth profile of Banana</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The objective for designation of this proposed protected area is the protection of its geographic and/or unique representation; and • The protection of potential VMEs.
<p>Criteria that the protected area meets</p>	<p>The area meets the following criteria:</p> <ul style="list-style-type: none"> • 3a. Geographic and/or unique representation – The area proposed is known to contain unique or unusual geomorphological features that fishing operations may damage.

	<p><u>Feature description and geographic representation</u></p> <p>The Banana feature is a very rocky and isolated elevation north of Walters’ Bank on the western boundary of the SIOFA Area, and reportedly exhibits hard corals. SIODFA (2016) note that this feature is thought to be a vulnerable ecosystem where fishing would have a significant adverse impact.</p> <p><u>Biodiversity representation</u></p> <p>This area reportedly has important benthic faunal populations and communities (SIODFA 2016). On 28 March 2011 the SIODFA Coral reporting noted a 5 kg catch of black coral (G. Patchell, pers. comm. 2018). Prior to 2006, vessel reports noted ‘Coral Fast’ and ‘Stky’ which is known by skippers to be coral (G. Patchell, pers. comm. 2018).</p> <p><u>Fishing history</u></p> <p>Orange roughy (<i>Hoplostethus atlanticus</i>) are present and in total 13 trawl shots have reportedly been attempted over the past decade, with most becoming fast (i.e. stuck to the bottom). The reported Orange Roughy catch is 4.3 tonnes (G. Patchell, pers. comm. 2018).</p> <p><u>Other information to support designation</u></p> <p>Industry members from Australia, the Cook Islands and Japan support the designation of the Banana feature. No trawling by SIODFA vessels is permitted.</p>
Social, cultural and economic interests	It is possible that designation could have adverse social, cultural or economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded to be small.
Risks to the proposed area	Fishing within this proposed area with all gears could detrimentally impact the feature. SIOFA should consider closure to all fishing.
Review periods	The scientific evidence to support a closure is in accordance with the requirements of the precautionary approach due to the likely occurrence of fragile benthos deepwater elasmobranchs. It is recommended that this designation be reviewed within 10 years, or sooner if new information becomes available that enhances or degrades the justification for its protection.
Outline of monitoring and/or research needed	A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation. Non-extractive research activities such as ROV monitoring of the area would be beneficial.

*Proposal template compiled and updated from working paper: SC-03-06.3.2 (03)

Recommendation	Recommended for permanent closure due to the presence of unique habitats, VME indicator taxa and likely presence of deepwater elasmobranchs.
-----------------------	--

Table 7: Protected area designation proposal for Bridle

<p>Name</p>	<p>Bridle</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: Latitude 38° 03' S, 49° 00' E and 38° 45' S and 50° 00' E Area: 6788 km²</p> <p style="text-align: center;">BPA - Bridle Cook Islands voluntary</p>  <p style="text-align: center;">Figure 6: Bathymetry of Bridle</p> <p style="text-align: center;">BPA - Bridle (cross section profile)</p>  <p style="text-align: center;">Figure 7: Cross section of depth profile of Bridle</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The objective for this area is to protect its unique geographic representation; and • the protection of potential VMEs;

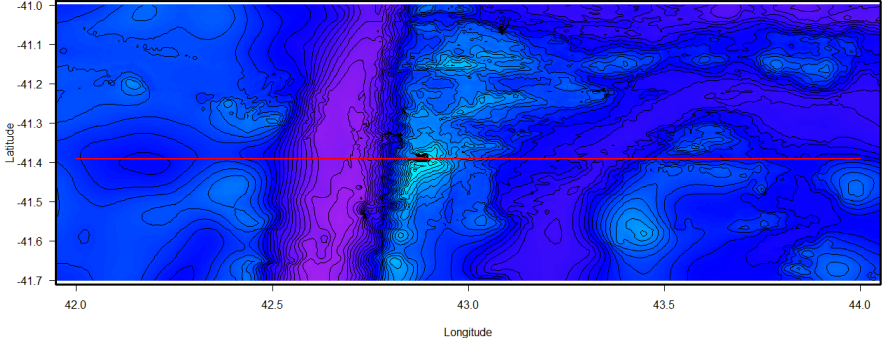
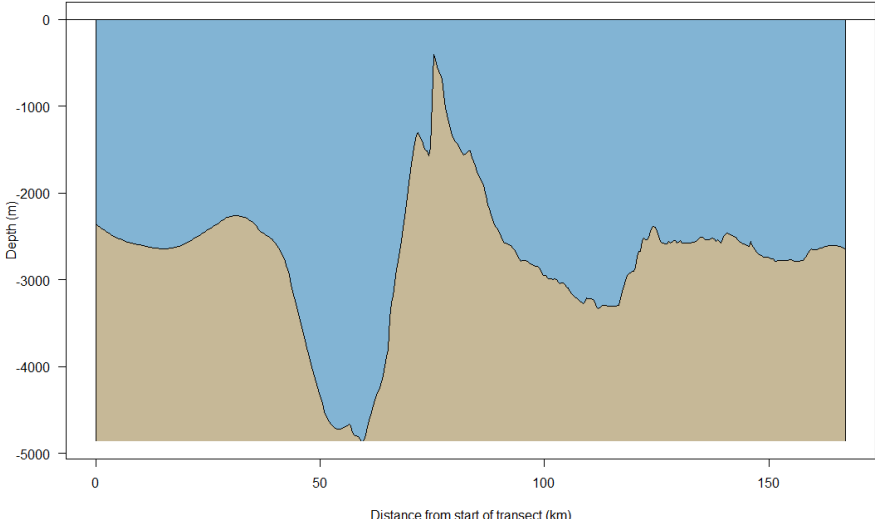
<p>Criteria that the protected area meets</p>	<p><u>This area meets the following criteria:</u></p> <ul style="list-style-type: none"> • 3a. Geographic and/or unique representation – The area proposed is known to contain unique or unusual geomorphological features that fishing operations may damage. <p><u>Feature description and geographic representation</u></p> <p>This seafloor region is located in the mid-region of the South Indian Ridge. The benthic substrate is characterized by many small ridges and reportedly has an abundance of brain corals, especially further south (SIODFA 2016). There appears to be heavy sedimentation from surface productivity in many areas and the extent of sedimentation in the region highlights the productivity in the water column and potentially the benthos in this area (Figure 3).</p> <p><u>Biodiversity representation</u></p> <p>While this area reportedly has important benthic faunal populations and communities, these have not as yet been documented for this proposal.</p> <p><u>Fishing history</u></p> <p>The region surrounding this area was reportedly heavily fished in the past with reports of 18 boats fishing one feature in one day and 36 boats fishing the region during the 2000 fishing season (SIODFA 2016). Commercial estimates of past catches from this region are reportedly in the range of 5000 to 10000 tonnes, which is thought to have considerably reduced biomass of stocks (SIODFA 2016). The area developed a reputation for breaking trawl bridles, the wires that connect the trawl doors to the net, and hence the name.</p> <p>There has since been only limited trawling effort in proposed area, with only small catches of orange roughy and oreo dories. There are reportedly five historically significant spawning stocks of orange roughy within 50 miles of this area.</p> <p><u>Other information to support this proposal</u></p> <p>Industry members from Australia, the Cook Islands and Japan support the designation of the Bridle feature. No trawling by SIODFA vessels is permitted.</p>
<p>Social, cultural and economic interests</p>	<p>Historical fishing data may assist with understanding any social, cultural and/or economic costs associated with designating this as a protected area. It is possible that designation could have adverse social, cultural or economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded small.</p>
<p>Risks to the proposed area</p>	<p>Fishing within this proposed area with all gears could detrimentally impact the feature. SIOFA should consider closure to all fishing.</p>
<p>Review periods</p>	<p>The scientific evidence to support a closure is uncertain and it is proposed that this fishery closure be included in accordance with the requirements of the precautionary approach due to the likely occurrence of deepwater elasmobranchs. It is recommended that this designation be reviewed within 10 years, or sooner if new information becomes available that enhances or degrades the justification for its protection.</p>
<p>Outline of monitoring</p>	<p>A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation.</p>

and/or research needed	Non-extractive research activities such as ROV monitoring of the area would be beneficial.
-------------------------------	--

*Proposal template compiled and updated from working paper: SC-03-06.3.2 (04)

Recommendation	Recommended for permanent closure due to the presence of unique habitats, VME indicator taxa, deepwater elasmobranchs and endemic species.
-----------------------	--

Table 8: Protected area designation proposal for Coral

<p>Name</p>	<p>Coral</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: Latitude 41° 00' S, 42° 00' E and 41° 40' S and 44° 00' E. Area: 12, 376 km²</p> <div style="text-align: center;"> <p>BPA - Coral (Current interim in CMM-01)</p>  </div> <p style="text-align: center;">Figure 8: Bathymetry of Coral</p> <div style="text-align: center;"> <p>BPA - Coral (cross section profile)</p>  </div> <p style="text-align: center;">Figure 9: Cross section of depth profile of Coral</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The protection of potential VMEs; • the protection of its bioregional representativeness; • the protection of biodiversity; and • protection of an area of special scientific interest.
<p>Criteria that the protected area meets</p>	<p><u>This area meets the following criteria:</u></p> <ul style="list-style-type: none"> • 2b. Bioregional representation – The area is known to contain unusual, rare or distinct habitats or ecosystems that bottom fishing operations will disturb. • 4b. Biodiversity representation – The area is known to contain high diversity of ecosystems, habitats, communities or species, or has higher genetic diversity.

	<ul style="list-style-type: none"> • 5. Scientific interest – The area, excluding existing fishing grounds, has 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. • Feature description <p>The Coral seafloor feature is on the Southwest Indian Ridge between the Del Cãno Rise and the Bridle feature and is located in sub-Antarctic waters. It is a spreading centre with seamounts and ridges. Depths range from 4500 m to 200 m (Read and Pollard 2017).</p> <p><u>Bioregional and biodiversity representation</u></p> <p>The <i>R.V. James Cook</i> cruise JC66 in November and December 2011 observed intact cold-water corals at ~1000 m, largely comprising dead coral framework with high densities of associated fauna including both sessile (corals, sponges) and mobile (squat lobsters, echinoderms) elements (Rogers and Taylor 2012). In shallower waters, located on the upper flanks and summit of the seamount are coral gardens comprising Scleractinia and Octocorallia (Rogers and Taylor 2012). The coral framework at 1000m largely comprised <i>Solenosmilia variabilis</i> (Rogers and Taylor 2012). The identity of Scleractinia on seamount summit and upper flanks is uncertain but could possibly be <i>Lophelia pertusa</i> (Rogers and Taylor 2012). As part of the outputs from this cruise, Nye (2013) described a two new species of hippolytid shrimps (Crustacea: Decapoda: Caridea: Hippolytidae) from the Coral seamount.</p> <p>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. The water mass overlying the seamount is Sub-Antarctic and hosts pelagic communities completely different to those further north (north of the Sub-Antarctic and Sub-Tropical Fronts). Pelagic species include Antarctic myctophids (<i>Electrona</i> spp) and also pelagic grenadiers. The benthic fauna varies depending on depth on the seamount and also the substratum slope and composition. Cold water coral reefs are located on the eastern flanks of the seamount at 1,000m depth. The main framework building species appears to be <i>Solenosmilia variabilis</i>. The framework is largely comprised of dead coral but is largely intact with fissures and holes probably created through seismic activity. 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 (Rogers 2014).</p> <p>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 (Rogers and Taylor 2012). 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.</p> <p>Coral Seamount is listed as an Ecologically or Biologically Significant Area (EBSA) by the Convention on Biological Diversity and met the following criteria:</p> <ul style="list-style-type: none"> • Uniqueness or rarity (High ranking). • Special importance for the life-history stages of species (Medium rank)
--	--

