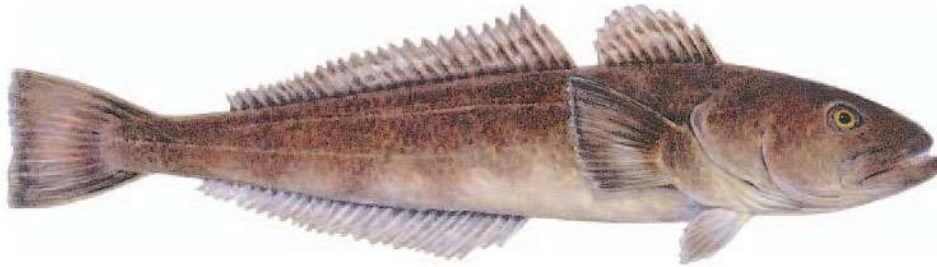


## MSC SUSTAINABLE FISHERIES CERTIFICATION

### South Georgia Patagonian Toothfish longline



### Public Certification Report

#### Re-Assessment

**September 2018**

Certificate Code	F-ACO-0020
Prepared For	Government of South Georgia and the South Sandwich Islands (GSGSSI)
Prepared By	Acoura Marine
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### Assessment Data Sheet

Fishery name	South Georgia Patagonian Toothfish Longline	
Species and Stock	South Georgia Patagonian Toothfish CAML R Sub-Area 48.3	
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# 1 Glossary

ACAP	Agreement on the Conservation of Albatrosses and Petrels
BAS	British Antarctic Survey
BCA	Benthic Closed Area
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CAMLR	Conservation of Antarctic Marine Living Resources Convention.
CDS	Catch Documentation Scheme (see section 5.6.2)
Cefas	Centre for Environment Fisheries and Aquaculture Science
COLTO	Coalition of Legal Toothfish Operators Inc.
CPUE	Catch per unit of fishing effort
DCD or EDCD	Dissostichus Catch Document (or Electronic Dissostichus Catch Document).
DED	Dissostichus Export Document
ENGO	Environmental Non-Governmental Organisation
ETP	Endangered, Threatened and Protected species.
F	Fishing mortality (with subscripts such as $F_{msy}$ = Fishing mortality at maximum sustainable yield).
FCO	Foreign and Commonwealth Office (department of UK Government)
GSGSSI	Government of South Georgia and South Sandwich Islands
IUU	Illegal unregulated unreported fishing activity
KEP	King Edwards Point, GSGSSI and BAS base on South Georgia
MFV	Motorised Fishing Vessel
MPA	Marine Protected Area
MRAG	Marine Resources Assessment Group
MZ	Maritime Zone
NPOA - Seabirds	National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries.
NTZ	No Take Zone
RIA	Reduced Impact Areas (relating to fishery impacts)
ROV	Remotely operated vehicles
SAERI	South Atlantic Environmental Research Institute
SGMZ	South Georgia Maritime Zone
SGSSI MZ	South Georgia and South Sandwich Islands Maritime zone
SSB	Spawning Stock Biomass
VME	Vulnerable Marine Ecosystem
WG - FSA	Working Group on Fish Stock Assessment (CCAMLR)
WWF	World Wildlife Foundation

## 2 Executive Summary

- » This report provides details of the MSC assessment process for the South Georgia Toothfish longline fishery for the Government of South Georgia and the South Sandwich Islands. The re-assessment process began in August 2017.
- » A comprehensive programme of stakeholder consultations were carried out as part of this assessment, complemented by a full and thorough review of relevant literature and data sources.
- » A rigorous assessment of the wide ranging MSC Principles and Criteria was undertaken by the assessment team and a detailed and fully referenced scoring rationale is provided in the assessment tree provided in Appendix 1 of this report.
- » The **Eligibility Date** for this assessment will be the date of recertification.

The assessment team for this fishery assessment comprised of Jim Andrews who acted as team leader and primary Principle 3 specialist; Paul Medley who was primarily responsible for evaluation of Principle 1. The team members shared responsibility for assessment of Principle 2 (Paul Medley assessed PIs 2.1.x & 2.2.x; Jim Andrews assessed PIs 2.3.x, 2.4.x and 2.5.x).

### Fishery strengths

- » The client for this fishery is the Government of South Georgia and the South Sandwich Islands (GSGSSI). The GSGSSI is responsible for management of the fishery, which is well monitored and well managed.
- » The fishery is located within the area covered by the Convention on Antarctic Marine Living Resources (CAMLR) and the fishery is managed in accordance with the precautionary management strategy implemented by the Commission for CAMLR (CCAMLR). Under this management regime some historical management problems (such as high bird bycatch and problems with IUU fishing) have been successfully addressed.
- » A long-established observer programme provides confidence that all management measures, including both fisheries regulations and bycatch mitigation measures, are effective and implemented.

### Client weaknesses

- » The team did not identify any significant weaknesses in the fishery. This is largely a result of the work carried out by the Government of South Georgia and the South Sandwich Islands (GSGSSI) during the previous three periods of MSC certification.

### Determination

- » On completion of the assessment and scoring process, the assessment team concluded that this fishery should be recertified according to the according to the Marine Stewardship Council Principles and Criteria. The MSC Principle scores were calculated according to the procedures set out in the MSC Certification Requirements v1.3 and are set out in the table below.

Final Principle Scores	
Principle	Score
Principle 1 – Target Species	98.1 – PASS
Principle 2 – Ecosystem	91.3 – PASS
Principle 3 – Management System	99.0 - PASS

### Conditions & Recommendations

Conditions of certification may be required where any of the Performance Indicators against which a fishery is assessed scores less than an unconditional pass mark of 80. Compliance with conditions of certification is mandatory for ongoing MSC certification.

“Recommendations” may be made by assessment teams where an opportunity for improving the performance of the fishery against a Performance Indicator has been identified even though a score of 80 or more has been awarded. Compliance with recommendations is not mandatory.

» **Conditions:** none of the Performance Indicators against which the fishery was assessed scored less than the unconditional pass mark of 80. There are therefore no conditions of certification.

» **Recommendations:** the assessment team identified 4 areas where the performance of the fishery could be improved. The recommendations are set out below:-

1. **Non-target species (PI2.1.1 & 2.2.1):** the fishery meets all of the requirements for non-target (retained and discarded) species under MSC CRv1.3. When the fishery is re-assessed, it will need to meet the requirements of FCRv2.0 (or its successor). MSC FCRv2.0 considers “primary” and “secondary” non-target species. It is recommended that the status of the non-target species and management measures in place are reviewed in order to ensure that the fishery is compatible with this change to the MSC Certification Requirements.
2. **Bait (PI2.1.2):** At the last re-assessment the Assessment Team recommended that in order to make the score under this SI more secure, it would be appropriate for the fishery to adopt a policy that will ensure that bait are sourced from stocks that meet the SG80 requirements (i.e. that the stock status is above a level at which recruitment may be impaired).

In order to ensure that the fishery remains compliant with the current and any future versions of the MSC Certification Requirements, the Assessment team recommend that this commitment to sourcing bait from stocks that meet the SG80 requirements for this SI (or its successor) is maintained.

3. **Habitat management (PI2.4.2)** – the fishery meets all of the requirements for habitat management under MSC CR v1.3. The management plan for the fishery is currently undergoing its quinquennial review. The scoring of the PIs relating to habitat management under CRv1.3 (and looking ahead, to reassessment under FCRv2.0) would be improved if the new management plan took account of emerging norms for habitat management, including the adoption of a “move-on rule” for vulnerable marine ecosystems.

4. **Habitat outcome & information (PI2.4.1 & 2.4.3):** again, while the MSC CR v1.3 requirements are fully met for these PIs, the information required to allow the assessment of the fishery against PI2.4.1 in CR v2.0 is more onerous. In particular the new CR required that there is an understanding of impacts on “commonly encountered” habitats and “vulnerable marine ecosystems”. The scoring of these PIs under CR v1.3 (and looking ahead, to reassessment under CRv2.0) would be improved by the work currently being carried out to investigate the extent and character of benthic habitats.

The main body of this report sets out the basis for the assessment of this fishery. It includes information that is required by the MSC to determine the extent of the Units of Assessment, and to describe the assessment procedures that have been followed. The assessment team have also included a summary of all of the information that has been made available to them by the client and stakeholders and which the team have considered during the course of this assessment of the fishery against MSC Principles 1, 2 and 3. The assessment of the fishery’s performance with respect to the MSC Standard is set out in a series of tables in section 10 of this report.

Acoura Marine Ltd. confirms that prior to carrying out this assessment it was determined that the South Georgia Patagonian Toothfish Longline Fishery (as defined in this report) meets the entry criteria set by MSC (i.e. it is considered to be “within scope”).

## 3 Authorship and Peer Reviewers

### 3.1 Assessment Team

All team members listed below have completed all requisite training and signed all relevant forms for assessment team membership on this fishery.

**Assessment team leader: Jim Andrews**

Primarily responsible for assessment under Principles 2 & 3

Jim is a marine biologist with over 25 years' experience working in marine fisheries and environmental management. He currently works as an independent fisheries and marine environmental consultant. His previous experience includes running the North Western and North Wales Sea Fisheries Committee as its Chief Executive from 2001 to 2005, and previously working as the SFC's Marine Environment Liaison Officer. During this time he was responsible for the regulation, management and assessment of inshore finfish and shellfish stocks along a 1,500km coastline. He has an extensive practical knowledge of both fisheries and environmental management and enforcement under UK and EC legislation. Jim has formal legal training & qualifications, with a special interest in the policy, governance and management of fisheries impacts on marine ecosystems. He has worked as an assessor and lead assessor on more than 25 MSC assessments within the UK, in Europe and in India since 2007. In 2008 he worked with the MSC and WWF on one of the pilot assessments using the new MSC Risk Based Assessment Framework, and has subsequently used the Risk Based Framework in three fishery assessments. Jim has carried out numerous MSC Chain of Custody assessments within the UK.

**Expert team member: Paul Medley**

Primarily responsible for assessment under Principle 1 & 2

Paul is an independent fisheries consultant, based in the UK. His expertise includes mathematical modelling of fisheries and ecological systems, techniques for multispecies stock assessment and external review of stock assessment methodologies. He has been an invited expert for a number of stock assessment working group meetings. He has a wide practical experience in marine biology, including design and implementation of surveys and fisheries experiments. This includes addressing wider environmental issues of ecological management, including maintenance of marine biodiversity. He has also taken part in the MSC assessment of the South Georgia Patagonian Toothfish fishery and has worked with MSC on new methodology developments.

#### 3.1.1 Peer Reviewers

Peer reviewers used for this report were John Nichols and Andrew Hough. A summary CV for each is available in the **Assessment downloads** section of the fishery's entry on the MSC website.

**John Nichols**

Mr John Nichols is a retired UK government fisheries biologist with 42 years research experience in plankton ecosystems in the North Atlantic specializing in the taxonomy of North Atlantic & NW European plankton including phytoplankton, micro and meso-plankton, ichthyoplankton and young fish.. He has been a member of ICES working groups on herring, mackerel, horse mackerel, sardine and anchovy assessments; and mackerel and horse mackerel egg surveys. He was also a member of ICES study groups on herring larval surveys and plankton sampling.

He was scientist in charge of numerous research vessel surveys for fish stock assessment purposes and directly involved in the assessment of pelagic and western demersal fish stocks from 1994 to 2000.

He has been involved in the publication of over fifty scientific papers and reports more than half of which have been in peer reviewed journals, and the publication of two fish egg and larvae identification keys.

Since retirement from his government post he has participated in more than 27 different fisheries MSC assessments as the Principle 1 expert plus the re-assessments of many of those fisheries Those assessments include the Thames estuary herring, PFA North Sea Herring, NEA mackerel and Atlanto- Scandian herring, Hastings Fleet Dover sole, the north – east coast of England bass fishery, the SW mackerel hand line fishery, Portuguese sardine, a Newfoundland herring fishery, Canadian Pacific sablefish, various Norwegian and Swedish pelagic fisheries, Faroese and Norwegian saithe fisheries, Faroese, Russian and Norwegian Arctic cod and haddock fisheries and a North Sea plaice and sole fishery,. He has also been a peer reviewer for numerous MSC certification reports by various Certification bodies and has also carried out two MSC pre-assessments and numerous annual audits.