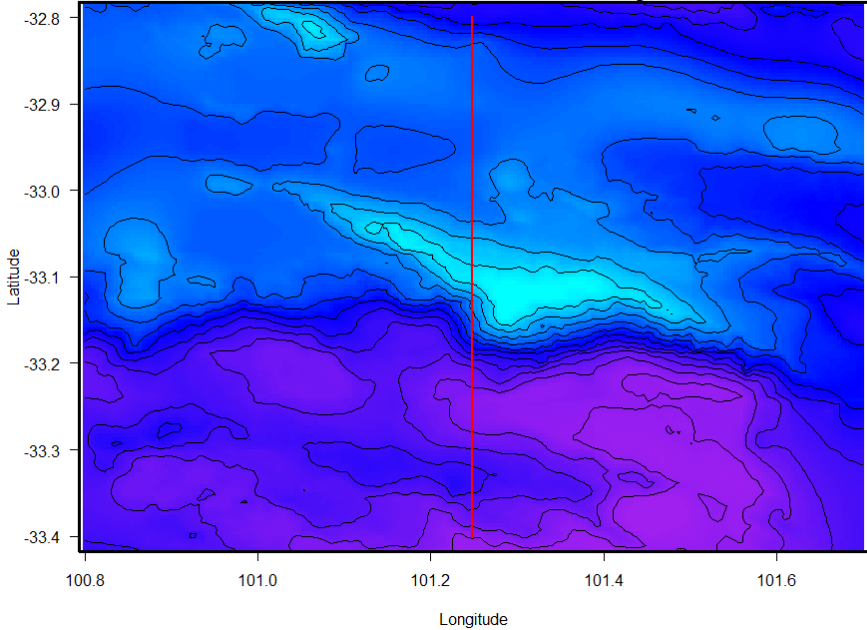
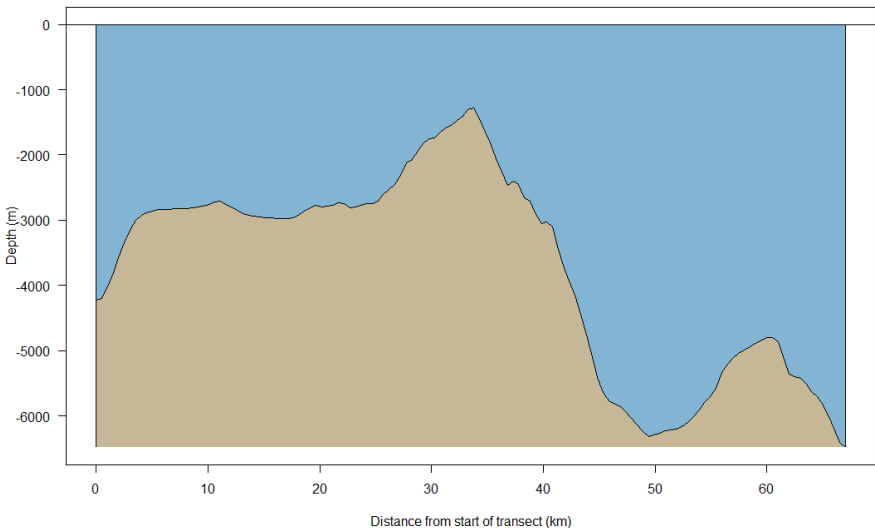
	<ul style="list-style-type: none"> • Importance for threatened, endangered or declining species and/or habitats (no information) • Vulnerability, fragility, sensitivity, or slow recovery (High ranking) • Biological productivity (No information) • Biological diversity (High ranking) • Naturalness (Medium ranking). <p>As part of the submission for assessment, Rogers (2014) noted that cold-water coral reef ecosystems (such as the Coral seamount) fit the criteria of a Vulnerable Marine Ecosystem under the FAO Guidelines for Implementation of UNGA Resolution 61/105.</p> <p>Scientific interest</p> <p>The Coral seamount has been extensively studied. Observations were made of this seamount using a remotely operated vehicle (ROV), <i>Kiel 6000</i>, on the <i>R.V. James Cook</i> cruise JC66 in November and December 2011. In late 2009, the research vessel <i>Dr. Fridtjof Nansen</i> carried out a 6-week multi-disciplinary survey of six seamounts in the Southwest Indian Ocean. Read and Pollard (2017) provide details of the physical oceanography of the Coral seamount. Pollard and Read (2017) provide details of the circulation and stratification on and around the Coral seamount. Other research supporting this criterion is cited herein.</p> <p>Fishing history</p> <p>Early exploratory trawling by the FV Will Watch indicated the presence of extensive coral formations and no subsequent fishing activities were undertaken (SIODFA 2016). Rogers (no date) notes that there was evidence of fishing on the seamount in the form of lost fishing gear, some of which looked relatively recent (lack of biofouling).</p> <p>Rogers and Taylor (2012) noted that ROV work as part of the <i>RV James Cook</i> cruise was stopped on at least 4 occasions due to the discovery of fishing lines. On one of these incidents the gear was confirmed as a gill net. It looked very new with no overgrowth on the ropes. The net was filled with corals and coral framework and the area around it was cleared of live corals and sponges. The authors noted that this sighting was of great concern as the seamount had been placed under a voluntary closure to fishing by the deep-sea trawling industry. The authors noted that it would appear to confirm rumours of gill net fishing in the region, probably targeted at deep-sea sharks.</p> <p>There is an existing bottom longline fishery in this area including fishing effort from vessels from Australia and the European Union.</p> <p>Other information to support designation</p> <p>Industry members from Australia, the Cook Islands and Japan support the designation of Coral seafloor feature.</p>
<p>Social, cultural and economic interests</p>	<p>It is possible that designation could have adverse social, cultural or economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded small.</p>
<p>Risks to the proposed area</p>	<p>Fishing within this proposed area with all gears could detrimentally impact the biodiversity and scientific interest of this area. SIOFA should consider closure to all fishing.</p>

Review periods	The proposal documents and provides information to support a closure. It is recommended that this designation be reviewed at least every 10 years, or more frequently if new information becomes available that enhances or degrades the justification for its protection.
Outline of monitoring and/or research needed	A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation. Non-extractive research activities such as ROV monitoring of the area would be beneficial.

*Proposal template compiled and updated from working paper: SC-03-06.3.2 (05)

Recommendation	Recommended for permanent closure for trawl gear due to the presence of unique habitats, VME indicator taxa and endemic species.
-----------------------	--

Table 9: Protected area designation proposal for East Broken Ridge

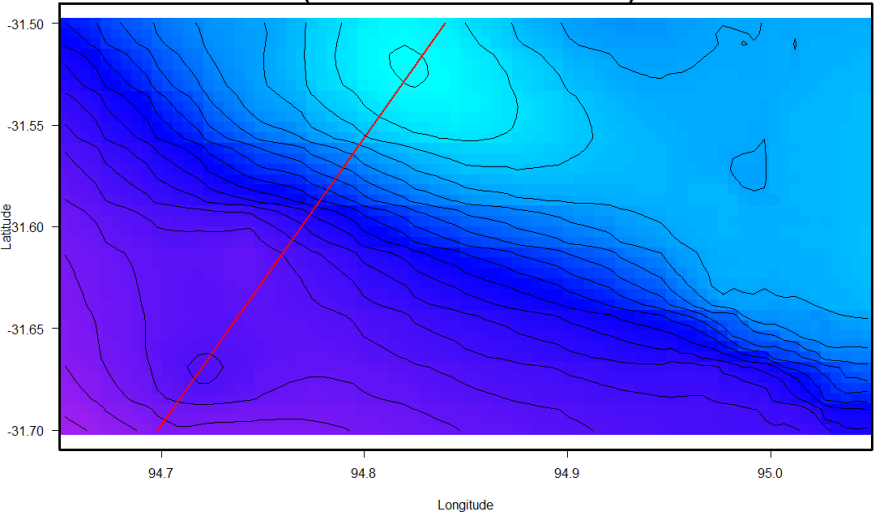
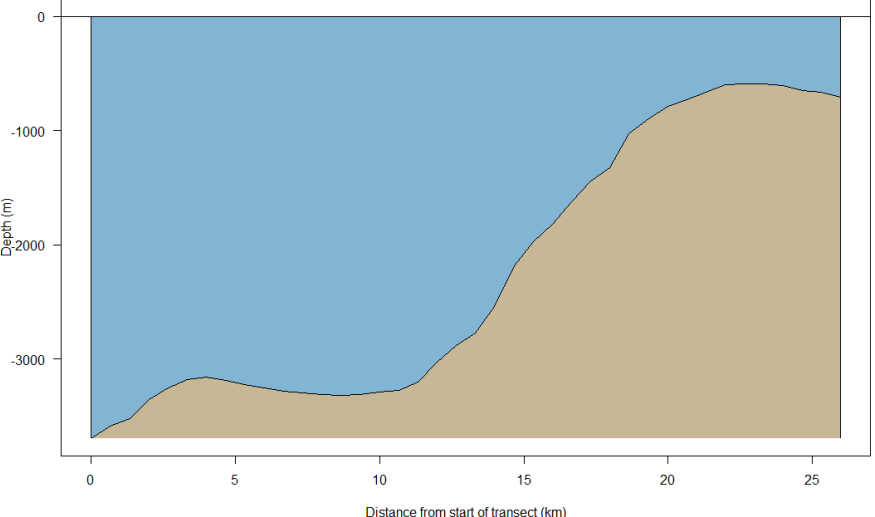
<p>Name</p>	<p>East Broken Ridge</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: Latitude 32° 50' S, 100° 50' E and 33° 25' S and 101° 40' E. Area: 5034 km²</p> <p style="text-align: center;">BPA - East Broken Ridge Cook Islands voluntary</p>  <p style="text-align: center;">Figure 10: Bathymetry of East Broken Ridge</p> <p style="text-align: center;">BPA - East Broken Ridge (cross section profile)</p>  <p style="text-align: center;">Figure 11: Cross section of depth profile of East Broken Ridge</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The objective for this area is to protect its geographic and/or unique representation; and • the protection of potential VMEs;

<p>Criteria that the protected area meets</p>	<p><u>The area meets the following criteria:</u></p> <ul style="list-style-type: none"> • 3a. Geographic and/or unique representation – The area proposed is known to contain unique or unusual geomorphological features that fishing operations may damage. <p><u>Feature description and geographical representation</u></p> <p>This guyot¹ is located on the eastern end of Broken Ridge and is characterised by numerous slips and canyons extending down the sides. This seafloor feature is in the same Broken Ridge region in the northeast of the SIOFA area as the Rusky and Fools’ Flat seamount locations. Figures 1 and 2 show the regional bathymetry of the East Broken Ridge area. This seafloor feature rises from a depth of 3000 m to 1060 m. As far as is known it has not been previously described and has not been trawled (SIODFA 2016).</p> <p><u>Biodiversity representation</u></p> <p>There are reportedly 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 3). When these have been observed on vessel echo sounders they look like aggregations of fish (but they do not move) – hence the term “East Broken Ridge”. There appears to be strong upwelling over the south-west boundary and this no doubt has resulted in favourable conditions for the growth of deepwater corals.</p> <p><u>Fishing history</u></p> <p>Known searches for fish aggregations have reportedly been undertaken, but only for one day (SIODFA 2016). The seamount appears to have suitable environmental conditions for the deepwater species of fish that typically occur in the area.</p> <p><u>Other information to support designation</u></p> <p>Industry members from Australia, the Cook Islands and Japan support the designation of East Broken Ridge feature. No trawling by SIODFA vessels is permitted.</p>
<p>Social, cultural and economic interests</p>	<p>It is possible that designation could have adverse social, cultural or economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded small.</p>
<p>Risks to the proposed area</p>	<p>Fishing within this proposed area with all gears could detrimentally impact the feature. SIOFA should consider closure to all fishing.</p>
<p>Review periods</p>	<p>The scientific evidence to support in accordance with the requirements of the precautionary approach. It is recommended that this designation be reviewed within 10 years, or sooner if new information becomes available that enhances or degrades the justification for its protection.</p>
<p>Outline of monitoring and/or research needed</p>	<p>A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation.</p> <p>Non-extractive research activities such as ROV monitoring of the area would be beneficial.</p>

*Proposal template compiled and updated from working paper: SC-03-06.3.2 (01)

Recommendation	Recommended for permanent closure due to the presence VME indicator taxa and the likely occurrence of deepwater elasmobranchs but should be reviewed if ROV data can be obtained for this seamount.
-----------------------	---

Table 10: Protected area designation proposal for Fools' Flat

<p>Name</p>	<p>Fools Flat</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: Latitude 31° 20' S, 94° 55' E and 31° 30' S and 95° 00' E. Area: 585.3 km²</p> <div style="text-align: center;"> <p>BPA - Fools-Flat (Curent interim in CMM-01)</p>  </div> <p style="text-align: center;">Figure 12: Bathymetry of Fools Flat</p> <div style="text-align: center;"> <p>BPA - Fools Flat (cross section profile)</p>  </div> <p style="text-align: center;">Figure 13: Cross section of depth profile of Fools Flat</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The protection of potential VMEs; • Protection of its bioregional representation; • Protection of its geographic and/or unique representation; • Protection of its biodiversity.
<p>Criteria that the protected area meets</p>	<p><u>The area meets the following criteria:</u></p>

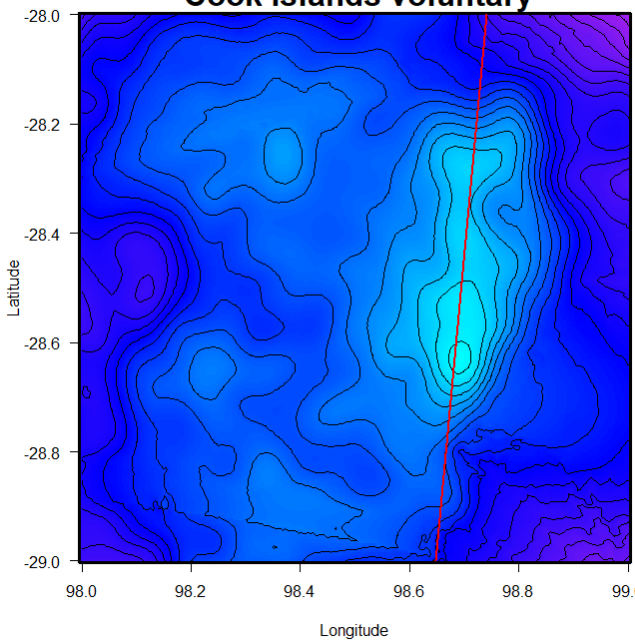
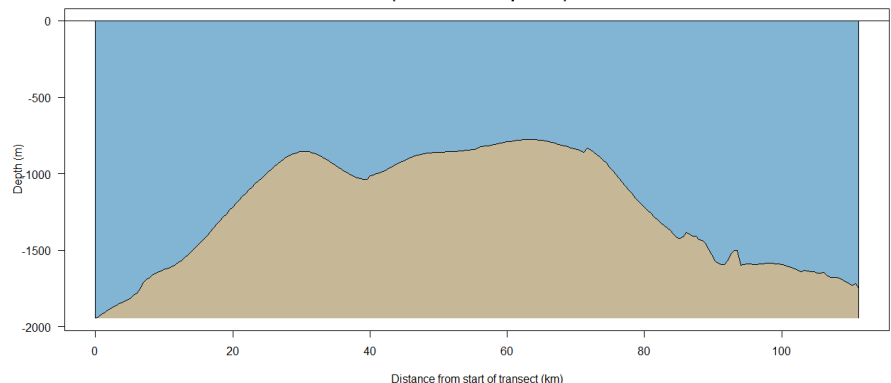
	<ul style="list-style-type: none"> • 2b. Bioregional representation – Area is known to contain unique, rare or distinct, habitats or ecosystems that bottom fishing operations will disturb. • 3a. Geographic and/or unique representation – The area proposed is known to contain unique or unusual geomorphological features that fishing operations may damage. • 4b. Biodiversity representation – The area is known to contain unique, rare (occurs only in few locations) species, populations or communities. <p><u>Feature description and geographical representation</u></p> <p>This region is located on the southern side of Broken Ridge Plateau to the south of the Rusky Knoll feature. This site reportedly has a wide range of benthic habitat types (SIODFA 2016). The seamount shoals to around 990 m; its southern side (the edge of Broken Ridge) drops steeply down to over 4000 metres. Figure 12 shows the bathymetry of this seafloor feature. CBD (2015) notes that the seamount appears to have suitable environmental conditions for the deepwater species of fish that occur in the area. CBD (2015) notes that is believed to be biologically pristine, and its benthos and topography are highly fractured. There are some indications that this feature may have been above sea level in the past (CBD 2015).</p> <p><u>Bioregional and biodiversity representation</u></p> <p>The Fools Flat (central) region is the only part of the entire Broken Ridge that shows substantial coral reefs (FAO 2006). CBD (2015) notes that the extent of this coral habitat is much greater than identified on Coral Seamount in the southwest Indian Ocean, with individual reefs of over 2.5 km² in area, and possibly the largest area of cold-water coral habitat yet identified in any ocean. The unique nature of this region comes from the presence of framework-building scleractinian coral reefs on the shallow southern side of the largest single feature in the Indian Ocean, a 1300km-long ridge (CBD 2015).</p> <p>There are reportedly 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 2) (SIODFA 2016). When these have been observed on vessel echo sounders they look like aggregations of fish (but they do not move) – hence the term “Fool’s Flat”. There appears to be strong upwelling over the south-west boundary and this no doubt has resulted in favourable conditions for the growth of deepwater corals (SIODFA 2016).</p> <p>CBD (2015) notes that the main framework-building species appears to be <i>Solenosmilia variabilis</i>. The framework largely comprises dead coral, and these three-dimensional habitats are sensitive to impacts, with slow recovery (Koslow et al. 2000, Rogers et al. 2008, Althaus et al. 2009, FAO 2009, Williams et al. 2010).</p> <p>Fools Flat is listed as an Ecologically or Biologically Significant Area (EBSA) by the Convention on Biological Diversity and met the following criteria:</p> <ul style="list-style-type: none"> • Uniqueness or rarity (High ranking) • Special importance for the life-history stages of species (No information) • Importance for threatened, endangered or declining species and/or habitats (No information) • Vulnerability, fragility, sensitivity, or slow recovery (High ranking)
--	--

	<ul style="list-style-type: none"> • Biological productivity (No information) • Biological diversity (No information) • Naturalness (High ranking). <p><u>Fishing history</u></p> <p>The only trawl shots undertaken here have been on the flat sedimented bottom at around 1000m (SIODFA 2016). At least two fishing vessels are believed to have collected data in the past (SIODFA 2016). It is reported that there has been past fishing by Soviet/Ukrainian vessels across the flats about the Broken Ridge area.</p> <p>CBD (2015) reports that a single bottom trawl shot was carried out on July 8th 1997, which landed at 31° 43.54' S, 95° 13.7'E at 795 m and immediately came fast. A catch of 3.5 tonnes of dead brain coral was taken, which destroyed the net. This identified the type of habitat as coral reef rather than rocky knoll, and no further fishing activity was undertaken on this type of feature.</p> <p><u>Other information to support designation</u></p> <p>Industry members from Australia, the Cook Islands and Japan support the designation of Fools' Flat feature. No trawling by SIODFA vessels is permitted.</p>
Social, cultural and economic interests	It is possible that designation could have adverse social, cultural or economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded small.
Risks to the proposed area	Fishing within this proposed area with all gears could detrimentally impact the biodiversity and scientific interest of this area. SIOFA should consider closure to all fishing.
Review periods	The proposal documents and provides information to support a closure. It is recommended that this designation be reviewed at least every 10 years, or more frequently if new information becomes available that enhances or degrades the justification for its protection.
Outline of monitoring and/or research needed	A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation. Non-extractive research activities such as ROV monitoring of the area would be beneficial.

*Proposal template compiled and updated from working paper: SC-03-06.3.2 (07)

Recommendation	Recommended for permanent closure due to the presence of unique habitats, VME indicator taxa, likely presence of deepwater elasmobranchs and long history of closure despite historic commercial fishing activities in the past.
-----------------------	--

Table 11: Protected area designation proposal for Gulden Draak

<p>Name</p>	<p>Gulden Draak</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: Latitude 28° 00' S, 98° 00' E and 29° 00' S and 99° 00' E. Area: 10,867 km²</p> <div style="text-align: center;"> <p>BPA - Gulden Draak Cook Islands voluntary</p>  </div> <p style="text-align: center;">Figure 14: Bathymetry of Gulden Draak</p> <div style="text-align: center;"> <p>BPA - Gulden Draak (cross section profile)</p>  </div> <p style="text-align: center;">Figure 15: Cross section of depth profile of Gulden Draak</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The protection of potential VMEs; • the protection of its bioregional representativeness; and • the protection of its unique geological/geomorphological representativeness.
<p>Criteria that the protected area meets</p>	<p>The proposed area meets the following criteria:</p> <p>2c. Bioregional representation – Area with a comparatively higher degree of naturalness because of the lack, or low level of, human-induced disturbance or degradation, as an example considering historical fishing activities.</p>