John has passed MSC training and has no Conflict of Interest in relation to this fishery. Full CV available upon request

### **Andy Hough**

Andrew Hough has been active in the development of Marine Stewardship Council certification since 1997, when involved in the pre-assessment of the Thames herring fishery. He was a founding Director of Moody Marine, led the establishment of Moody Marine fishery certification systems and has represented Moody Marine at all MSC workshops until 2011. He has also worked with MSC on several specific development projects, including those concerned with the certification of small scale/data deficient fisheries.

He has been Lead Assessor (and often also expert team member) on many fishery assessments to date. This has included Groundfish (e.g. cod, haddock, pollock, hoki, hake, flatfish), Pelagics (e.g. tuna species, herring, mackerel, sprat, krill, sardine) and shellfish (molluscs and crustacea); included evaluation of the environmental effects of all main gear types and considered many fishery administrations including the North Atlantic, South Atlantic, Pacific, Southern Ocean and in Europe, North America, Australia and New Zealand, Japan, China, Vietnam and Pacific Islands. He has recently acted solely as an expert team member of Principle 2 inputs of European inshore fisheries and Falkland Islands Toothfish.

He has carried out peer reviews for various CABs including fisheries for molluscs, crustacea and freshwater finfish. Other assessments include Chain of Custody assessments for merchants, processors, distributors and retailers.

Andrew has also been involved in the development of certification schemes for individual vessels (Responsible Fishing Scheme) and evaluation of the Marine Aquarium Council standards for trade in ornamental aquarium marine species.

Consultancy services have included policy advice to the Association of Sustainable Fisheries, particularly with regard to the implications of MSC standard development, and assistance to fisheries preparing for, or engaged in, MSC assessment.

Andy has passed MSC training and has no Conflict of Interest in relation to this fishery. Full CV available upon request.

## **3.2 RBF Training**

RBF was not used for this fishery assessment.

## 4 Description of the Fishery

### 4.1 Unit(s) of Assessment (UoA) and Scope of Certification Sought

#### 4.1.1 UoA and Proposed Unit of Certification (UoC)

Acoura Marine Ltd confirm that the fishery is within scope of the MSC certification sought (see section 4.2) following the assessment as defined below.

<b>Species:</b>	Patagonian toothfish ( <i>Dissostichus eleginoides</i> )
<b>Stock:</b>	South Georgia Patagonian Toothfish CAMLRL Sub-Area 48.3
<b>Geographical area:</b>	The waters around the island of South Georgia and the associated plateau to the west around Shag Rocks, within the South Georgia and the South Sandwich Islands 200nm Maritime Zone
<b>Harvest method:</b>	Bottom Set Longline.
<b>Client Group:</b>	Certification will apply to the whole South Georgia Longline Fishery. Licences are issued by the Government of South Georgia and the South Sandwich Islands
<b>Other Eligible Fishers:</b>	None

The proposed Unit Of Certification for this fishery is as below:

<b>Species:</b>	Patagonian toothfish ( <i>Dissostichus eleginoides</i> )
<b>Stock:</b>	South Georgia Patagonian Toothfish CAMLRL Sub-Area 48.3
<b>Geographical area:</b>	The waters around the island of South Georgia and the associated plateau to the west around Shag Rocks, within the South Georgia and the South Sandwich Islands 200nm Maritime Zone
<b>Harvest method:</b>	Bottom Set Longline.
<b>Client Group:</b>	Certification will apply to the whole South Georgia Longline Fishery. Licences are issued by the Government of South Georgia and the South Sandwich Islands
<b>Other Eligible Fishers:</b>	None

This Unit of Assessment was used as it is compliant with client wishes for assessment coverage and in full conformity with MSC criteria.



#### 4.1.2 Final UoC(s)

(PCR ONLY)

The final Unit Of Certification for this fishery is as defined below. This has not changed throughout the process. Alternatively provide rationale for why this has changed.

<b>Species:</b>	
<b>Stock:</b>	
<b>Geographical area:</b>	
<b>Harvest method:</b>	
<b>Client Group:</b>	
<b>Other Eligible Fishers:</b>	

## 4.2 Scope of Fishery

Acoura Marine considers that the unit of certification in the fishery is within the scope set out in the MSC Fisheries Certification Requirements v.2.0 at §7.4 *et seq.*

Specifically:-

- **Target taxa** §7.4.1.1 – the fishery does not target amphibians, reptiles, birds or mammals.
- **Destructive fishing practices** §7.4.1.2 – no destructive fishing practices (explosives or poisons) are used in this unit of certification.
- **Controversial unilateral exemptions** §7.4.1.3 – the assessment team note that UK sovereignty over South Georgia and the South Sandwich Islands is disputed by Argentina. This dispute does not materially affect the management of the fishery which is conducted in accordance with international (CCAMLR) regulations that are independent of national sovereignty. The fishery is therefore not subject to a “*controversial unilateral exemption to an international agreement*”.
- **Forced labour** §7.4.1.4 – fishery operators have not been prosecuted for any violations against forced labour laws.
- **Controversial disputes** §7.4.2 – there are mechanisms in place for resolving disputes between the fishery and the management system.
- **Enhanced fishery** §7.4.3– this is not an enhanced fishery.
- **Introduced Species Based Fisheries** §7.4.4 – toothfish are not an introduced species.
- **Inseparable or practically inseparable catches** §7.4.13 – there are no non-target IPI species in the UoAs.

The fishery is therefore eligible for assessment against the MSC Standard.

### 4.3 Total Allowable Catch (TAC) and Catch Data

The TAC and catch data for the most recent fishing year are summarised below. A TAC of 2,170t has been set by GSGSSI for 2018.

**Table 1: TAC and Catch Data for South Georgia toothfish longline fishery.**

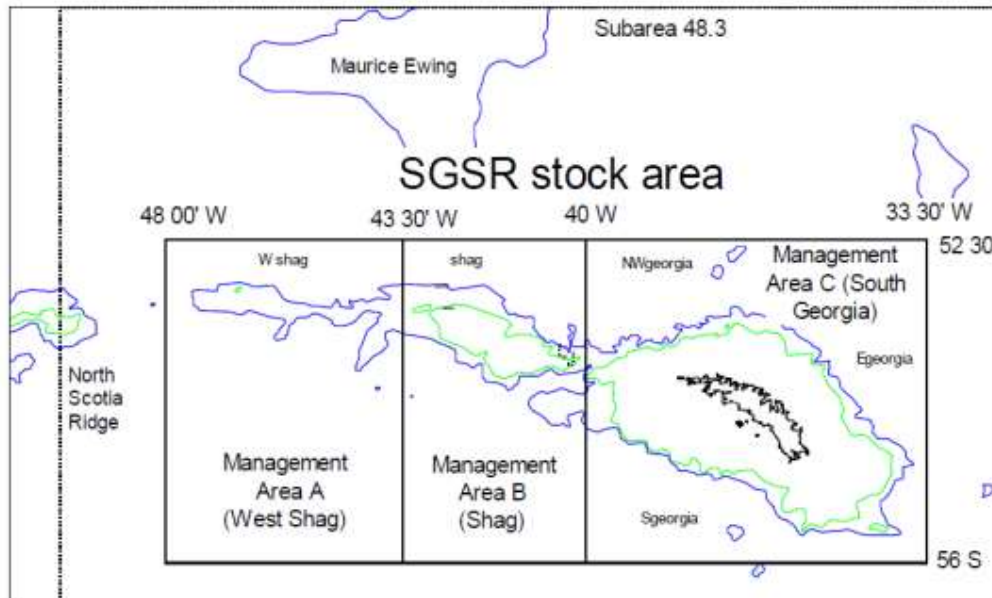
<b>TAC</b>	<b>Year</b>	<b>2017</b>	<b>Amount</b>	<b>2,200t</b>
<b>UoA share of TAC</b>	<b>Year</b>	<b>2017</b>	<b>Amount</b>	<b>2,200t</b>
<b>UoC share of TAC</b>	<b>Year</b>	<b>2017</b>	<b>Amount</b>	<b>2,200t</b>
<b>Total green weight catch by UoC</b>	<b>Year (most recent)</b>	<b>2017</b>	<b>Amount</b>	<b>2,192t</b>
	<b>Year (second most recent)</b>	<b>2016</b>	<b>Amount</b>	<b>2,194t</b>

## 5 Overview of the fishery

### 5.1 Background

#### 5.1.1 Area Under Evaluation

The South Georgia Patagonian toothfish longline fishery takes place within the area of the Antarctic Ocean that is managed through the international Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). The fishery takes place around the island of South Georgia and Shag Rocks, an area known as the South Georgia-Shag Rocks (SGSR) stock area, located in CCAMLR Subarea 48.3 (see Figure 1).



**Figure 1: Map showing the location of the South Georgia – Shag Rocks (SGSR) stock area, the boundary of CCAMLR Subarea 48.3 and its subdivision into management areas A, B and C.**

#### 5.1.2 Fishery Ownership & Organisational Structure

South Georgia & the South Sandwich Islands (SGSSI) is a UK Overseas Territory. There is no indigenous population, and no permanent population. Staff from the British Antarctic Survey (BAS) and from GSGSSI are based at the administrative centre at King Edward Point.

SGSSI is administered by the Commissioner, a post that is held by the Governor of the Falkland Islands, on behalf of the Queen. The Chief Executive Officer deals with policy matters and is Director of SGSSI Fisheries, responsible for the allocation of fishing licences. Other staff now include an Operations Director, Environment Officer (part-time), Marine Environment and Fisheries Manager, Visitor Management Officer and Administration and Logistics Officer.

The administrative boundaries for the SGSSI toothfish fisheries are the 200 mile maritime zone (MZ) extending from South Georgia and the South Sandwich Islands. Exclusive management jurisdiction is exercised within that boundary. All vessels fishing within those boundaries are considered to be subject to all administrative and management regulations implemented by the Director of Fisheries for SGSSI. Surveillance and enforcement by SGSSI authorities is exercised fully within those boundaries as well.

All of the SGSSI Maritime Zone falls within the boundaries of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), conservation measures for which are set by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), a multinational organisation. Although the Maritime Zone covers three CCAMLR statistical subareas, the entire catch for this fishery comes from within only one: subarea 48.3.

The CCAMLR convention was adopted in 1980 and entered into force in 1982. Currently 24 members have subscribed to the Commission (the executive body), including the European Union. The aim of the Convention is the conservation of Antarctic marine life. Conservation is defined to include rational use, although there is no activity directed at management of seals and whales as harvestable resources, these being covered by other conventions. Fisheries management in South Georgia waters is therefore based directly on the annual scientific advice and recommended management measures of CCAMLR, on top of which GSGSSI apply additional requirements.

As an Overseas Territory of the UK, GSGSSI has no formal direct contact with CCAMLR, but is represented at CCAMLR by the Polar Regions Department of the Overseas Territories Directorate, Foreign and Commonwealth Office of the UK. Enforcement is conducted by the GSGSSI patrol vessel "*Pharos SG*", operating consistent with CCAMLR standards and procedures as well as domestic policy GSGSSI puts into effect the conservation measures set by CCAMLR, which is advised by its Scientific Committee (SC-CCAMLR), which is in turn advised by its Working Group on Fish Stock Assessment. Some conservation measures are aimed at preservation of the target stock while others are aimed at the reduction of direct or incidental impacts on other species. Conservation measures for target species of fisheries include the setting of annual Total Allowable Catches (TACs) for each species according to individual sub-areas.

Licences that permit fishing for toothfish are issued on a quadrennial basis by the GSGSSI. The number of licences issued and the Total Allowable Catch of toothfish are varied in response to the status of the stock in accordance with both CCAMLR requirements and also requirements and regulations implemented by the GSGSSI including creation of a sustainable-use marine protected area, enhanced vessel safety standards, and enhanced seabird mitigation measures.

### **5.1.3 History of the Fishery.**

Fishing for Patagonian toothfish occurred at an exploratory scale in Chilean waters as early as 1955, but it was not until the later development of deep-water longline systems that it was exploited on a larger scale. Exploitation of Patagonian toothfish around South Georgia began in the 1970s as by-catch from a bottom trawl fishery.

Longlining was introduced to the South Georgia area in the late 1980s and early 1990s, and allowed exploitation of older, mature fish in areas where trawls could not be used. Longlining is now the only fishing method for toothfish allowed commercially in sub-area 48.3 (although trawling still takes place around some other sub-Antarctic islands). Potting for toothfish was carried out experimentally around South Georgia, but has not been used at all since 2008.

Large amounts of Illegal, Unreported and Unregulated (IUU) fishing for Patagonian toothfish occurred in sub-Antarctic Atlantic waters during the 1990s, reaching an estimated four times the regulated catch in 1997. Measures have been put into place by CCAMLR and GSGSSI in an attempt to deal with this, including most recently the Catch Documentation Scheme adopted at the 1999 CCAMLR meeting. In South Georgia waters, three arrests of vessels fishing illegally were made in 1994 - 1996 and illegal fishing is reported to have declined rapidly

thereafter. Recent levels of IUU activity have been estimated to be zero. The last event recorded was the sight and capture of the *Elqui* in 2005.

The South Georgia Patagonian Toothfish Longline Fishery was first assessed against the MSC Standard and certified in 2004. It was re-assessed and re-certified again in 2009. The second re-assessment of the fishery against the MSC Standard was completed in September 2014.

## 5.2 Vessels and fishing gear

Prior to 2013/14, fishing licences were issued annually; since 2013/14 fishing licences have been applied for and issued on a biennial basis. From 2018 onwards, vessels have been licensed for a period of four years. A list of vessels currently licensed to operate in the fishery is provided in Table 2 below.

**Table 2: List of licensed vessels in the South Georgia Patagonian Toothfish Longline fishery, for the period 2018-21.**

Vessel
Antarctic Bay
Argos Froyanes
Altamar
Nordic Prince
Argos Georgia
San Aspiring

Vessels are subjected to a pre licensing inspection by GSGSSI at King Edward Point (KEP) before they are issued with the papers to enter the fishery.

All Motorised Fishing Vessels (MFV) are set up specifically to fish with long lines. The longlines are rigged in different ways, described below. Note measurements are approximate in the following text.

### 5.2.1 Spanish long line

An 18-22mm rope (fatherline), with 8.5kg stone weights attached at regular intervals to make it sink, is used as a backrope/heaving line. A second line (motherline) of 5mm rope or 3mm monofilament is tied to the back rope in short lengths. The snoods with the hooks attached are tied/clipped to the motherline.

### 5.2.2 Autoline long line

A 15mm rope (motherline) is used. The rope is leaded so that it sinks. The snoods with the hooks attached are tied/clipped to the motherline.

### 5.2.3 Trot-line system also referred to as 'cachalotera' or 'umbrella system'

This method of fishing was previously used in the fishery, to reduce losses of fish to whale depredation. This method is not allowed in the UoC area any longer. The decision to prohibit this fishing method was taken because of concerns about post-capture survival of tagged fish caught using this method, which is liable to result in multiple hooking of fish.

### 5.2.4 Hooks

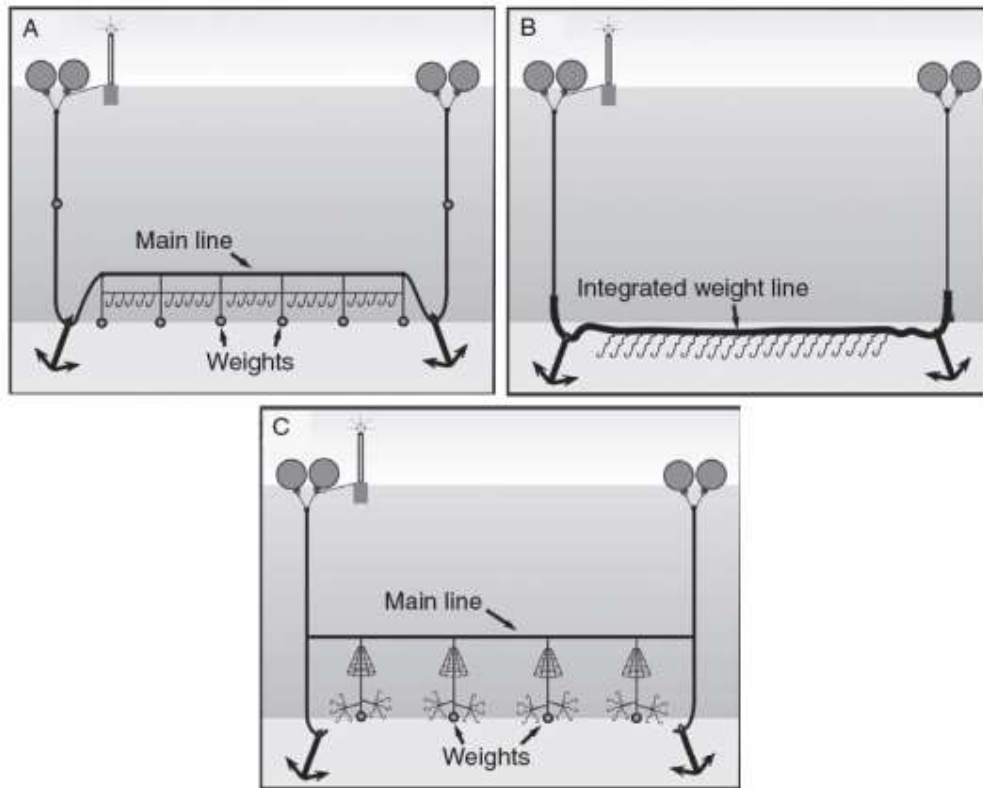
The design of hook used on longlines is unrestricted. Hook design is fairly standard although particular companies, fishing masters or campaigns may use specific hook designs, hook manufacturers or colour/material of snood. Hooks are now marked to identify which vessel they were deployed from, which allows GSGSSI to identify any lost gear that is recovered and confirm that it is not illegal.

Specimen hooks with snoods have been collected from toothfish longline fishing boats and are retained at the BAS base at KEP. BAS operate a base on Bird Island, South Georgia where many seabirds nest. The reference collection can be used in the event of the recovery of hooks from nesting birds and chicks. Importantly the hook library may reveal that hooks recovered from seabirds did not originate from the SG fishery.

The most recent information from BAS scientists is that a total of eight marked hooks have been recovered from bird nests at Bird Island. Two hooks were found in 2011; 5 in 2012 and 1 in 2014. Five of the eight hooks were from vessels that are no longer operating in the South Georgia fishery.

With regard to the hook found in 2014, the vessel from where it originated was inspected at sea during that season and during the inspection was found to have breached licence conditions with regard to hook management and removal of hooks from offal prior to discharge. The vessel received an administrative penalty of £20,000.

There have been no further incidences of marked hooks being found in nests since 2014.



**Figure 2: Illustrations of the longline systems that have been used in the South Georgia Toothfish Longline Fishery. A = Spanish longline; B = Autoline; C = “Umbrella” gear (no longer used in this fishery). [Source: Collins et al, 2010]**



### **5.2.5 Fish traps/pots**

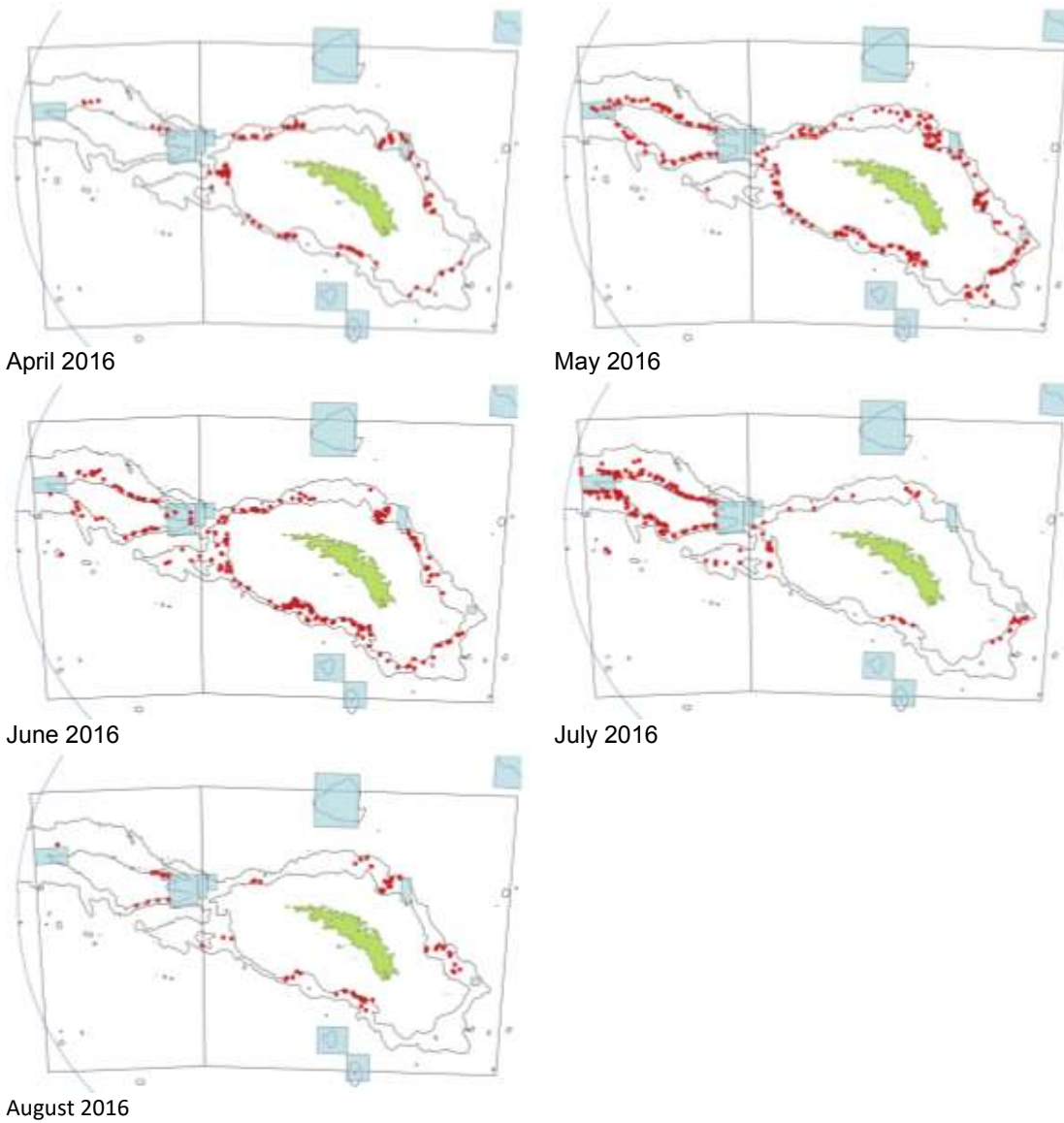
Small amounts of toothfish were previously taken in an experimental pot fishery around South Georgia. Although this fishing method is still permitted, there has been no pot/trap fishing for toothfish since 2008. If this fishery should resume, any catch taken using this method would be accounted for within the TAC for the fishery.

### **5.3 Location and timing of fishing activity**

The fishery is confined in its operation to waters between 700m and 2250m depth. In recent years the large majority of effort is within the specified depth range around South Georgia and the plateau around the Shag Rocks. There is a separate fishery deploying substantially less effort in the same depths around the South Sandwich Islands. Although the GSGSSI Maritime Zone spans three CAMLR subareas, the assessed fishery occurs entirely within CAMLR subarea 48.3. In the initial (2004) MSC assessment report some fishing was reported to occur outside of the South Georgia Maritime Zone but still within sub-area 48.3. This took place mainly in the area immediately to the west of Shag Rocks. Catch rates were lower in this fishery than in the fishery within the SGSSI MZ, and effort in the fishery in 48.3 but outside the SGSSI MZ has declined further; in recent years being at or near zero. Any legal fishing in this area is reported to CCAMLR and is included in stock assessments and total catch statistics.

Since 1998 this fishery has been restricted to the winter months to minimise interactions with foraging seabirds during their breeding season. For a period of years the start of the fishing season was brought forwards into early April to allow an earlier start to the season. Following some bird bycatch incidents in recent years, the start of the fishery has reverted to the 16th April. In 2018 the GSGSSI introduced a further constraint for part of the South Georgia EEZ, where an “Early Season Closed Area” has been established which is closed until the 1<sup>st</sup> May to minimise the risk of interactions with seabirds (see section 5.5.4.1).

The location of fishing activity during the 2016 fishing season is shown month-by-month in Figure 3. All fishing activity took place within the South Georgia MZ, and all commercial fishing activity was located outside the benthic closed areas that have been established to protect marine environmental features around South Georgia (see section 5.5.5 of this report).



**Figure 3:** Location of fishing activity during the 2016 fishing season around South Georgia. Red dots show locations of fishing activity. Blue shaded areas are Benthic Closed Areas. [Source: GSGSS].

## 5.4 Principle One: Target Species Background

Principle 1 of the Marine Stewardship Council standard states that:

*“A fishery must be conducted in a manner that does not lead to over fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.”*

The following sections outline the features of this fishery which are relevant to Principle 1.