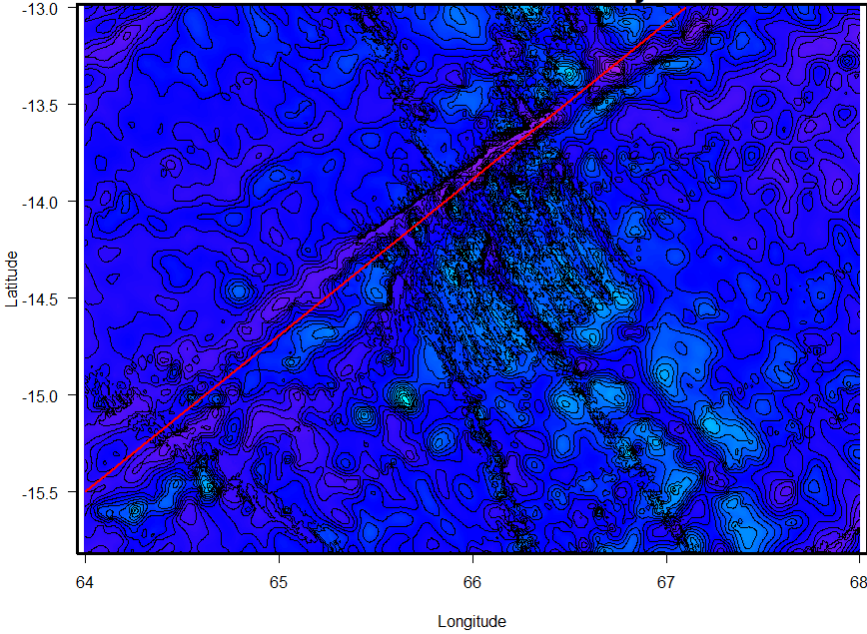
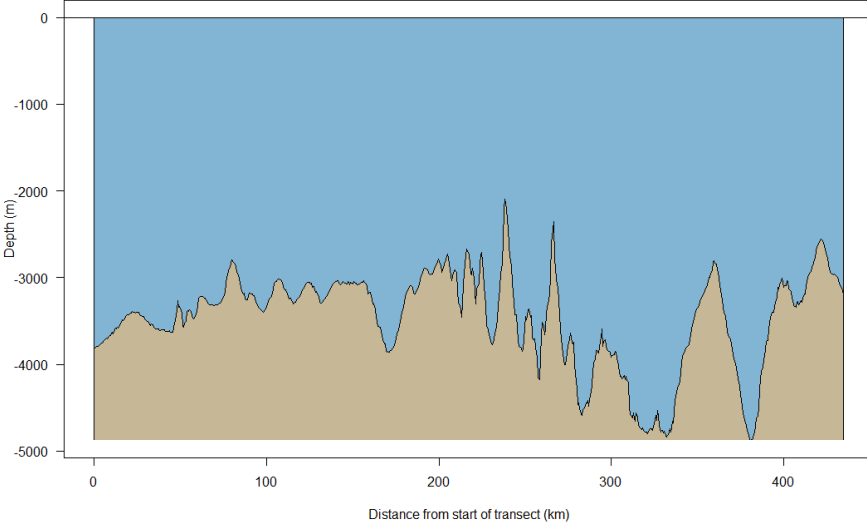
	<p>3a. Geographic and/or unique representation – The area proposed is known to contain unique or unusual geomorphological features that fishing operations may damage.</p> <p><u>Feature description</u></p> <p>Gulden Draak is a large broken ridge and plateau north of Broken Ridge (Figures 1 and 2). It covers an area in excess of 10 000 km². The location of the Gulden Draak seafloor feature is to the extreme northeast of the area that has been the subject of exploratory fishing. This north-easterly location could result in its benthos being atypical of that found to the south and west.</p> <p>High resolution gravity modelling of the seamount was undertaken by Scripps Institution and published in 2014 (Sandwell et al. 2014). Detailed sea-floor maps were made during the search for the missing Malaysia Airlines Flight MH370 and included the Golden Draak Knoll.</p> <p><u>Bioregional and geographic/geological representation</u></p> <p>Gulden Draak Knoll comprises complex geological and geomorphological characteristics and is regarded as a microcontinent (Gardner et al. 2015; Whittaker et al. 2016). Gardner et al. (2015) analysed dredged samples from the Gulden Draak Knoll which demonstrated that it is a submarine rifted continental fragment that lies at the boundary between the western Perth Abyssal Plain and Wharton Basin, Indian Ocean. Whittaker et al. (2016) report on the geological processes required to calve the Batavia and Gulden Draak microcontinents in the Cretaceous Indian Ocean.</p> <p>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). This research showed that this seafloor feature has particularly interesting characteristics pointing to a terrestrial origin (Frey et al. 2000). The rocks collected from this seafloor feature are the same as those found on continents, with some containing fossils.</p> <p><u>Biodiversity representation</u></p> <p>Little appears to be documented about the faunal characteristics of this area.</p> <p><u>Fishing history</u></p> <p>Although the area is considered suitable for trawl fishing, because the region's distance from other fishing zones in the Indian Ocean it would have only rarely been visited over the past decade (SIODFA 2016). Despite this some information may be available from a range of fishing vessels that trialled fishing here in the past. These vessels included the <i>F.Vs. Will Watch, Nikko Maru, Southern Champion</i> and <i>Austral Leader</i>.</p> <p>Commercial fishes found in this area reportedly include several oreo species (SIODFA 2016). Bottom water temperatures are low. Some commercial logbook information and acoustic records are available for this region and future work should be directed at documenting relevant fisheries information for this area. Despite this, it is believed that the benthic area of this area should be relatively pristine (SIODFA 2016).</p>
--	---

	<p><u>Other information to support designation</u></p> <p>Industry members from Australia, the Cook Islands and Japan support the designation of the Gulden Draak feature. No trawling by SIODFA vessels is permitted.</p>
Social, cultural and economic interests	It is possible that designation could have adverse social, cultural or economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded small.
Risks to the proposed area	Fishing within this proposed area with all gears could detrimentally impact the representativeness of this area. SIOFA should consider closure to all fishing.
Review periods	The scientific evidence to support a closure in accordance with the requirements of the precautionary approach. It is recommended that this designation be reviewed within 10 years, or sooner if new information becomes available that enhances or degrades the justification for its protection.
Outline of monitoring and/or research needed	<p>A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation.</p> <p>Non-extractive research activities such as ROV monitoring of the area would be beneficial.</p>

*Proposal template compiled and updated from working paper: SC-03-06.3.2 (08)

Recommendation	Recommended for permanent closure due to the likely presence of VME indicator taxa and deepwater elasmobranchs. The remote nature of this area as well as the long history of closure suggest retaining this area as closed would be beneficial.
-----------------------	--

Table 12: Protected area designation proposal for Mid-Indian Ridge

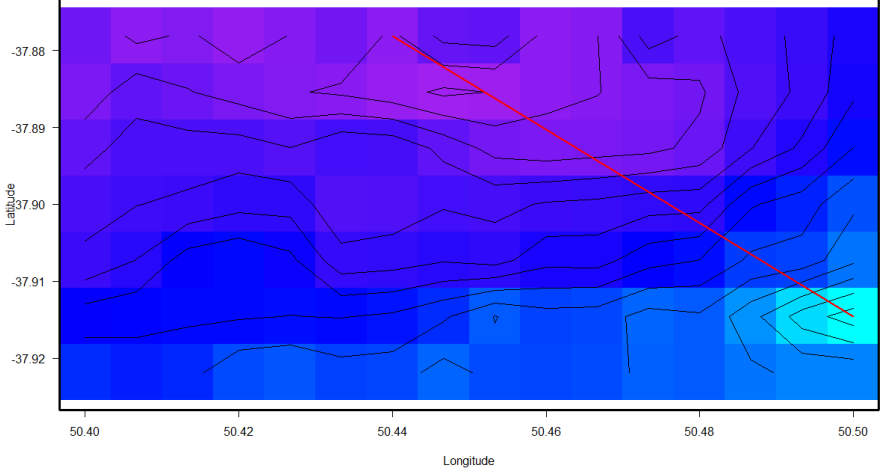
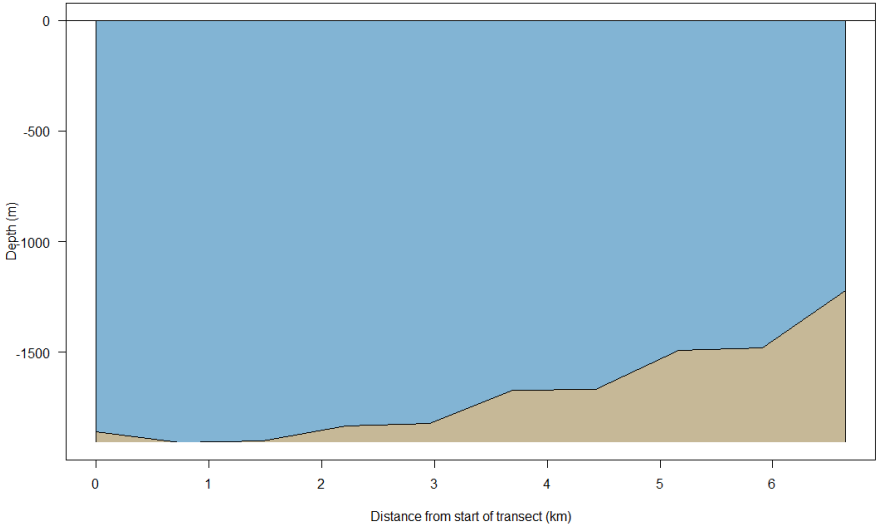
<p>Name</p>	<p>Mid-Indian Ridge</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: 13°00'S - 64°00'E : 15°50'S - 68°00'E Area: 135,688 km²</p> <div style="text-align: center;"> <p>BPA - Mid-Indian Ridge Cook Islands voluntary</p>  </div> <p style="text-align: center;">Figure 16: Bathymetry of Mid-Indian Ridge</p> <div style="text-align: center;"> <p>BPA - Mid Indian Ridge (cross section profile)</p>  </div> <p style="text-align: center;">Figure 17: Cross section of depth profile of Mid-Indian Ridge</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The objective for designation of this proposed protected area is the protection of its unique geographic representation; and • the protection of potential VMEs.

<p>Criteria that the protected area meets</p>	<p><u>This protected area meets the following criteria:</u></p> <ul style="list-style-type: none"> • 3a. Geographic and/or unique representation – The area proposed is known to contain unique or unusual geomorphological features that fishing operations may damage. <p><u>Feature description</u></p> <p>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 seamounts rising to 650 m in warm waters (SIODFA 2016). Specific hills occur in the region of 15°39’ S, 64°14’E.</p> <p>This area is assumed to be biologically pristine and an area where corals are vulnerable to bycatch from deepwater fishing operations (SIODFA 2016). The area is proposed by SIODFA (2016) as representative of the tropical bioregion of the Southern Indian Ocean, complementing the Prince Edward Island Marine Protected Area and the Heard Island and McDonald Islands World Heritage Area.</p> <p><u>Geographic and geomorphological representation</u></p> <p>The evidence provided for protection of the seamounts as geographically significant is more compelling than the biological case for protected area 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 SC (SC-01- INFO-26).</p> <p><u>Fishing history</u></p> <p>There is an existing bottom longline fishery in this area including fishing effort from vessels from Australia and the European Union.</p>
<p>Social, cultural and economic interests</p>	<p>It is possible that designation could have adverse social, cultural or economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded small.</p>
<p>Risks to the proposed area</p>	<p>Fishing within this proposed area with all gears could detrimentally impact the feature. SIOFA should consider closure to all fishing.</p>
<p>Review periods</p>	<p>The scientific evidence to support a closure is uncertain and it is proposed that area be closed permanently in accordance with the requirements of the precautionary approach. It is recommended that this designation be reviewed after 10 years, or sooner if new information becomes available that enhances or degrades the justification for its protection.</p>
<p>Outline of monitoring and/or research needed</p>	<p>A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation.</p> <p>Non-extractive research activities such as ROV monitoring of the area would be beneficial.</p>

*Proposal template compiled and updated from working paper: SC-03-06.3.2 (09)

<p>Recommendation</p>	<p>Recommended for permanent closure to trawl fishing due to its geographical significance the presence of VME indicator taxa and length of the unfished period.</p>
------------------------------	--

Table 13: Protected area designation proposal for Middle of What

<p>Name</p>	<p>Middle of What</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: Latitude 37° 54' S, 50° 23' E and 37° 56.5' S and 50° 27' E. Area: 6084 km²</p> <div style="text-align: center;"> <p>BPA - Middle of What (MoW) (Current interim in CMM-01)</p>  </div> <p style="text-align: center;">Figure 18: Bathymetry of Middle of What</p> <div style="text-align: center;"> <p>BPA - Middle of What (cross section profile)</p>  </div> <p style="text-align: center;">Figure 19: Cross section of depth profile of Middle of What</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The objective for this area is the protection of its bioregional representativeness; and • the protection of potential VMEs.
<p>Criteria that the protected area meets</p>	<p>The proposed area meets the following criteria:</p> <p>2b. Bioregional representation – Area is known to contain unique, rare or distinct, habitats or ecosystems that bottom fishing operations will disturb.</p> <p>Feature description</p>