### 5.4.1 Biology of the target species

Patagonian toothfish *Dissostichus eleginoides* is a large, long-lived species, belonging to the family Notothenidae, or “Antarctic cods”. Toothfish show distinct depth preferences with age, with juveniles (< 50 cm) living on the continental shelf and moving into deeper water (>500m) as they reach maturity (~ 90 cm). Toothfish are important predators, primarily feeding on fish, cephalopods and crustaceans, and also scavenge.

The species is easily recognised and not confused with others. The life history is reasonably well understood for a deep water species. On-going research should continue to improve understanding of the distribution of toothfish by sex, size and age (Roberts 2006; Collins *et al.* 2007; Brigden *et al.* 2017), growth and natural mortality rates, and the position of the species in the food web and ecosystem (Croxall and Wood, 2002).

Genetic research has been used for stock identification and to verify that the stock in Area 48.3 is well mixed and does not require any special measures to protect genetic diversity (Roberts *et al.* 2006). The genetic structure of Patagonian toothfish populations in the Atlantic and western Indian Ocean Sectors of the Southern Ocean (SO) indicated that populations of toothfish from around the Falkland Islands were genetically distinct from those at South Georgia, around Bouvet Island and the Ob Seamount populations. Genetic differentiation between these populations can be explained by their hydrographic isolation, as the sites are separated by two, full-depth, ocean-fronts and topographic isolation (Rogers *et al.* 2006).

Mark-recapture experiments (tagging) have been used to help identify stock structure, and results support treating SGSSI toothfish as a single stock for management purposes (CCAMLR 2007, Agnew *et al.* 2006, Hillary and Agnew 2007, Roberts and Agnew 2007). The tagging data, now substantial, shows no evidence of significant movement of individuals from the SGSSI stock to exploited populations in other areas of the south Atlantic (Soeffker, Darby & Scott 2014).

### 5.4.2 Stock

#### 5.4.2.1 Stock Identity

The MSC Certification Requirements define a fish stock as:-

*“The living resources in the community or population from which catches are taken in a fishery. Use of the term fish stock implies that the particular population is a biological distinct unit. In a particular fishery, the fish stock may be one or several species of finfish or other aquatic organisms.”*

All assessments consider only the SGSR stock found within management areas A, B and C around South Georgia. The SGSR stock is genetically separate from fish taken in the extreme north and west of Subarea 48.3, but does not appear to be made up of separate sub-populations. This is supported by tagging (Roberts and Agnew 2007) and genetic (Rogers *et*

al. 2006) work. Patagonian toothfish from Subarea 48.3 are genetically distinct from those found on the Patagonian Shelf (FAO Area 41).

The South Georgia and South Sandwich Islands stocks are managed as separate units. *D. eleginoides* do not appear to reach spawning condition at the South Sandwich Islands (subarea 48.4), which implies they recruit from elsewhere, most likely South Georgia (Roberts, 2012). Different growth rates and maturity suggest that there is no regular exchange between the two areas, tag recapture data clearly show only a small number of adult toothfish moving between them, and genetic analysis indicates that both stocks belong mostly to the same genetic population (Soeffker, Belchier & Laptikhovsky 2015). The lack of significant recaptures at the South Sandwich Islands of fish tagged at South Georgia and different growth characteristics between the two regions suggests that immigration to the South Sandwich Islands occurs before recruitment. Therefore, although fish originating from South Sandwich Islands are probably caught in the South Georgia fishery, these fish are probably spawned from the South Georgia stock, and therefore these populations are closely related. However, given the demonstrated low levels of exchange on an annual basis, managing them as separate stocks is fully justified.

#### 5.4.2.2 Stock status

In 2017, the spawning stock was estimated to be slightly above the CCAMLR target reference point (Table 2). The spawning stock has not been estimated to be below the target throughout the history of the fishery (Figure 4). The CCAMLR target reference point is 50% of the unexploited state (i.e.  $B_y / B_0 = 0.50$ ). The GSGSSI management goal is more precautionary and uses a long term target of 55%  $B_0$ .

**Table 3 Median spawning biomass and 95% CIs for the initial equilibrium SSB ( $B_0$ ), the current SSB, ( $B_y$ ) and the ratio of current to initial SSB for the 2007-2017 stock assessments (from Earl and Fischer 2017).**

Assessment Year	$B_0$ (000t)	$B_y$ (000 t)	$B_y / B_0$
2007	112 (98.7-125.0)	67.1 (52.9-79.9)	0.59 (0.54-0.64)
2009	98.5 (93.6-103.8)	60.2 (55.0-65.7)	0.61 (0.58-0.64)
2011	85.1 (78.9-92.1)	44.9 (38.9-51.9)	0.53 (0.49-0.56)
2013	84.9 (80.5-89.9)	45.6 (41.4-50.8)	0.54 (0.51-0.57)
2015	85.9 (81.6-91.3)	44.7 (41.4-48.7)	0.52 (0.50-0.54)
2017	83.2 (79.0-88.1)	42.2 (38.9-52.6)	0.51 (0.49-0.53)

#### 5.4.3 Harvest strategy

The general strategy is to apply an exploitation rate such that the spawning biomass approaches a precautionary target of 50% of the unexploited level. This strategy is defined in the decision rule which sets the annual total allowable catch (TAC) every two years on the basis of the stock size estimated from the stock assessment. As long as the stock assessment is accurate and there is no fishing beyond the TAC, the strategy should guarantee the fishery is sustainable. At present future recruitment levels are predicted from a truncated time series (1992 to 2011) to provide a more precautionary estimate of future productivity in the stock. The strategy includes feedback to management, from setting the controls through data collection and analysis, which estimates the outcome and subsequently will lead to an adjustment in the exploitation level. An outline of the strategy and other aspects of the

CCAMLR management regime are available from the CCAMLR website (<http://www.ccamlr.org>). The conservation measures are available at <https://www.ccamlr.org/en/conservation-and-management/conservation-measures>.

The TAC is administrated through a licensing system and quota allocation. Vessels are licensed on the basis of their track record (previous licences and on-going good behaviour). The number of licences issued reflects the size of the quota, so fewer licences would be issued should the TAC be reduced. Licences are now allocated on a quadrennial (4-yearly) basis, with the TAC adjusted within the licensing period to correspond with the biennial TAC recommendation from GSGSSI. There was a minor overshoot of the TAC by 77t (<2% TAC) in 2004 and since then the TAC has not been taken (CCAMLR, 2016; Table 4) because for precautionary reasons the quota allocated to vessels is less than the overall TAC ensuring that the actual catch is below the catch limit (GSGSSI 2016b). The TAC is further allocated among three management areas (A-C) defined in Conservation Measure 41-02, with no quota allocated to management area A (West Shag).

**Table 4: Quota settings recommended based on HCR, TAC set by GSGSSI and actual landings in tonnes unprocessed weight by seasons. [Source GSGSSI]**

Year	CCAMLR TAC Sub-area 48.3	GSGSSI Total allocation	Total Catch Taken
2012	2600	1850	1843
2013	2600	2100	2097
2014	2400	2200	2178
2015	2400	2200	2194
2016	2750	2200	2194
2017	2750	2200	2192

The catch limits are set to achieve the objectives of Article II of the Convention (Constable and de la Mare, 1996 and Constable *et al.* 2000). Achievement of the TAC is estimated by GSGSSI and CCAMLR on the basis of ongoing catch reports during the season. The measures to close fishery each year when the TAC is achieved are effective at stopping the licensed fishery.

The licensing system increases the interest in sustainable management and understanding of the regulations (GSGSSI, 2017g). The system builds an improving relationship between the industry and management, which should improve compliance. Compliance with the quota is enforced by inspectors at the landing site in Port Stanley, Falkland Islands. All catch is offloaded at Port Stanley for inspection and to ensure correct measurement.

The objective of the conservation measures on the gear is mainly to minimise bycatch, whereas toothfish size is best controlled by controlling the fishing location and depth. Currently, the only fishing methods used are bottom-set long-lines (Spanish type and Mustad autoline), which are the subject of this certification. Most catch has been taken by longlines, but 66t was taken by the experimental pots in 2001, 24t in 2006 and 55t in 2008. It is possible trot-lines and pots could be allowed in future, but a licence application would require scientific support (GSGSSI, 2017g). Trawls are prohibited because they target shallow areas holding young immature toothfish, and also bycatch species (such as grenadiers).

All fishing methods are well known and understood and each vessel's operations are recorded in detail in the CCAMLR haul by haul logbooks and verified by independent fishery observers.

The “Spanish” type has a main line, taking the snoods and hooks, suspended from a heavy hauling line, whereas the autoline system uses a single line. Lines are set with 8000-10000 hooks, at depths of between 700 m and 2250 m on the shelf slope.

A series of different gear modifications have been tested to reduce bycatch and cetacean depredation (Mitchell *et al.* 2007, Mitchell and Agnew 2007, Agnew and Mitchell, 2007) and experimental fishing using pots has been undertaken (Agnew *et al.* 2000). These are being conducted to explore different gear types and configurations used to catch toothfish. There have been no more recent trials using pots.

More recent research has been undertaken with a view to reducing depredation primarily by orcas, which can be significant (Söffker *et al.* 2015). The depredation is accounted for in the stock assessment (Söffker & Earl 2016). Management actions to reduce depredation are under review, but there is also a strong incentive for vessels to avoid depredators during operations.

The other main controls on fishing are through area closures. Currently fishing is excluded (unless approved by consensus at CCAMLR) from management area A (West Shag). GSGSSI domestic legislation additionally prohibits fishing at depths shallower than 700 m or greater than 2250 m, or within the No-take Zones or within the Benthic Closed Areas of the South Georgia and South Sandwich Islands Marine Protected Area. Closed area design is based on CPUE data: identified areas with mature animals in spawning condition and bycatch, including rays, skates and rates of snagging vulnerable benthic animals such as deep water corals and sponges (Roberts 2006). Several likely spawning grounds have been identified which could be closed off to fishing to protect recruitment if necessary, and at least one spawning area is located in the same place as a CWC/sponge aggregation site and closing off this area could meet two objectives. It is also recognised that closing off larger areas requires the displacement of larger amounts of fishing effort into the non-protected areas and this could compromise both the assessment and conservation objectives.

While the legal fishery is well controlled, most concern in the past has been with illegal, unreported and unregulated (IUU) fishing. Current levels of surveillance and enforcement appears to be effective in addressing IUU fishing (Agnew and Kirkwood 2005) and the IUU catch can be safely considered negligible (CCAMLR 2016ja).

#### 5.4.4 Harvest Control Rule and Reference Points

Clear documented harvest control rules are in place and are applied annually in CCAMLR advice on TACs. The GSGSSI have established an additional level of precaution by aiming to achieve a management goal of 55%  $B_0$ , which is higher than the CCAMLR target of 50%  $B_0$ .

The decision rule procedure requires Monte Carlo simulations of the population trajectory over 35 years under a constant TAC. A TAC is found such that if this constant catch is applied over 35 years in a projection, there is a 10% chance or less of the spawning stock falling below 20% of the pre-exploitation level, **and** the median spawning biomass is at or above 50% (CCAMLR) of its pre-exploitation level (see Figure 4). More precisely, the rule is stated as follows. A constant catch calculation must satisfy the CCAMLR decision rules:

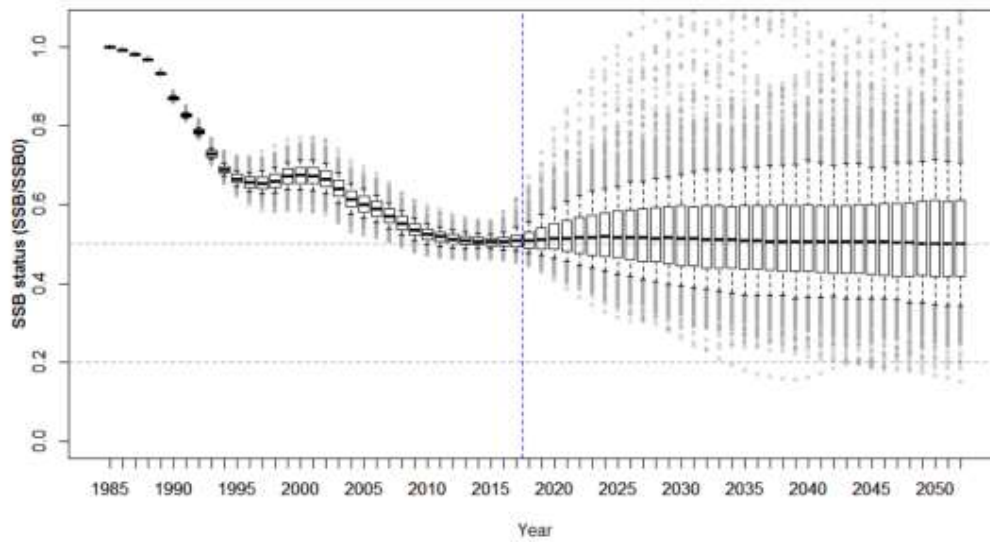
1. Choose a yield  $y_1$ , so that the probability of the spawning biomass dropping below 20% of its median pre-exploitation level, over a 35-year harvesting period, is 10% (depletion probability).
2. Choose a yield  $y_2$ , so that the median escapement in the SSB over a 35-year period is 55% (GSGSSI) of the median pre-exploitation level, at the end of the projection period.