	<p>The location of the MOW seafloor feature is towards the southern end of the South Indian Ridge in waters forming a dynamic boundary region between sub-Antarctic and sub-tropical waters and has a deep summit (~900-1000m depth). Strong currents sweep over the seamount. It is a spreading centre with seamounts and ridges with depths from 4500 m to 180 m. This area was surveyed by the R.V. James Cook during November - December 2011 and by RV <i>Dr Fridtjof Nansen</i> in 2009 (Rogers et al. 2009).</p> <p>Read and Pollard (2017) provide details of the physical oceanography of the MoW feature. Pollard and Read (2017) provide details of the circulation and stratification on and around the feature.</p> <p><u>Bioregional and biodiversity representation</u></p> <p>The area has been proposed as an Ecologically and Biologically Significant Area (EBSA) for consideration by the Convention on Biological Diversity (Rogers No Date). The proposal notes that this is the only known example of a seamount with cold-water coral reef habitat lying in the boundary region of sub-Antarctic and sub-tropical water masses in the Southern Indian Ocean. The water mass overlying the seamount hosts pelagic communities typical of sub-tropical waters. The benthic fauna varies depending on depth on the seamount and also the substratum slope and composition. Cold water coral reef is located on the peak of the seamount at ~1,000m depth.</p> <p>The proposal notes that the main framework building species appears to be <i>Solenosmilia variabilis</i>. The framework is largely comprised of dead coral and is highly degraded probably as a result of trawling damage. However, more intact stony coral reef is present on parasitic sub-cones located on the Southern flanks of the seamount. Very broken ground around these sub-cones also host coral garden habitat with large (2m tall) bamboo corals and stylasterids particularly notable. Lantern sharks are very abundant around Middle of What Seamount, especially around the sub-cones, but this is from a single set of observations. Live colonies of the framework-building species are also present. The coral reef hosts high densities of a range of other coral species, particularly octocorals and sponges. Glass sponges also occur at high density.</p> <p>The proposal notes evidence of fishing on the seamount in the form of highly degraded and damaged coral habitat on the summit of the main feature of the seamount to the extent that this area could be viewed as compromised as an area for conservation. However, the parasitic cones located on the southern flanks of the seamount host intact cold-water coral reef and rough ground to the south and also the northeastern part of the seamount host extensive coral garden habitat. High numbers of sharks were observed in the southern area.</p> <p>The benthic habitats documented on this seamount includes a very high diversity of species, especially corals and coral associates. Rogers (No Date) noted that this diversity is currently being analysed in various laboratories in the UK, France, Australia and the USA. Preliminary results for, for example, ophiuroids, indicate 50% of the species are new to science.</p> <p>The EBSA proposal notes the area as meeting the following EBSA criteria:</p> <ul style="list-style-type: none">• Uniqueness or rarity (High ranking)• Special importance for the life-history stages of species (Medium ranking)
--	---

	<ul style="list-style-type: none"> • Importance for threatened, endangered or declining species and/or habitats (High ranking) • Vulnerability, fragility, sensitivity, or slow recovery (High ranking) • Biological productivity (High ranking) • Biological diversity (High ranking) • Naturalness (Medium ranking). <p><u>Scientific interest</u></p> <p>The MoW feature has been the subject of a number of research cruises, cited herein.</p> <p><u>Fishing history</u></p> <p>This general area tends to be an area of much past fishing activity (SIODFA 2016). This fishing ground was one targeted by inexperienced vessels during the ‘race for fish’ which occurred in the period of 2000-2001, but there has been limited fishing since then (SIODFA 2016).</p> <p><u>Other information to support designation</u></p> <p>Industry members from Australia, the Cook Islands and Japan support the designation of the MOW feature. No trawling by SIODFA vessels is permitted.</p>
Social, cultural and economic interests	It is possible that designation could have adverse social, cultural or economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded small.
Risks to the proposed area	Fishing within this proposed area with all gears could detrimentally impact the representativeness of this area. SIOFA should consider closure to all fishing.
Review periods	The proposal documents and provides information to support a closure. It is recommended that this designation be reviewed at least every 10 years, or more frequently if new information becomes available that enhances or degrades the justification for its protection.
Outline of monitoring and/or research needed	A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation. Non-extractive research activities such as ROV monitoring of the area would be beneficial.
*Proposal template compiled and updated from working paper: SC-03-06.3.2 (10)	
Recommendation	Recommended for permanent closure due to the presence of unique habitats, VME indicator taxa, high density of deepwater elasmobranchs, endemic species and long history of closure following historic high fishing effort.

Table 14: Protected area designation proposal for Rusky Knoll

<p>Name</p>	<p>Rusky Knoll</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: Latitude 31° 20' S, 94° 55' E and 31° 30' S and 95° 00' E. Area: 147 km²</p> <div data-bbox="718 448 1101 1153" data-label="Figure"> </div> <p>Figure 20: Bathymetry of Rusky Knoll</p> <div data-bbox="446 1254 1332 1848" data-label="Figure"> </div> <p>Figure 21: Cross section of depth profile of Rusky Knoll</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The objective for this area is the protection of its bioregional representativeness; and • the protection of potential VMEs.

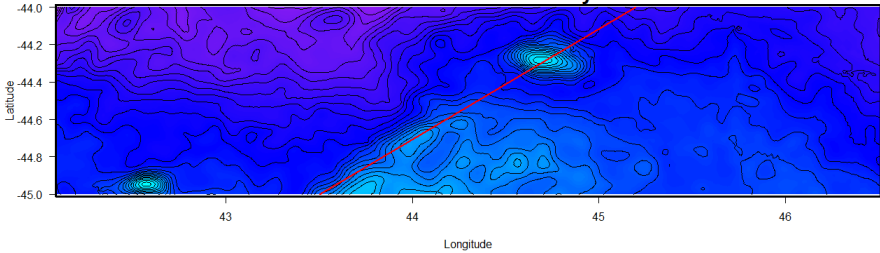
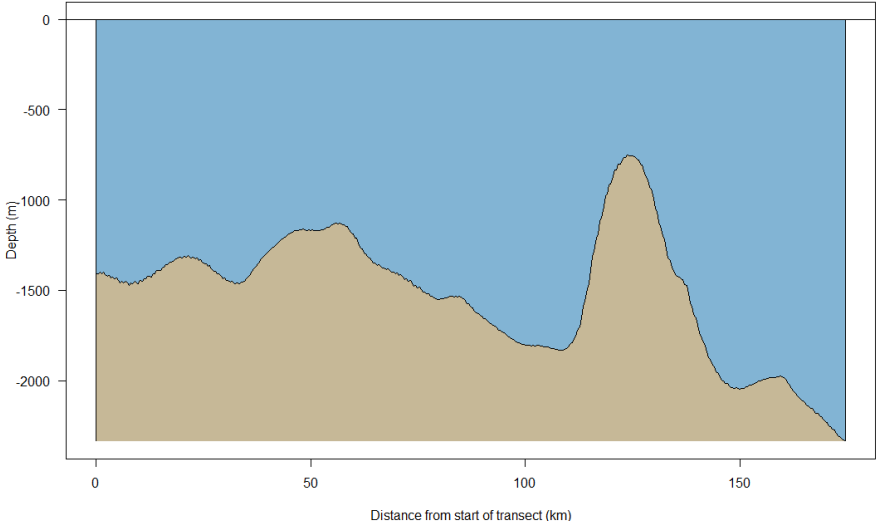
<p>Criteria that the protected area meets</p>	<p><u>The proposed area meets the following criteria:</u></p> <p>2b. Bioregional representation – The area is known to contain unusual, rare or distinct habitats or ecosystems that bottom fishing operations will disturb.</p> <p><u>Feature description</u></p> <p>Rusky Knoll rises in the middle part of Broken Ridge at 95° E, rising from the base seafloor of the ridge at 1200 m, to a depth of 580 m and is the only known knoll that occurs on the central ridge (CBD 2015). The knoll is unique, being the only such structure that does not arise on the edge of the ridge, as do several other knolls that exist on the ridge (CBD 2015).</p> <p>The location of the Rusky Knoll seafloor feature is to the northeast of the area that has been the subject of exploratory fishing (SIODFA 2016). CBD (2015) notes that the entire Broken Ridge Plateau was habitat mapped by the University of Hawaii Mapping Group under contract to Sealord Group New Zealand, using MR1 sidescan sonar in 1997. Most of the ridge is continuous and overlain with sand and sediments, but local areas of rocky, coral garden and knoll/bank habitat exist. Several knolls were identified, with Rusky as the most prominent. It is close to the area surveyed by Russian research vessels in the 1970s (Kotlyar 1980), where orange roughy (<i>Hoplostethus atlanticus</i>) were identified. Orange roughy in small numbers have also been caught on Rusky (CBD 2015).</p> <p><u>Bioregional and biodiversity representation</u></p> <p>CBD (2015) note that small alfonso (<i>Beryx splendens</i>) and amourhead (<i>Pseudopentaceros</i> spp) are found on the knoll. This is the only known area containing black coral on Broken Ridge (FAO 2006), which are slow growing and vulnerable to fishing impact (Rogers et al 2008; FAO 2009). The area has been declared a Benthic Protected Area by SIODFA (CDB 2015; SIODFA 2016).</p> <p>SIODFA (2016) note that the area could be expected to have similar benthos to the nearby Gulden Draak seafloor feature, both of which are in the Broken Ridge area. This north-easterly location could result in its benthos being atypical of that found to the south and west (SIODFA 2016).</p> <p>Rusky Knoll is listed as an Ecologically or Biologically Significant Area (EBSA) by the Convention on Biological Diversity was assessed as meeting the following criteria:</p> <ul style="list-style-type: none"> • Uniqueness or rarity (High ranking). • Special importance for the life-history stages of species (No information) • Importance for threatened, endangered or declining species and/or habitats (No information) • Vulnerability, fragility, sensitivity, or slow recovery (High ranking) • Biological productivity (No information) • Biological diversity (No information) • Naturalness (Low ranking). <p><u>Fishing history</u></p> <p>CBD report that some bottom-trawling has occurred on the knoll, and black coral (Cnidaria) has been identified from catches made. SIODFA (2016) note that fishing on the Rusky Knoll is restricted to one, possibly two tracks on the feature in the depth range 400 – 500 m and consequently, most of the feature should not have</p>
--	---

	<p>been affected by demersal trawling. It is reported that there has been past fishing by Soviet/Ukrainian vessels across the flats about the Broken Ridge area (Romanov 2013).</p> <p><u>Other information to support designation</u></p> <p>Industry members from Australia, the Cook Islands and Japan support the designation of this feature. No trawling by SIODFA vessels is permitted.</p>
Social, cultural and economic interests	It is possible that designation could have adverse social, cultural or economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded small.
Risks to the proposed area	Fishing within this proposed area with all gears could detrimentally impact the representativeness of this area. SIOFA should consider closure to all fishing.
Review periods	The scientific evidence to support a closure in accordance with the requirements of the precautionary approach. It is recommended that this designation be reviewed within 5 years, or sooner if new information becomes available that enhances or degrades the justification for its protection.
Outline of monitoring and/or research needed	<p>A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation.</p> <p>Non-extractive research activities such as ROV monitoring of the area would be beneficial.</p>

*Proposal template compiled and updated from working paper: SC-03-06.3.2 (11)

Recommendation	Recommended for permanent closure due to the presence of VME indicator taxa, likely deepwater elasmobranchs and long period of closure following historic fishing effort.
-----------------------	---

Table 15: Protected area designation proposal for South Indian Ridge (aka Del-Cano Rise)

<p>Name</p>	<p>South Indian Ridge (aka Del-Cano Rise)</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: 44°00'S, 40.878° 00'E, 44°00'S, 46.544° 00'E; 45°00'S, 42.124° 00'E, 45°00'S 45.711° 00'E Area: 81,439 km²</p> <div style="text-align: center;"> <p>BPA - South Indian Ridge Cook Islands voluntary</p>  </div> <p style="text-align: center;">Figure 22: Bathymetry of South Indian Ridge (aka Del-Cano Rise)</p> <div style="text-align: center;"> <p>BPA - South Indian Ridge (cross section profile)</p>  </div> <p style="text-align: center;">Figure 23: Cross section of depth profile of South Indian Ridge (aka Del-Cano Rise)</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The protection of potential VMEs; • Protection of its unique bioregional representativeness; • Protection of its geographic representation; and • Protection of its biodiversity.
<p>Criteria that the protected area meets</p>	<p><u>This proposed protected area meets the following criteria:</u></p> <ul style="list-style-type: none"> • 2b. Bioregional representation – Area is known to contain unique, rare or distinct, habitats or ecosystems that bottom fishing operations will disturb. • 3a. Geographic representation – The area proposed is known to contain unique or unusual geomorphological features that fishing operations may damage

- 4b. Biodiversity representation – The area is known to contain high diversity of ecosystems, habitats, communities or species, or has higher genetic diversity.