3. Select the lower of  $\gamma_1$  and  $\gamma_2$  as the yield.

In recent years, the TAC has been set lower than the CCAMLR HCR requires, to encourage the stock to approach the more precautionary 55% management goal.

IUU catch is not included in the projection. Currently it is considered negligible and the effects of excluding IUU catch from the TAC is not additive over time as each year's assessment takes account of the estimated IUU fishing that has occurred in the previous assessment periods.

The reference points (20% and 50% of the pre-exploitation spawning biomass) are based on a precautionary approach and conform to the CCAMLR standard for management. The biological basis for the level of risk aversion and depletion level are not tightly tied to the biology of this species, but are conservative compared to the international standard practice in fisheries.



**Figure 4** Historic and projected stock status for a constant future (2017–2048) yield of 2600t tonnes prescribed for 2017 with recruitment variation. Boxes show median and 25th and 75th percentiles; whiskers extend to the 10th and 90th percentiles. (Earl and Fischer 2017).

### 5.4.5 Information and Monitoring

The legal landings of *D. eleginoides* are very well documented and very reliable. The total landings are recorded and verified in Port Stanley, Falkland Islands. In addition, on board observers provide excellent information on catch composition (length, sex and maturity of individual fish), depredation rates as well as a description and check on fishing operations from the observer reports. Average reduction in catch and CPUE due to depredation has been around an average of 3.6% around South Georgia (Moir Clark and Agnew 2010; CCAMLR 2016a). This allows a reliable catch estimate and other data on commercial catches to be provided to the stock assessment. More recently the use of electronic monitoring systems has been explored which could lead to further improvements (Benedet 2014; Benedet et al. 2016).

Historical IUU catch biomass estimates are made for all areas (CCAMLR Secretariat, 2014, 2015; CCAMLR, 2016b) and are included in stock assessments. IUU fishing has been statistically assessed for 48.3 (Agnew et al. 2002, Agnew and Kirkwood 2005). IUU fishing however does not represent a very large proportion of the total catch in area 48.3 over the last 15 years (around 0.09% over 2000-06; 0% 2007-2017; CCAMLR 2016ja; Earl and Fischer 2017). IUU estimates are based on the reasonable assumption that the same methods and gear types are used. However, there inevitably remains a degree of uncertainty around the amount of IUU fishing taking place and future IUU fishing may be dependent upon conditions outside Area 48.3 (increased enforcement elsewhere, relative changes in stock status etc.). However, with increasing time since IUU was known to occur, IUU risks are decreasing.

The stock assessment uses several indices of abundance. Standardised commercial CPUE data are split into two periods 1998-2003 and 2004-2017. Both periods are fitted with a catchability parameter and are therefore treated as relative indices of abundance (Earl and Fischer 2017). In the same way, fishery independent survey data are also used as a relative index of abundance for the period 1987-2011. In addition the survey proportions at length are also included in the assessment. The standardised commercial CPUE provides an index based on the fish caught in the fishery whilst the survey provides an index based on juvenile fish up to 75cm in length. The assessment therefore uses a variety of data both from fishery dependent and fishery independent sources that provide information on both the adult population and the juvenile component that has not yet recruited to the commercial fishery.

The more important use of tagging, rather than for stock identification, is now to provide information for the stock assessment on growth, mortality and population size (CCAMLR 2007, Agnew *et al.* 2006, Earl and Fischer 2017). The CASAL assessment model is able to make direct use of tagging data, which are important for growth estimates. These data have led to ongoing improvements in population parameter estimates both within and outside the model (e.g. suggesting natural mortality is lower than assumed in previous assessment models). The CASAL assessment method relies mostly on tag data to scale the assessment and to determine the estimate of  $B_0$ , the biomass at the start of the time series. Commercial catch and CPUE data along with survey catch and CPUE data are used to determine the subsequent trajectory of the stock abundance from this initial point.

The fishery independent surveys (conducted by the UK and in the past by Russia) are used to provide indices of abundance. Due to the depth of the survey, it is most useful to estimate the abundance of juveniles and could be valuable as a recruitment index. The index is included in the assessment, but is fitted poorly in the current model, possibly due to differences in age selectivity and growth assumptions at the younger ages.

Ongoing research is being conducted on environmental factors. There is some evidence that recruitment is higher in cooler conditions, and a PhD project looking at the effect of environmental variables on toothfish spawning is nearing completion. Climate and ecosystem



factors are considered and taken into account when setting reference points and controls. There is evidence that various relationships have been regularly discussed and considered during WG-FSA meetings (various WG-FSA reports), and where data are lacking, suitably precautionary scientific advice is given.

#### 5.4.6 Stock Assessment

The latest assessment (Earl and Fischer 2017) was reviewed by the WG-FSA (CCAMLR 2017a). The assessment used to determine the state of the stock was basically the same as that used previously with some improvements and the dataset updated to the most recent fishing season that was available. The assessment model assumes a single area and single fleet fishery with separate selection patterns estimated for two distinct time periods, the first from 1985 to 1997, the second from 1998 to 2017.

The model uses all the available data to describe the overall population dynamics (Earl and Fischer 2017). The data consist of:

- The total catch, also corrected for cetacean depredation. The correction varies annually, but is typically in the range of a 3% to 5% increase.
- A fishery independent index of abundance, derived from a first quarter bottom trawl survey, is available for most years between the period 1987 to 2016. Length compositions of survey are also collected and used.
- An index of CPUE, determined from the commercial fishery available for the period 1998 to 2016. The CPUE index is corrected for cetacean depredation (i.e., CPUE is increased to account for removal of catch by killer whales) for the period that cetacean observations are available (2004 onwards) using a GLM analysis (see Söffker & Earl 2016).
- Commercial catch length frequencies, weights and maturity and otoliths (for length-at-age data) are collected by observers.
- Tag-release and tag-recapture data from 2003-2016. The model applies the same population processes to both the tagged and untagged, but allows for a growth retardation in tagged fish. All fish are double tagged, so tag shedding is accounted for.

Assessments are discussed and analysed within a recognised forum, the CCAMLR Working Group on Fish Stock Assessment. Various assessment models have been used at South Georgia to assess the toothfish stock from a Generalized Yield Mode (GYM) through analysis of localised depletions, to the current age structured CASAL assessment model, which was first used to assess the toothfish stock in 48.3 in 2006. An age-structured production model (ASPM) has been tested and proposed (Martínez and Wöhler, 2006), but did not use the mark-recapture data, and therefore was rejected by WG-FSA. The CCAMLR WG-FSA in 2017 agreed on the current CASAL assessment model as the basis for the latest assessment (CCAMLR 2017a).

Uncertainties in the model's structure and assumptions have been assessed, and there is a search for on-going improvement. Evidence is available in the biennial fishery reports and assessment reports, the latest being CCAMLR (2017a), which requested a further evaluation of a possible trend in estimates of  $B_0$ . There has been considerable research on the treatment of data and model structure. For example, Agnew *et al.* (2006) looked at sensitivity to the assumed IUU catch and found the results are insensitive to estimates of past IUU catch. Welsford and Ziegler (2013) have reviewed best practice in the use of tagging data, and Earl (2017) conducted an evaluation of an assumption in the use of tagging data on the request. Moir Clark and Agnew (2010) estimated depredation rates, which was further evaluated by Söffker & Earl (2016). Results of this research are reflected in the current model, which includes growth delay after tagging (0.75 years) and corrections for depredation rates.

Statistical uncertainty in the data is explicitly included in the decision rule. The assessment and data were externally reviewed in 2014 (Hanchet & Welsford 2014).

#### **5.4.7 South Sandwich Islands Fishery**

There is a small fishery for toothfish in the South Sandwich Islands (CCAMLR 2016c). The fishery is divided into two areas. Patagonian toothfish (*D. eleginoides*) are caught in the northern area; whereas in the southern area a mixture of Patagonian toothfish and Antarctic toothfish (*D. mawsoni*) are caught. Catches of *D. eleginoides* are around 40t annually. The most recent stock assessment suggested that SSB/SSB<sub>0</sub> was 0.84 in 2015 (CCAMLR 2016c).

## 5.5 Principle Two: Ecosystem Background

Principle 2 of the Marine Stewardship Council standard states that:

*Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent ecologically related species) on which the fishery depends.*

The information presented in this section is provided to support the rationale set out for the Principle Two Performance Indicators. Principle Two of the MSC Standard has 5 components:-

- Retained non-target species
- Bycatch species (discarded non-target species)
- Endangered, Threatened or Protected (ETP) species
- Habitats
- Ecosystems

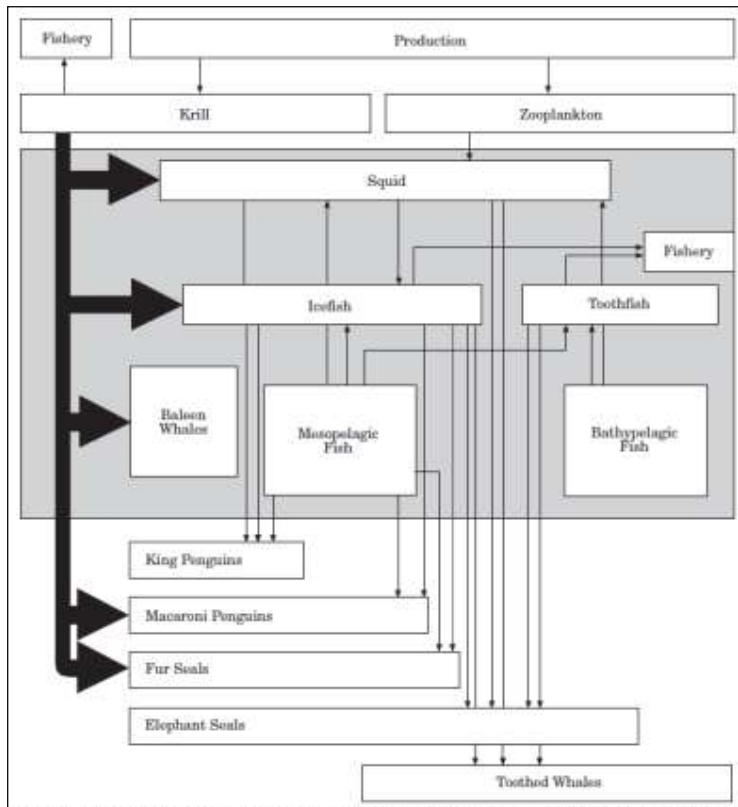
This section considers the information available about the potential effect of the fishery on each of these Principle Two components in turn. We also describe the information available about the status of the components and the management arrangements that are in place to mitigate or regulate adverse impacts.

### 5.5.1 Ecosystems

The marine ecosystem around South Georgia is based on krill (Constable et al, 2000; see Figure 5). Investigations of toothfish diet (from pot-caught specimens) show that they are an opportunistic predator (Pilling et al, 2001). Studies of isotopic ratios in other areas indicate that toothfish occupy a high trophic level (Pinkerton et al, 2007).

Elephant seals and toothed whales (sperm whales) are known to feed on toothfish (Brown et al, 1999). However the combination of the large size and depth range favoured by toothfish puts them out of the range of most predators (Collins et al, 2007).

Ecosystem modelling of the effect of the toothfish fishery suggests that the fishery is sustainable and is not likely to affect non-target species. However it is also apparent that the predicted increases in sperm whale populations in the future could adversely affect fish stocks, and need to be taken account in the future management of the fishery (Phang, 2008).