Feature description

The Southern Indian Ridge (Del Caño Rise) feature is 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.

Geographic representation

The Del Caño Rise has diverse and complex bathymetry, which may be a major factor 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. Lombard et al. (2006) 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 1800 m isobath, i.e. the upper-lower slope division resulting in an area of high zooplankton biomass.

Benthic surveys have been conducted on the shelf between the two Prince Edward islands (Beckley & Branch 1992; Branch et al. 1993), which may provide indications of the benthic characteristics of the broader area.

Fisher and Goodwillie (1998) provide additional detail on the physiography of the region, and note its unique geographic and geological characteristics.

Fishing history

SIODFA (2016) reported that the area is untrawled but that it is also the location of a productive fishery. Some historical fishing data may be available (e.g. Romanov 2003).

Biodiversity and bioregional representation

Currently the Prince Edward and Crozet Islands (to the west and east, respectively) are protected as a nature reserve to safeguard the millions of birds and mammals that breed there every year. It is reported that there has been collaboration between South African and French governments, NGOs and

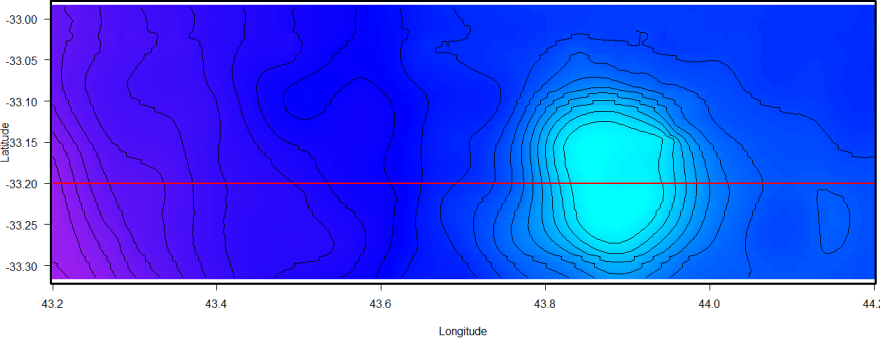
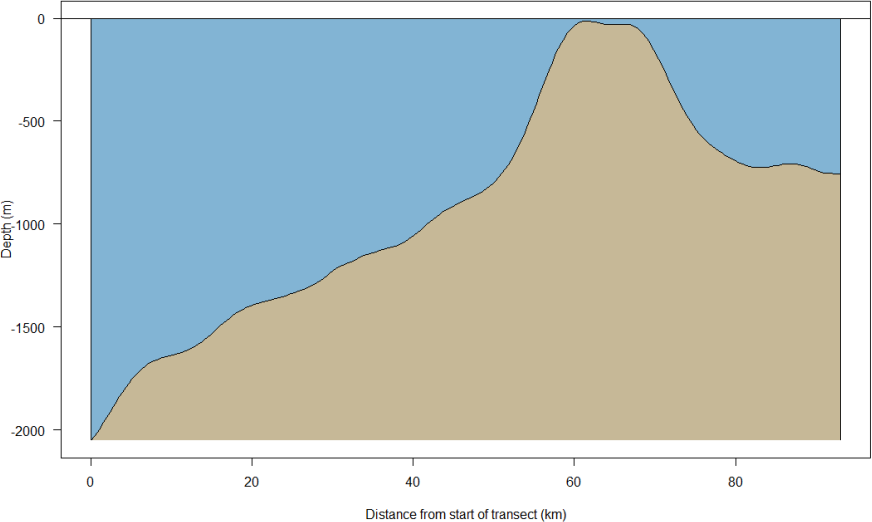
	<p>scientists to protect the waters around the Prince Edward and Crozet Islands (SIODFA 2016). Rare species have been reported foraging in these regions, and it is documented to be a driving area in the productivity of the Southwest Indian Ocean (SIODFA 2016).</p> <p>Gon & Heemstra (1990) provide distribution data for seven fishes that can be expected to inhabit this area. Patagonian toothfish (<i>Dissostichus eleginoides</i>) are present in adjacent areas (Lombard et al. 2007), so are likely to be present in the proposed area.</p> <p>Lombard et al. (2007) and Nel and Omardien (2008) note that the southern region of this area, along the ridge of the Del Caño Rise (and between the protected areas of the Prince Edward Island to the west and the Crozet Islands to the east) provides a movement and foraging axis for seabirds, specifically white-chinned petrels (<i>Procellaria aequinoctialis</i>), wandering albatrosses and sooty (<i>Phoebetria fiscal</i>). They also note the importance of nesting the proposed Prince Edward Island marine protected area within a broader management framework in the wider region. Lombard et al. (2007) also map the Del Caño ridge as a foraging area for southern elephant seals.</p> <p>Koubbi et al. 2012 note that the Agulhas Return Current has a strong influence on this region and that the latitudinal zonation of bioregions according to frontal zones may be influenced by climate change. These authors note that this may have consequences for marine bird and mammal populations as it will change the habitat of their main pelagic prey species (e.g. euphausiids, squids, mesopelagic fish, etc.). Koubbi et al. (2012) described ichthyofauna and benthos in the region as being characteristic of the subantarctic zone with some species being endemic but note that cryptic benthic species had not yet been studied.</p> <p>The French and South African islands to the east and west support colonies of seabirds and seals. The Crozet and Prince Edward Islands together host the entire population of Crozet shag, about 70% of the world population of wandering albatross, 54% of king penguin, 33% of Indian yellow-nosed albatross, 33% of subantarctic fur seal, 27% of sooty albatross and 21% of the world's southern rockhopper penguin (Koubbi et al. 2012).</p> <p>The high productivity in the vicinity of the islands, together with the large aggregations of seabirds and seals found at the islands, reportedly attract various other animals including several cetacean species, to their vicinity (Koubbi et al. 2012). The populations of several seabirds that breed at the islands have decreased and there is evidence that decreases of albatrosses and petrels have been influenced by bycatch mortality in fisheries (Koubbi et al. 2012). Although the islands themselves are protected areas and fishing is currently excluded within 12 nautical miles of the islands, many of the seabirds and seals range well beyond the immediate precincts of the islands (Koubbi et al. 2012).</p> <p>The role this area plays in the pelagic ecosystem and where it is situated between two existing protected areas, as well as its potential to have unique benthic habitats that fishing operations would disturb, is why it is most fitting to criteria 2b. Bioregional representation.</p> <p>Prince Edward Islands, Del Cano Rise and Crozet Islands is listed as an Ecologically or Biologically Significant Area (EBSA) by the Convention on Biological Diversity and met the following criteria:</p>
--	--

	<ul style="list-style-type: none"> • Uniqueness or rarity (High ranking) • Special importance for the life-history stages of species (High ranking) • Importance for threatened, endangered or declining species and/or habitats (High ranking) • Vulnerability, fragility, sensitivity, or slow recovery (High ranking) • Biological productivity (High ranking) • Biological diversity (High ranking) • Naturalness (High ranking).
Social, cultural and economic interests	<p>Some historical fishing data may be available (e.g. Romanov 2003), which may assist with understanding social, cultural and/or economic costs associated with designating this as a protected area. SIODFA (2016) reported that the area is untrawled but that it is also the location of a productive fishery. It is possible that designation could have adverse social, cultural or economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded small.</p> <p>Given the size of the area and the significant longline fishery in the area this BPA may need to be a benthic trawl closure only.</p>
Risks to the proposed area	<p>Fishing within this proposed area with all gears could detrimentally impact the biodiversity and scientific interest of this area. SIOFA should consider closure to all fishing.</p>
Review periods	<p>The proposal documents and provides information to support a closure. It is recommended that this designation be reviewed at least every 10 years, or more frequently if new information becomes available that enhances or degrades the justification for its protection.</p>
Outline of monitoring and/or research needed	<p>A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation.</p> <p>Non-extractive research activities such as ROV monitoring of the area would be beneficial.</p>

*Proposal template compiled and updated from working paper: SC-03-06.3.2 (06)

Recommendation	<p>Recommended for permanent closure due to the presence of unique habitats, potential VME indicator taxa and likely presence of deepwater elasmobranchs. This area is highly significant habitat for seabirds.</p>
-----------------------	---

Table 16: Protected area designation proposal for Walter’s Shoal

<p>Name</p>	<p>Walter’s Shoal</p>
<p>Details of the proponents</p>	<p>Australia, Cook Island, Japan and SIODFA</p>
<p>Geographic description</p>	<p>Coordinates: 33° 00’N-43° 10’W : 33° 20’S -44°10’E Area: 3,443 km²</p> <div style="text-align: center;"> <p>BPA - Walters Shoal (Current interim in CMM-01)</p>  </div> <p style="text-align: center;">Figure 24: Bathymetry of Walter’s Shoal</p> <div style="text-align: center;"> <p>BPA - Walters Shoal (cross section profile)</p>  </div> <p style="text-align: center;">Figure 25: Cross section of depth profile of Walter’s Shoal</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • The protection of potential VMEs; • the protection of its bioregional representativeness; • the protection of biodiversity; and • protection of an area of special scientific interest.
<p>Criteria that the protected area meets</p>	<p><u>This area meets the following criteria:</u></p> <ul style="list-style-type: none"> • 2b. Bioregional representation – The area is known to contain unusual, rare or distinct habitats or ecosystems that bottom fishing operations will disturb. • 4b. Biodiversity representation – The area is known to contain high diversity of ecosystems, habitats, communities or species, or has higher genetic diversity.

- 5. Scientific interest – The area, excluding existing fishing grounds, has 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.

Feature description

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 from 4500 m to within 15 m of the surface (Rogers 2012).

Biodiversity and bioregional representation

Walters Shoal was sampled in 1964 during the International Ocean Expedition by the R/V *Anton Bruun*, which led to the discovery of several invertebrates (Payne 2015). Clark (1972) described a new endemic sub- species of crinoid, *Comanthus wahlbergi tenuibrachia* (currently *Comanthus wahlbergi*). Kensley (1975) described a new endemic isopod, *Jaeropsis waltervadi*. Kensley (1969, 1981) described an endemic species of shrimp, *Alpheus waltervadi*, and the presence of four other decapods. Various corals were collected in 1976 using the French vessel *Marion Dufresne* (Zibrowius 1982). Many fishery resources (and some crustaceans) were also found by French and Soviet vessels (Collette and Parin 1991; Romanov 2003; Rogers et al. 2009). Collette and Parin (1991) describe the discovery of fishery resources in more detail. Nesis (1994) describes cephalopod species found in on, over or around the seamount. A number of endemic fish species were discovered and described by Poss and Collette (1990), Collette et al. (1991) and Iwamoto et al. (2004). Early work on the distribution patterns of Walters Shoal benthic and water-column fauna were undertaken (e.g. Parin et al. 1993 and Detonova and Sagaidachny (1994) but these are reportedly inaccessible (Payne 2015).

More recently, a commercial fishing trip on board the Spanish vessel *Iannis* led to the discovery of a new species of lobster, *Palinurus barbarae*, as described by Groeneveld et al (2006). The research vessel *Dr Fridtjof Nansen* undertook a research cruise in 2009 aimed at understanding pelagic biology and physical oceanography of the region, and included a sampling point near the Walters Shoal seamount (Rogers et al. 2009).

Le Corre et al. (2012) note that Walters Shoal is an important foraging ground for the red-tailed tropicbird and Barau's petrel.

It provides a habitat for a variety of whale species, including sperm whales, humpback whales and short-finned whales (Collette and Parin 1991; Rogers et al. 2009; Shotton 2006).

Scientific interest

There is a long history of scientific research associated with the Walters Shoal feature (see Payne et al. 2015 for a comprehensive review). More recently, 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

	<p>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).</p> <p><u>Fishing history</u></p> <p>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 areas of sandy bottom (SIOFA 2016).</p> <p>Romanov (2003) provides a summary and review of Russian and Ukrainian scientific and commercial fishing operations on the deepwater ridges of the southern Indian Ocean.</p> <p>There is an existing bottom longline fishery in this area including fishing effort from vessels from Australia and the European Union.</p>
Social, cultural and economic interests	<p>Some historical fishing data are available (e.g. Romanov 2003), which may assist with understanding social, cultural and/or economic costs associated with designating this as a protected area. The area is the location of a productive fishery. It is possible that designation could have adverse social, cultural or economic impacts in terms of forgone opportunity for fishing. However, given, the very small area relative to the entire SIOFA fishing areas available and the long history of voluntary closure this lost opportunity is conceded small.</p>
Risks to the proposed area	<p>Fishing within this proposed area with all gears could detrimentally impact the biodiversity and scientific interest of this area. SIOFA should consider closure to all fishing.</p>
Review periods	<p>The proposal documents and provides information to support a closure. It is recommended that this designation be reviewed at least every 10 years, or more frequently if new information becomes available that enhances or degrades the justification for its protection.</p>
Outline of monitoring and/or research needed	<p>A desk-top compilation of publications from research undertaken within this area would assist with future reviews of the designation.</p> <p>Non-extractive research activities such as ROV monitoring of the area would be beneficial.</p>

*Proposal template compiled and updated from working paper: SC-03-06.3.2 (12)

Recommendation	<p>Recommended for permanent closure to trawl fishing due to the presence of VME indicator taxa, likely presence of deepwater elasmobranchs and its long history of closure and the proximity to major fishing grounds.</p>
-----------------------	---

Discussion

The BPAs considered here are all unique and have a long history of closures either through CMM 01 (2023 and its predecessors) or through voluntary closures. Collectively these areas make up only 0.82% of the SIOFA area. The current interim SIOFA BPAs specified in CMM 01 (2023) make up 0.09% of the area and the voluntary closed areas make up 0.73% of the area.

While this constitutes a very small proportion of the entire area these areas represent areas that are geographically unique and contain habitats that contain VME indicator taxa as well as deep water elasmobranchs or are areas that are critical feeding areas for seabirds all of which require protection.

While some of these areas have not been well researched the topography alone strongly suggests that protecting them would provide long-term protection for the habitats represented within them.

Three of the areas under consideration (*Coral, Southern Indian Ridge and Walters Shoal*) have ongoing bottom longline fisheries within them. Bottom longlining is thought to have less of an impact than bottom trawling and could be continued in these three areas. Bottom trawling and to a lesser extent benthic-pelagic trawling both can come into contact with the benthos and could cause damage to sensitive benthic fauna. As such we believe that these three areas would benefit from having trawl closures mandated.

Conclusions

While the areas under consideration have only either interim or voluntary protection they have been closed in reality for at least 17 years. As deep-sea species tend to be fragile, slow growing and long lived offering them small areas for long-term protection where they can exist undisturbed will provide conservation benefits. This move will effectively formalise existing practice and provide surety for the conservation efforts of SIOFA as well as clarity for the fishing industry on their status.

It is therefore **recommended** that SIOFA designate *Atlantis Bank, Banana, Bridle, East broken Ridge, Fools Flat, Gulden Draak, Mid-Indian Ridge, Middle of What and Rusky Knoll* as permanent benthic Protected Areas and that *Coral, Southern Indian Ridge and Walters Shoal* be closed to trawl fishing. We **recommend** that the workshop recommend these areas for BPA designation as outlined above to the SC10.

Acknowledgments

This work relied heavily on the previous analyses presented by SIOFA and the Australian delegation to SC3. We thank them for their historic efforts to collate the initial information presented here.

References

Althaus F, Williams A, Schlacher TA, Kloser RJ, Green MA (2009) Impacts of bottom trawling on deep-coral ecosystems of seamounts are long-lasting. *Marine Ecology Progress Series* 397: 279– 294.

Ansorge, I.J. & J.R.E. Lutjeharms 2002. The hydrography and dynamics of the ocean environment of the Prince Edward Islands. *J. Mar. Systems* 37: 107-127. 1990.

Baines, A.G., M.J. Cheadle, H.J.B. Dick, A.H. Scheirer, B.E. John, N.J. Kusnir & T. Matsumoto. 2003. Mechanism for generating the anomalous uplift of oceanic core complexes: Atlantis Bank, southwest Indian Ridge. *Geol. Soc. Am.* 31(12):1105-1108.

CBD 2015. Ecologically or Biologically Significant Areas (EBSAs): Fool's Flat, published: 13 Jun 2015, available at <https://chm.cbd.int/database/record?documentID=204021>

CBD 2015. Ecologically or Biologically Significant Areas (EBSAs): Rusky Knoll, available at <https://chm.cbd.int/database/record?documentID=204020>

Clark AM, 1972. Some crinoids from the Indian Ocean. *Bulletin of the British Museum (Natural History)*, 24(2), pp. 73-156.

Collette, B.B. & N.V. Parin. 1991. Shallow-Water Fishes of Walters Shoals, Madagascar Ridge. *Bulletin of Marine Science*, Volume 48, Number 1, January 1991, pp. 1-22(22)

Detinova, N.N. & A. Yu Sagaidachny. 1994. Vertical distribution of bottom fauna on the slope of the Walters Shoal (Madagascar Ridge). *Trans. of the P.P. Shirshov Inst. Oceanology.* 129:17-30.

Dick, H.J.B., J. Lian & H. Schouten 2003. An ultraslow-spreading calss of ocean ridge. *Nature* 426:405-412. Dick, H.J.B. 1998. Indian Ocean's Atlantis Bank Yields Deep-Earth Insight. *OCEANUS* 41(1):29-32. Gon, O. & P.C. Heemstra (eds) 1990. *Fishes of the Southernn Ocean*. Johannesburg: Macmillan South Africa. Lombard, A.T., B. Reyers, L.Y. Schonegevl, J. Cooper, L.B. Smith-Adao, D.S. Nel, P.W. Froneman, I.J. Ansorge,

FAO (2006), Management of demersal fisheries resources of the southern Indian Ocean. FAO Fisheries Circular No. 1020

FAO (2009). Annex F of the Report of the Technical Consultation on International Guidelines for the Management of Deepsea Fisheries in the High Seas. Rome, 4–8 February and 25-29 August 2008.

FAO 2006 Management of Demersal Fisheries Resources of the Southern Indian Ocean. FAO Fisheries Circular No. 1020 FAO Rome 2006.

FAO 2009. International guidelines for the management of deep- sea fisheries in the high seas. FAO Rome 2009.

Freestone, D, Laffoley, D, Douvere, F, Badman, T 2016. World Heritage in the High Seas: An Idea Whose Time Has Come, World Heritage Reports 44, United Nations Educational, Scientific and Cultural Organization, France.

Frey et al. 2000, Origin and evolution of a submarine large igneous province: the Kerguelen Plateau and Broken Ridge, southern Indian Ocean, *Earth and Planetary Science Letters*, Volume 176, Issue 1, 28 February 2000, Pages 73-89

Gardner, R, Daczko, N, Halpin, J & Whittaker J 2015. Discovery of a microcontinent (Gulden Draak Knoll) offshore Western Australia: Implications for East Gondwana reconstructions, *Gondwana Research* 28(3)

Geinrikh, A.K. 1995. Vertical distribution of copepods in the area of Walters Shoals (southwestern Indian Ocean). *Oceanology* 35(3). (Cited in SIODFA paper but full citation not provided.)

Gon, O. & P.C. Heemstra (eds). 1990. *Fishes of the Southern Ocean*. Johannesburg: Macmillan South Africa.

Groeneveld, J., S. Steph, R. Tiedemann, D. Garbe-Schönberg, D. Nürnberg & A. Sturm. Pliocene development of east-Pacific hydrology as revealed by Mg/Ca analyses on the planktic foraminifer *Globigerinoides sacculifer*. ODP Scientific Results, Leg 202. Chapter 209.

http://www-odp.tamu.edu/publications/prelim/176_PREL/176OBJT.HTML

IUCN, 2013. Seamounts Project: An Ecosystem Approach to Management of Seamounts in the Southern Indian Ocean. Gland, Switzerland: IUCN, see <https://www.iucn.org/theme/marine-and-polar/our-work/international-ocean-governance/conservation-seamounts-ecosystems/seamounts-project>

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.

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.

Iwamoto, T., Shcherbachev, Y.N. & Marquardt, B., 2004. Grenadiers (Gadiformes, Teleostei) of Walters Shoals, Southwestern Indian Ocean, with description of a new "West-Wind Drift" species. *Proceedings of the California Academy of Sciences*, 55(10), pp. 190-207.

JAMSTEC (Japan Agency for Marine-Earth Science and Technology), 2000. Submersible observations for the deep-sea fauna of the south-west Indian Ocean: preliminary results for the mesopelagic and near-bottom communities. *J. Deep Sea Res.* 16:23-33

Kensley, B. (1975), Marine Isopoda from the continental shelf of South Africa. *Annals of the South African Museum* 67 (4): 35-89.

Kensley, B. (1981) On the zoogeography of southern African decapod Crustacea, with a distribution checklist of the species. *Smith Contrib Zool* 338:64.

Kensley, B., 1969. Decapod Crustacea from the South-West Indian Ocean. *Annals of the South African Museum*, 52(7), pp. 149-181.

Koslow, J.A., Hoehlert GW, Gordon JD, Haedrich RL, Lorance P and N Parin. 2000. Continental slope and deep-sea fisheries: implications for a fragile ecosystem. *ICES Journal of Marine Science* 57: 548-557.

Kotlyar, 1980: Classification & distribution of trachichthyid fish from the Indian Ocean. *Trudy Instituta Okeanologii* 110.

Le Corre, M., Jaeger, A., Pinet, P., Kappes, M.A., Weimerskirch, H., Catry, T., Ramos, J.A., Russell, J.C., Shah, N. & Jacquemet, S., 2012. Tracking seabirds to identify potential marine protected areas in the tropical Western Indian Ocean. *Biological Conservation*, 156, pp. 83-93.

Lutjeharms, J.R.E. 1985. Location of frontal systems between Africa and Antarctica: some preliminary results. *Deep-Sea Research* 32: 1499-1509.

M.N. Bester, C.A. Tosh, T. Strauss, T. Akkers, O. Gon, R.W. Leslie & S.L. Chown 2006. Conserving pattern and process in the Southern Ocean: designing a Marine Protected Area for the Prince Edward Islands. *CCAMLR-XXV/BG/16*. 45pp.

MacLeod, C.J., Dick, H.J.B., Blum, P., and the Expedition 360 Scientists, 2017. Southwest Indian Ridge Lower Crust and Moho. Proceedings of the Inter-national Ocean Discovery Program, 360: College Station, TX (International Ocean Discovery Program). <http://dx.doi.org/10.14379/iodp.proc.360.2017>

Nesis, K.N., 1994. Teuthofauna of Walters Shoals, a seamount in the Southwestern Indian Ocean. *Ruthenica*, 4(1), pp. 67-77.