**Figure 5: Structure of the food web around South Georgia Island in the Atlantic Ocean, including the fisheries for krill, Patagonian toothfish, and mackerel icelfish. The grey box represents the pelagic system that depends on krill and other zooplankton. [Source: Constable et al, 2000]**

CCAMLR adopts a precautionary approach to ecosystem management, expected to preclude unacceptable impacts (under Article II of the Convention). The CCAMLR management objective for the fishery is designed to result in a standing stock of toothfish of 50%  $B_0$  which is considered by CCAMLR to be large enough to play its role as a predator in the ecosystem. As a further precautionary measure the GSGSSI sets an annual TAC for toothfish that is less than the CCAMLR recommendation, and which also takes account of whale depredation of toothfish (see section 5.4.4 of this report)..

### 5.5.2 Management context

There are several aspects of the management of fisheries and the protection of the marine environment at South Georgia that are relevant to all of the MSC Components. These are summarised briefly below.

The SGSSI Environment Charter was signed jointly by the GSGSSI and the UK Minister for Overseas Territories in September 2001 (GSGSSI, 2001). The Environment Charter outlines the environmental management commitments of the UK government and the GSGSSI. The Environment Charter serves as a framework policy, and has been used to guide the development of the current management plan and policies at SGSSI.

The management of SGSSI is informed by a number of International Treaties and Agreements. These include the following:

- Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR);
- Convention on Migratory Species (under which the Agreement on the Conservation of Albatrosses and Petrels (ACAP) is a part);
- Convention on Biological Diversity (CBD) (and the associated “Aichi” biodiversity targets for 2011-2020);
- London Convention on the prevention of Marine Pollution;
- Ramsar Convention on conservation of wetlands;
- United Nations Convention on the Law of the Sea (UNCLOS);
- Vienna Convention for the Protection of the Ozone Layer;
- Aarhus Convention (which concerns access to information and public participation in decision-making and access to justice in environmental matters).

The GSGSSI commitment to meeting the targets set out in these agreements is set out in the Biodiversity Action Plan for South Georgia & the South Sandwich Islands 2016-2020 (GSGSSI 2016ja). The main objectives of this BAP are:-

1. *Integrate principles of environmental sustainability into Government policies and ensure that environmental management practices are fully transparent and conform to, or exceed, global standards.*
2. *Increase SGSSI’s environmental global reach through collaboration and knowledge sharing with our stakeholders.*
3. *Ensure that our obligations under multilateral environmental agreements are met.*
4. *Develop standardised environmental assessment procedures which are scalable and commensurate with the potential impact the activity may have on the environment.*
5. *Enhance knowledge of the biodiversity and habitats of SGSSI through research, monitoring and review, including the establishment of scientific baselines from which to assess environmental change including the potential effects of climate change.*
6. *Effectively manage non-native species and work along the entire biosecurity continuum to implement best practice biosecurity protocols, post-border monitoring and emergency response measures.*
7. *Adopting an evidence-based approach and using the best available data, ensure appropriate protection of the terrestrial and marine environments through a suite of protected areas, ensuring that activities are managed sustainably and with minimal impacts on the environment.*
8. *Understand and, where possible, mitigate the risks from substances that have the potential to harm the environment such as heavy fuel oil and pollutants present in old whaling stations.*

[Source: GSGSSI, 2016a]

Evidence of the GSGSSI commitment to meeting the requirements of the Convention on Biological Diversity and associated Agreement on the Conservation of Albatrosses and Petrels include the production of species action plans intended to arrest the decline of black-browed, grey-headed and wandering albatross; this species action plan has recently been published (GSGSSI, 2016b). Other commitments include the ongoing management of the GSGSSI Marine Protected Area (MPA) that was declared in 2012 and covers 1.07 million km<sup>2</sup>. This is a sustainable use MPA (IUCN Class 6) and includes no take zones (see section 5.5.5 of this report).

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) regulates fisheries activities in the Southern Ocean waters, including around South Georgia, by means of Conservation Measures and resolutions. These include the prescription of

seabird bycatch mitigation measures. The Fisheries (Conservation and Management) Ordinance (2000) and subsequent amendments give effect to the GSGSSI's obligations under CCAMLR.

Domestic legislation underpins the delivery of the GSGSSI commitments to international conventions and its overall management strategy. The legislation relevant to the management of fishery impacts on the marine environment is briefly described below:-

### **Proclamation (Maritime Zone) 1993**

In 1993, the Proclamation (Maritime Zone) established the SGSSI MZ as its inner boundaries the outer limits of the territorial sea of South Georgia and the South Sandwich Islands and its seaward boundary a line drawn so that each point on the line is 200 nautical miles from the nearest point on specified baselines. The Proclamation provides for regulation of activity in the Maritime Zone, together with the seabed and its subsoil, in accordance with relevant international laws.

### **Fisheries (Conservation and Management) Ordinance 2000**

In 1993, the Fisheries (Conservation and Management) Ordinance was established to provide for the regulation, conservation and management of the fishing waters in the SGSSI MZ. This Ordinance was updated in 2000. The Ordinance gives effect to the UK Government's conservation and management obligations under CCAMLR. It also provides the framework for licensing and enforcement of fishing, and the penalties for illegal fishing. A number of restrictions are imposed including a requirement that vessels are flagged to a CCAMLR state and licensed by GSGSSI. Specific requirements include each fishing vessel carrying a vessel monitoring system, the daily reporting of catch effort and international observers being present on fishing vessels.

### **Wildlife and Protected Areas Ordinance 2011**

The Wildlife and Protected Areas Ordinance gives comprehensive protection to the flora and fauna of SGSSI. The legislation includes:

- Protection for wild birds and mammals, native invertebrates, native plants and the habitats in which they live;
- Prohibition of introducing non-native species;
- Prohibition of inhumane methods of capturing or killing animals;
- Prohibition of possession or transport of live or dead wildlife; and
- Powers to designate and manage Specially Protected Species and Habitats, Specially Protected Areas and Marine Protected Areas.

The Marine Protected Areas Order 2013 was made under this legislation. This formally declared a marine protected area covering those parts of SGSSI MZ that are north of the 60°S degree latitude line.

The GSGSSI has in place a licensing policy for this fishery that is relevant to all of the Components assessed under the MSC standard. The criteria used in determining eligibility for toothfish fishing licences are:-

#### **1) Compliance**

- *The compliance record in SGSSI, in other Convention Areas, and elsewhere of the applicants, owners, operators, charterers and vessel over the preceding 10 years.*
- *Evidence of due diligence having been undertaken in relation to the recruitment of officers and crew who will be on the vessel when in the Maritime Zone.*

#### **2) Welfare and safety**

- *The characteristics of the vessel, including her overall age, condition, and (for Subarea 48.4) her ice classification.*
  - *Evidence of safety protocols and standards, contingency planning, safety training and equipment on board the vessel.*
  - *Provision of support for welfare and safety of crew on board the vessel, such as medical provision.*
  - *Evidence of corporate culture and commitment in respect of welfare and safety beyond the confines of the vessel, such as in relation to social responsibility.*
- 3) *Raising fishery standards*
- *Evidence of previous contributions to fisheries science and the raising of fishery standards in SGSSI, in other Convention Areas, and in other fisheries.*
  - *Proposals for how the operator intends to contribute to the future raising of standards in the SGSSI fisheries in line with the science priorities set out in the management plan.*
  - *Proposals for scientific research and/or innovation outside of the science priorities in the management plan that will contribute to the management of the fishery or marine environment.*
- 4) *Experience*
- *Operational experience of the operator or charterer, and associated officers and crew, in SGSSI, other Convention areas, and in similar longline fisheries.*
  - *Demonstration of how experience is being applied to support the successful operation of the vessel and in furthering the objectives of the Government, CCAMLR and similar longline fisheries.*
  - *Evidence of past catch effectiveness of target species while ensuring minimisation of by-catch.*

These criteria provide a very strong management incentive for vessels to comply with all measures in place for minimising impacts on non-target species, ETP species, marine habitats and ecosystems.

Key aspects of the interactions between the fishery and each of the environmental Components considered in the MSC scheme are summarised in the following sections of this report.

### **5.5.3 Non-target species (retained and discarded)**

The South Georgia longline fishery catches some non-target species of fish and elasmobranchs, as well as some invertebrates. The quantities of these non-target species caught are recorded by on-board fishery observers and included in vessels reports to CCAMLR and GSGSSI. As well as recording the number of fish caught and discarded for each species, the observers also record the number of fish that are observed to be lost as the line is recovered to the fishing vessel (CCAMLR, 2017d).

#### **5.5.3.1 Catch of non-target species**

The average weight of each non-target species caught each year is shown in Table 5. Actual landing from the fishery are shown in Table 6.

These figures show that grenadiers (Macrourids) make up the majority of the catch of non-target species. Three species of Macrourids are caught in the fishery: *Macrourus holotrachys*, *M. caml* (previously called *M. whitsoni*) and *M. carinatus*. *M. holotrachys* has a depth and geographical range that overlaps with the South Georgia toothfish fishery and is the species

most frequently caught in this fishery. *M. carinatus* favours shallower waters and is caught less frequently. *M. caml* is caught infrequently in this fishery.



**Table 5 Summary of all retained and discarded/lost catch in the South Georgia Toothfish Longline fishery, over the past 5 years (2012-16 inclusive). The small proportion of “lost” fish are reported by the observers as numbers only because they are not brought aboard the vessel. Weights of “lost” fish have been estimated using the average weight of the retained/discarded fish. [Source: GSSGSI].**

Scientific Name	English Name	Retained (t)	Discarded/Lost (t)	Catch Percentage	Discard Percentage
<i>Dissostichus eleginoides</i>	Patagonian toothfish	10501.603	59.072	96.5%	0.6%
<i>Macrourus</i> spp	Grenadiers	44.773	262.621	2.8%	85.4%
<i>Antimora rostrata</i>	Blue antimora	1.564	62.174	0.6%	97.5%
Rajiformes	Skates and rays	0.821	12.878	0.1%	94.0%
<i>Lamna nasus</i>	Porbeagle Shark	0.000	0.191	0.0%	100.0%
Lithodidae	Crabs	0.004	0.141	0.0%	97.2%
<i>Muraenolepis</i> spp.	Moray cod	0.000	0.036	0.0%	100.0%
<i>Dissostichus mawsoni</i>	Antarctic toothfish	0.035	0.000	0.0%	0.0%
Invertebrata	Other invertebrates	0.000	0.021	0.0%	100.0%
Holothurioidea	Sea cucumber	0.000	0.015	0.0%	100.0%
	Unknown	0.000	0.012	0.0%	100.0%
<i>Lepidonotothen squamifrons</i>	Grey rock cod	0.000	0.003	0.0%	100.0%
Nototheniidae	Antarctic rockcods	0.000	0.001	0.0%	100.0%
<b>Total</b>		<b>10548.800</b>	<b>397.164</b>		<b>3.6%</b>

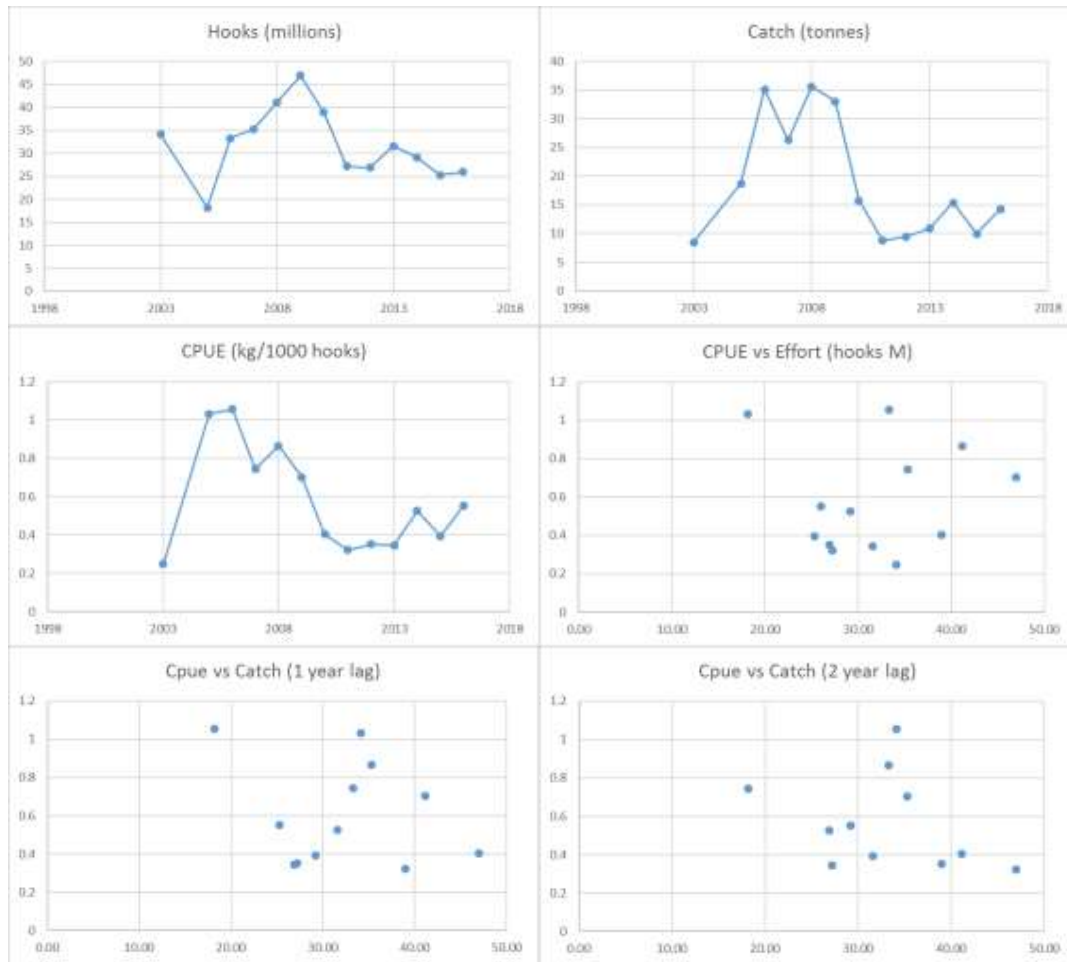
### 5.5.3.2 Status of non-target catch

Due to its dominance in the catch proportions and the northern and southern distribution of *M. carinatus* and *M. caml*, which are at the edges of their temperature ranges in South Georgia, only *M. holotrachys* is considered as likely to be impacted by the longlining fisheries occurring there.

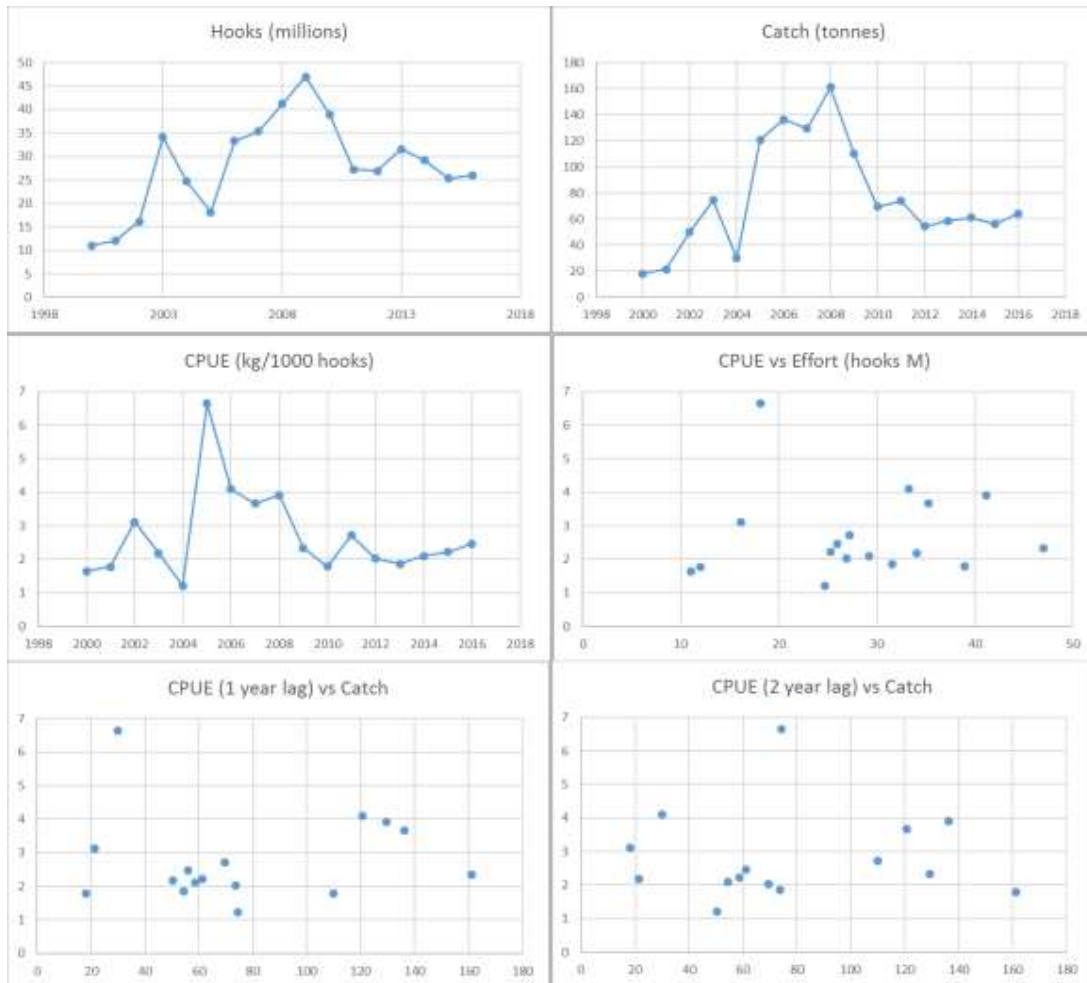
Current monitoring of changes in population size of the main bycatch species (*Antimora rostrata* and *Macrourus holotrachys*) is based on the annual mean catch-per-hook of these species, which is assumed to be an index of abundance. Fluctuations in CPUE follow the same pattern for both species (Figure 6, Figure 7), suggesting significant changes are most likely due to changes in the vessel operations and the effect on catchability. CPUE since 2010 has been stable or slightly increasing. There is no relationship between catch and CPUE, which might be expected if the catches were having a significant impact on population size. The preliminary scientific conclusion of CEFAS scientists is that the available information on *Antimora rostrata* and aggregated *Macrourus* species, which dominate the by-catch composition, do not indicate a decline over time, or in relation to historic increases or decreases in catch and effort (Darby 2017). This indicates that potential over-exploitation of the exploitable biomass of these species does not appear to have occurred.

A rajid tagging program has been underway since 2006 in Subarea 48.3. A preliminary stock assessment found that the Rajiformes caught in subarea 48.3 are mostly one species, *Amblyraja georgiana*, and the tag population size estimator estimation indicates that the stock is currently stable and has been since at least 2010. (Soeffker et al, 2014). There is evidence that the number of skates and rays caught per hook has declined, but as for blue *Antimora* and the grenadiers above, the decline in catch rates was likely due to changes in fishers' behaviour (changes in the bait used in the fishery, soak times of gear and also changes in the depths fished both as a result of depth restrictions and industry practice).

This work is ongoing and improvements in population estimates can be expected, but population trends are not likely to change (Soeffker and Walker 2017).



**Figure 6 Subarea 48.3 *Antimora rostrata*. Catch (tonnes), effort (millions of hooks), mean catch per unit effort (kg/1000 hooks) and relationships between each of the metrics. [Source GSGSSI/CEFAS]**



**Figure 7 Subarea 48.3 *Grenadier spp.* Catch (tonnes), effort (millions of hooks), mean catch per unit effort (kg/1000 hooks) and relationships between the metrics. [Source GSGSSI/CEFAS]**

Modelling of the South Georgia ecosystem indicates that fishery removals of rajids and macrourids by the toothfish fishery at current levels have a small and reversible effect on population status (Phang, 2008).

**5.5.3.3 Management measures for non-target species**

CCAMLR have specified management controls for Macrourids and for skates and rays (“rajids” in the toothfish fishery in this fishery, including overall catch limits and a “move on” rule:-

*By-catch*

6. Any by-catch of crab shall, as far as possible, be released alive.
7. The by-catch of finfish in the fishery for *Dissostichus eleginoides* in Statistical Subarea 48.3 in the 2017/18 and 2018/19 seasons shall not exceed 130 tonnes for skates and rays and 130 tonnes for *Macrourus spp.* in each season. For the purpose of these by-catch limits, ‘*Macrourus spp.*’ and ‘skates and rays’ shall each be counted as a single species.

8. *If the by-catch of any one species is equal to, or greater than, 1 tonne in any one haul or set, then the fishing vessel shall move to another location at least 5 n miles distant. The fishing vessel shall not return to any point within 5 n miles of the location where the by-catch exceeded 1 tonne for a period of at least five days. The location where the by-catch exceeded 1 tonne is defined as the path followed by the fishing vessel.*

[Source: CCAMLR Conservation Measure 41-02 (CCAMLR 2017c)]

CCAMLR report that catches of Macrourids and rajids within subarea 48.3 (from all fisheries) are well within these catch limits (see Table 6). The catch limit for macrourids has been progressively reduced from 291t pa (Morley et al, 2004) to the current TAC of 130t pa (CCAMLR, 2016a).

In addition to these controls, the GSGSSI established three “Reduced Impact Areas” (RIA) in 2008. These RIA became benthic closed areas (BCAs) as part of the MPA in 2013, with four additional benthic closed areas added. These areas are closed to fishing (apart from fishing as part of the stock tagging programme), and cover over 6,000 km<sup>2</sup>. Unpublished results of research fishing from within these areas during 2013 (Collins, pers comm.) indicate that high catches of macrourids (over 15% of total catch) are taken fishing in the West Shag and West Gully areas; confirmation that macrourids are abundant in these areas and that they were appropriately chosen.

**Table 6: Summary of catches of Macrourids and skates and rays from all fisheries within CCAMLR subarea 48.3 over the past 5 years. (Note that catch data differ from observer data shown in Table 5, which have to be raised by an appropriate factor to make them equivalent to the total catch) [Source: CCAMLR, 2017c].**

Season	Macrourids		Skates & Rays		
	Catch Limit (t)	Reported Catch (t)	Catch Limit (t)	Reported Catch (t)	Number released alive
2012	130	54	130	2	13503
2013	130	59	130	2	14005
2014	120	61	120	4	12969
2015	120	56	120	2	10937
2016	138	64	138	1	14960
2017	138	54	138	3	12921

CCAMLR used to permit a crab fishery within Subarea 48.3. The TAC for crabs was set at 1,600t per annum (CCAMLR Conservation Measure 225/XX (CCAMLR, 2001)). The fishery is no longer permitted. The observed catch of crabs by toothfish vessels (an average of 79kg pa) is far less than the CCAMLR TAC and not therefore likely to have any impact on the species concerned.

Directed fishing is prohibited for sharks throughout the CCAMLR convention area (Conservation Measure 32-18 (CCAMLR, 2006)), and also prohibited for certain fish species within certain CCAMLR subareas (CCAMMLR Conservation Measure 32-02 (CCAMLR, 2012a)). There is no evidence of any directed fishing for the species concerned in the fishery under assessment.

There is good correspondence between the independent observer records (Table 5) when they are raised by a factor of 4 and catch records (Table 6).



### 5.5.3.4 Bait species

The longlines used in the toothfish fishery are baited with squid, jack mackerel, sardines, mackerel or herring. Operators are required to inform GSGSSI in their licence applications of the bait that they intend to use in the fishery. The squid species used are Humboldt squid (*Dosidicus gigas*) or *Illex argenticus* from South America. The sardines used as bait are *Sardina pilchardus*, caught in ICES Division VIII. The herring used as bait are *Clupea harengus* caught in the North Sea. The jack mackerel (*Trachurus* spp.) are sourced from New Zealand. The estimated maximum quantities of each species used on average are shown in Table 7. These represent likely maximum use, as the actual quantity used depends on quota allocation, bait prices and availability. Information on bait use was provided based on information provided just before the 2016 season.

**Table 7: Maximum average quantity of bait (tonnes) used annually in the South Georgia Toothfish Longline Fishery during the fishing season. [Source: GSGSSI].**

Species & Source	Quantity (t)	Percent Total Catch*
North Sea Herring ( <i>Clupea harengus</i> )	70	3.2%
NE Atlantic Mackerel ( <i>Scomber scombrus</i> )	70	3.2%
South America Humboldt squid ( <i>Dosidicus gigas</i> )	225	10.3%
South Atlantic <i>Illex argenticus</i>	70	3.2%
Spanish Sardines ( <i>Sardina pilchardus</i> )	100	4.6%
New Zealand Jack Mackerel ( <i>Trachurus</i> spp.)	20	0.9%
<b>Grand Total</b>	<b>555</b>	

\* This is the ratio of the quantity of bait used per year: catch from fishery per year (recently around 2,200t).

The status of the bait species populations is briefly outlined below.