Nye, V 2013. New species of hippolytid shrimps (Crustacea: Decapoda: Caridea:Hippolytidae) from a southwest Indian Ocean seamount. *Zootaxa*, 3637, (2), pp. 101-112.

Parin, N.V., K.N. Nesis, A.Yu. Sagaidachny & Yu. N. Shcherbachev. 1993. Fauna of Walters Shoals, a seamount in the Southwestern Indian Ocean. Trans. (Trudy) of the P.P. Shirshov Inst. Oceanology. 128:199-216.

Payne, R 2015. Taxonomy and diversity of the sponge fauna from Walters Shoal, a shallow seamount in the Western Indian Ocean region, University of the Western Cape. Thesis for M.Sc. https://www.researchgate.net/publication/316220893_Taxonomy_and_diversity_of_the_sponge_fauna_from_Walters_Shoal_a_shallow_seamount_in_the_Western_Indian_Ocean_region

Pollard, R & Read, J 2017. Circulation, stratification and seamounts in the Southwest Indian Ocean, *Deep-Sea Research II* 136 (2017) 36–43

Poss, S.G. & Collette, B.B., 1990. *Scorpaenodes immaculatus*, a new species of scorpionfish (Osteichthyes: Scorpaenida) from Walters Shoals, Madagascar Ridge. *Proceedings of the Biological Society of Washington*, 103(3), pp. 543-549.

Read, J & Pollard, R 2017. An introduction to the physical oceanography of six seamounts in the southwest Indian Ocean. *Deep-Sea Research II* 136 (2017) 44–58.

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.

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. http://www-odp.tamu.edu/publications/prelim/176_PREL/176OBJT.HTML

Rogers A.D. & M.L. Taylor. 2012. Benthic biodiversity of seamounts in the southwest Indian Ocean

Rogers A.D., Clark M.R, Hall-Spencer K.M and Gjerde K.M. (2008). The Science behind the Guidelines: A Scientific Guide to the FAO Draft International Guidelines (December 2007) For the Management of Deep-Sea Fisheries in the High Seas and Examples of How the Guidelines May Be Practically Implemented. IUCN, Switzerland, 2008.

Rogers AD no date. Template for Submission of Scientific Information to Describe Ecologically or Biologically Significant Marine Areas: Middle of What Seamount, available here <https://www.cbd.int/doc/meetings/mar/ebsa-sio-01/other/ebsa-sio-01-uk-01-en.pdf>

Rogers AD, Alvheim O, Bemanaja E, Benivary D, Boersch-Supan PH, Bornman T, Cedras R, Du Plessis N, Gotheil S, Hoines A, Kemp K, Kristiansen J, Letessier T, Mangar V, Mazungula N, Mørk T, Pinet P, Read J, Sonnekus T (2009) Cruise Report “Dr. Fritjof Nansen” Southern Indian Ocean Seamounts (IUCN/ UNDP/ ASCLME/ NERC /EAF Nansen Project 2009 Cruise 410) 12th November – 19th December, 2009. International Union for the Conservation of Nature, Gland, Switzerland, 188pp.

Rogers, A., Alvheim, O., Bemanaja, E., Benivary, D., Boersch- Supan, P., Bornman, T., Cedras, R., DuPlessis, N., Gotheil, S., Høines, A., Kemp, K., Kristiansen, J., Letessier, T., Mangar, V., Mazungula, N., Mørk, T., Pinet, P., Read, J., Sonnekus, T. (Eds.), Secondary “Dr. Fritjof Nansen” Southern Indian Ocean Seamounts (IUCN/UNDP/ASCLME/NERC/EAF Nansen Project 2009 Cruise 410) 12th November – 19th December. Gland, CH, International Union for Conservation of Nature, 12/2009, 188 pp.

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 a history of scientific exploration in the region.

Rogers, A.D. No date. Template for Submission of Scientific Information to Describe Ecologically or Biologically Significant Marine Areas, available at <https://www.cbd.int/doc/meetings/mar/ebsa-sio-01/other/ebsa-sio-01-uk-02-en.pdf>

Rogers, A.D. Submission to Describe Coral Seamount as an Ecologically or Biologically Significant Marine Areas. CBD 2014.

Rogers, A.D. Submission to Describe Coral Seamount as an Ecologically or Biologically Significant Marine Areas. CBD 2014. Rogers A.D., O. Alvheim, E. Bemanaja, D. Benivary, P.H. Boersch-Supan, T. Bornman, R. Cedras, N. Du Plessis, S. Gotheil, A. Hoines, K. Kemp, J. Kristiansen, T. Letessier, V. Mangar N. Mazungula, T. Mørk, P. Pinet, J. Read & T. Sonnekus 2009. Cruise Report “Dr. Fritjof Nansen” Southern Indian Ocean Seamounts (IUCN/ UNDP/ ASCLME/ NERC /EAF Nansen Project 2009 Cruise 410) 12th November – 19th December, 2009. International Union for the Conservation of Nature, Gland, Switzerland, 188pp.

ROGERS, A.D., ALVHEIM, O., BEMANAJA, E., BENIVARY, D., BOERSCH-SUPAN, P.H., BORNMAN, T., CEDRAS, R., DU PLESSIS, N., GOTHEIL, S., HOINES, A., KEMP, K., KRISTIENSEN, J., LETESSIER, T., MANGAR, V., MAZUNGULA, N., MØRK, T., PINET, P., READ, J. & SONNEKUS, T., 2009. *Cruise report “Dr. Fridtjof Nansen” southern Indian Ocean seamounts (IUCN/ UNDP/ ASCLME/ NERC/EAF Nansen Project 2009 Cruise 410) 12th November – 19th December, 2009* Gland, Switzerland: International Union for the Conservation of Nature.

Romanov, E.V. (Ed.) (2003) Summary and Review of Soviet and Ukrainian scientific and commercial fishing operations on the deepwater ridges of the Southern Indian Ocean. FAO Fisheries Circular No. 991, 84pp.

Sandwell, D, R. Dietmar Müller, Walter H. F. Smith, Emmanuel Garcia, Richard Francis 2014, New global marine gravity model from CryoSat-2 and Jason-1 reveals buried tectonic structure, Marine Geophysics, VOL 346 ISSUE 6205

Seamounts Project 2013, An Ecosystem Approach to Management of Seamounts in the Southern Indian Ocean. Gland, Switzerland: IUCN.

Shotton, R., 2006, *Management of demersal fisheries resources of the southern Indian Ocean*. FAO Fisheries Circular No. 1020. Rome, Italy: FAO.

SIODFA 2015, Southern Indian Ocean Deepwater Fisheries Association (SIODFA) Benthic Protected Areas in the Southern Indian Ocean. SC-01-INFO-15.

SIODFA 2016, Southern Indian Ocean Deepwater Fisheries Association (SIODFA), Benthic Protected Areas in the Southern Indian Ocean. SIODFA Technical Report XVII 16/01. 40 pp

SIOFA 2017, Southern Indian Ocean Fisheries Agreement (SIOFA), Annex H of the Report of the Second Meeting of the Scientific Committee of the Southern Indian Ocean Fisheries Agreement, Le Reunion, 13-17 March 2017, 82pp.

Taylor, ML & Rogers, AD (2017) Primnoidae (Cnidaria: Octocorallia) of the SW Indian Ocean: new species, genus revisions and systematics, *Zoological Journal of the Linnean Society*, 2017, 181, 70–97.

Whittaker J.M., S.E. Williams, J.A. Halpin, T.J. Wild, J.D. Stilwell, F. Jourdan, N.R. Daczko 2016. Eastern Indian Ocean microcontinent formation driven by plate motion changes, *Earth and Planetary Science Letters*, Volume 454, 2016, Pages 203-212

Williams A, Schlacher TA, Rowden AA, Althaus F, Clark MR, et al. (2010) Seamount megabenthic assemblages fail to recover from trawling impacts. *Marine Ecology* 31(S1): 183–199.

Williams, Alan; Althaus, Franzis; Fuller, Mike; Klaer, Neil; Barker, Bruce. Australian report for the Southern Indian Ocean Fisheries Agreement (SIOFA). CSIRO Marine and Atmospheric Research; 2011. csiro:EP112897. <https://doi.org/10.4225/08/585188bbd8b46>

Zibrowius, H., 1982. Deep-water scleractinian corals from the South-Western Indian Ocean with crypts excavated by crabs, presumably Hapalocarcinidae. *Crustaceana*, 43(2), pp. 113-120.

List of Tables

Table 1: BPA Coordinates, Area and Area Feature Summaries. (*Note that Agulhas Plateau BPA falls outside of the SIOFA agreement area)	3
Table 2: List of Proposed Benthic Protected Areas and their physical characteristics (Modified from SIODFA 2016; Agulhas Plateau BPA is outside SIOFA jurisdiction)	6
Table 3: Current protection status of the 12 SIODFA Benthic Protected Areas within the SIOFA jurisdiction as per SIOFA CMM-01 (2023). Agulhas Plateau BPA excluded because it is outside SIOFA jurisdiction.	7
Table 4: Summary of various criteria in the SIOFA standard protocol for future protected area designation for the 12 features proposed as “Benthic Protected Areas”.	8
Table 5: Protected area designation proposal for Atlantis Bank	9
Table 6: Protected area designation proposal for Banana	13
Table 7: Protected area designation proposal for Bridle	15
Table 8: Protected area designation proposal for Coral.....	18
Table 9: Protected area designation proposal for East Broken Ridge	22
Table 10: Protected area designation proposal for Fools’ Flat.....	25
Table 11: Protected area designation proposal for Gulden Draak	28
Table 12: Protected area designation proposal for Mid-Indian Ridge.....	31
Table 13: Protected area designation proposal for Middle of What.....	34
Table 14: Protected area designation proposal for Rusky Knoll.....	37
Table 15: Protected area designation proposal for South Indian Ridge (aka Del-Cano Rise).....	40
Table 16: Protected area designation proposal for Walter’s Shoal.....	44

List of Figures

Figure 1: Locations of the SIOFA Benthic Protected Areas (BPAs) in the Southern Indian Ocean.	3
Figure 2: Bathymetry of Atlantis Bank	9
Figure 3: Cross section of depth profile of Atlantis Bank.....	9
Figure 4: Bathymetry of Banana	13
Figure 5: Cross section of depth profile of Banana.....	13
Figure 6: Bathymetry of Bridle	15
Figure 7: Cross section of depth profile of Bridle	15
Figure 8: Bathymetry of Coral	18
Figure 9: Cross section of depth profile of Coral	18
Figure 10: Bathymetry of East Broken Ridge	22
Figure 11: Cross section of depth profile of East Broken Ridge.....	22
Figure 12: Bathymetry of Fools Flat.....	25
Figure 13: Cross section of depth profile of Fools Flat	25
Figure 14: Bathymetry of Gulden Draak	28
Figure 15: Cross section of depth profile of Gulden Draak.....	28
Figure 16: Bathymetry of Mid-Indian Ridge.....	31
Figure 17: Cross section of depth profile of Mid-Indian Ridge	31
Figure 18: Bathymetry of Middle of What.....	34
Figure 19: Cross section of depth profile of Middle of What	34
Figure 20: Bathymetry of Rusky Knoll.....	37
Figure 21: Cross section of depth profile of Rusky Knoll	37
Figure 22: Bathymetry of South Indian Ridge (aka Del-Cano Rise).....	40
Figure 23: Cross section of depth profile of South Indian Ridge (aka Del-Cano Rise)	40
Figure 24: Bathymetry of Walter’s Shoal.....	44
Figure 25: Cross section of depth profile of Walter’s Shoal	44