#### **North Sea Herring**

The 2017 ICES stock assessment indicates that the spawning stock for North Sea Herring is at full reproductive capacity and above the management plan trigger point ( $B_{MSY}$  is undefined for this stock). Fishing mortality is at a level compatible with  $F_{MSY}$  and below the management plan limit. The 2013 TAC for this stock was set at 481608t in 2017 (ICES, 2017a). A number of fisheries are MSC certified for the North Sea herring stock (e.g. <https://fisheries.msc.org/en/fisheries/pfa-spsg-north-sea-herring>).

#### **North East Atlantic Mackerel**

The 2017 ICES stock assessment estimated that the biomass is above the MSY  $B_{trigger}$  (and therefore  $B_{lim}$ ), but the fishing mortality has been consistently above  $F_{MSY}$  in recent years. Catches have exceeded scientific advice since 2009, and recent annual catches have been around 1 million tonnes. A number of fisheries are MSC certified for the North east Atlantic mackerel stock (e.g. <https://fisheries.msc.org/en/fisheries/minsa-north-east-atlantic-mackerel>).

#### **Humboldt squid**

*Dosidicus gigas* is a large squid, with a mantle length of up to 1m. It is found in the eastern Pacific from 35°N off California to southern Chile extending westwards furthest in the tropics

to about 120°W. It is largely an off-shelf species. It has a short lifespan of approximately one year at the end of which there is a single spawning event followed by death. (FAO, 2005).

There is no formal stock assessment for *D. gigas*, but an assessment was presented to the South Pacific Regional Fisheries Management Organisation in 2017 (Xu et al. 2017). The assessment estimated the stock status above MSY and the fishing mortality below  $F_{MSY}$ . This general result has also been the result of a tag recapture study for the Gulf of California (Morales-Bojórquez et al. 2012). The South Pacific RFMO has reported catches of between 400,000t and 500,000t in the south Pacific in 2014 and 2015 (SPRFMO, 2017). Landings are greatly affected by environmental effects such as El Niño events. No *D. gigas* stock has been MSC certified.

### **Sardines**

ICES recognises two sardine stocks in area 8. For the stock in divisions 8.a–b and 8.d, the stock was above its limit and MSY biomass reference points in 2017, although fishing mortality was also indicated as above the target level (ICES 2017c). This stock has been MSC certified (<https://fisheries.msc.org/en/fisheries/bay-of-biscay-purse-seine-sardine-fishery>), implying the stock status is likely to remain in a low risk region. Catches from this stock are currently around 30000t. For the stock in divisions 8c and 9, the stock is well below its limit reference point, and although the stock has shown a low increasing trend, fishing mortality is well above its MSY reference point (ICES 2017d). The stock was above its limit reference point in 2016, so current status is a significant change, primarily due to a revision in the reference points (ICES 2016). Catches were around 23000t in 2016. This stock is not MSC certified.

### **Jack Mackerel**

Three species of jack mackerel occur in New Zealand waters (two “New Zealand species” (*Trachurus declivis* and *T. novaezelandiae*); and the Chilean jack mackerel, *T. murphyi* which first appeared in New Zealand in the mid-1980s). Total landings and TAC of all species combined were 40,620t and 60,547t respectively in 2016/17. The overall stock status is unknown. Estimates of total mortality for *T. declivis* (JMD) and *T. novaezelandiae* from catch curve analyses in 2011 suggested that fishing mortality was well below natural mortality (M) for *T. declivis* and about equal to M for *T. novaezelandiae*. Natural mortality serves as a proxy for  $F_{MSY}$ . Their conclusion was that it was unlikely (< 40%) that overfishing is occurring while catches remain around current levels (NZ MPI 2017).

## **5.5.4 Endangered, Threatened & Protected Species**

This section of the report considers interactions with Endangered, Threatened and Protected (ETP) species, with particular attention being paid to seabirds and marine mammals.

For the purposes of MSC assessment, ETP species are defined as those listed in national legislation and in Appendix I of the Convention on International Trade in Endangered Species (CITES).

The only species listed in CITES Appendix I that this fishery is known to interact with is the sperm whale, *Physeter macrocephalus*. Other species of marine mammals and also seabird species are protected under GSGSSI legislation, and these are considered in turn below.

### **5.5.4.1 Seabirds**

South Georgia holds one of the world’s most abundant and diverse seabird communities. The total bird breeding population is thought to exceed 30 million breeding pairs. In global term South Georgia is the most important breeding site for Grey-headed albatrosses and white-



chinned petrels, and the world's third most important site for wandering albatrosses and black browed albatrosses (Poncet, 2005).

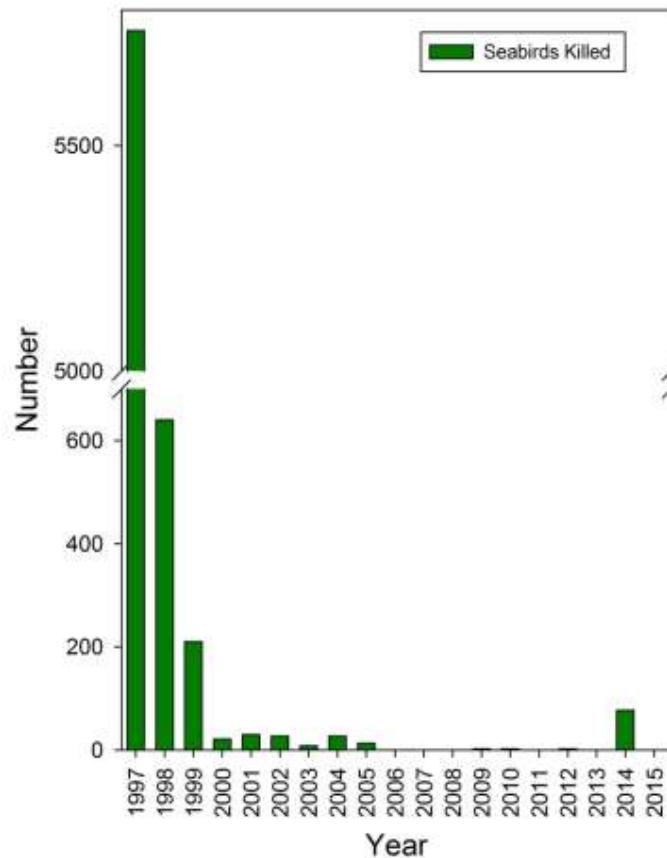
Mortality of seabirds caught during setting of longlines can be high if not managed, and longline fisheries for Patagonian toothfish were historically implicated in reducing populations of several species of albatross and petrels. In 1996, the mortality of birds in the fishery was estimated at 5,755 per annum (at a rate of 0.23 birds per 1,000 hooks) (Varty et al, 2008). Bird mitigation measures introduced by CCAMLR and GSGSSI have reduced this bycatch rate significantly (see Figure 8).

The management measures that have reduced bird mortality include a closed season for the fishery and various constraints on fishing activity that apply throughout the CCAMLR area, as well as some measures that are specific to subarea 48.3. The specific requirements are summarised below.

CCAMLR Conservation Measure 25-02 (CCAMLR, 2012b) requires that all longline vessels operating in the Convention area must:-

- Weight longlines so that they sink beyond the reach of seabirds as soon as possible after they are put in the water.
- Only set longlines at night, and even then only use the minimum ship's lights.
- Not discharge offal or discard any fish when longlines are being set; and must not discharge offal when longlines are being hauled. (Only vessels that are equipped with facilities to store offal on board or discharge it on the opposite site of the vessel to that where longlines are hauled are allowed to fish in the Convention area).
- Deploy a streamer line (see Figure 14) in all areas; and also deploy a "bird exclusion device" (BED) in high risk areas (which include subarea 48.3). The type of BED recommended by CCAMLR is shown in Figure 15.

The reduction of seabird bycatch in the South Georgia toothfish fishery is considered to be a model of best practice in seabird bycatch management (Varty et al, 2008). Despite the fact that bird mortality has been low over recent years, CCAMLR Subarea 48.3 is still considered to have a risk level for seabirds of category 5 (high), and the management measures that have reduced bycatch levels remain in force to prevent this problem recurring.



**Figure 8: Seabird mortality in the South Georgia longline fishery, 1997-2015. {Source: MarEcol, 2017}**

Seabird mortality in recent years is shown in Figure 8. It is noted that there have been some bird bycatch incidents in the past few years. These are all associated with the white chinned petrel, *Procellaria aequinoctialis*, and were all early-season events that occurred while the birds were still in the vicinity of South Georgia. During 2014, one fishing vessel caught a large number of white-chinned petrels (77) in a single haul. The vessel was found to have been in breach of daylight line setting regulations. A single white chinned petrel was killed in 2015, but 30 birds were also killed in 2016. The GSGSSI has reported that a further 19 white chinned petrels were killed in the 2017 fishing season, plus one giant petrel and another unidentified bird.

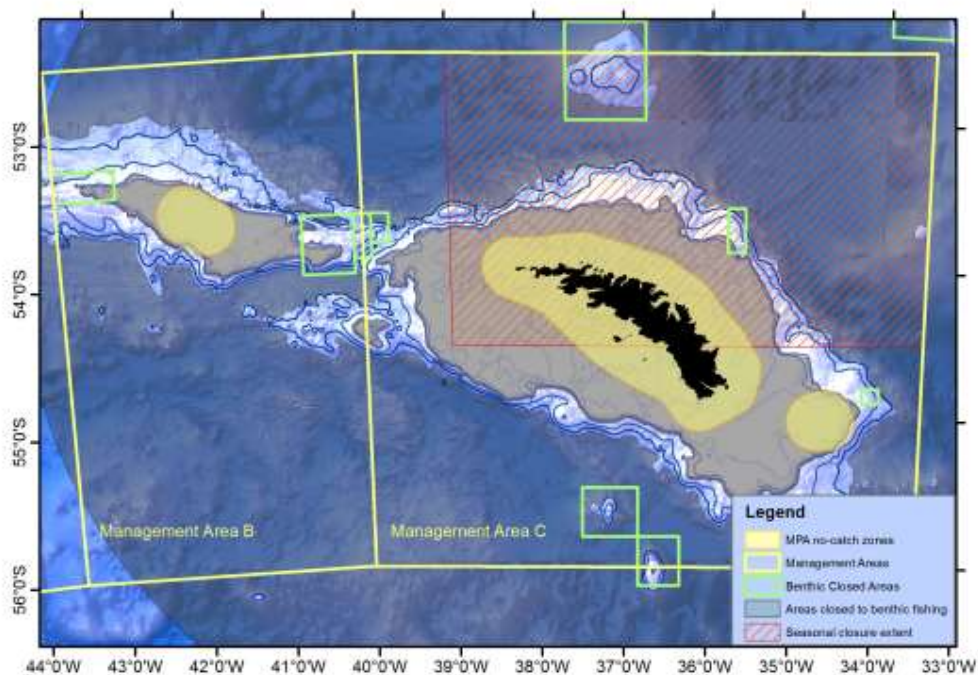
The GSGSSI has investigated all of these incidents. Where a fishing vessel has failed to implement bird mitigation measures, fines and administrative penalties have been levied (for instance the vessel involved in the 2014 incident was fined £30,000). The more recent events have occurred despite the vessels implementing all of the mitigation measures required, and despite the GSGSSI removing the “early start” to the season on 1<sup>st</sup> April and reverting to a 16<sup>th</sup> April start to the season. (The earlier start to the season had been permitted by CCAMLR under CM 41-02 included bird catch thresholds that were breached by these recent events).

GSGSSI scientists and observers report that the white-chinned petrels have recently appeared to be more abundant around South Georgia during April than they were in earlier years. The reason for this is not known. The GSGSSI’s scientific advisers (Cefas) consider that:

- 1) A possible increase in the population of white-chinned petrels cannot be determined as a potential cause of the recent increased observation of seabird interaction rate, as there is no information available on the recent trends in populations of white-chinned petrel populations at South Georgia.
- 2) There has been no major increase in the number of hooks deployed in the fishery in recent years, meaning that the increased observations of seabird interactions are not caused by an increased fishing effort.
- 3) Consequently, given the current information available, the primary factor that appears to affect the increased frequency of observed interactions is the change in the spatial distribution of the deployed fishing effort in the early part of the season.

As a result of the scientific advice GSGSSI are implementing a trial spatial management period for two weeks at the start of the 2018 season to try and minimise the risk of bird mortalities.

All vessels will be prohibited from fishing in a designated Early Season Closed Area (ESCA) to the North and West of South Georgia before 1<sup>st</sup> May to minimise the potential for interactions between birds and vessels at the most vulnerable time. The extent of the ESCA is shown in Figure 9.



**Figure 9: Location of Early Season Closed Area (ESCA) introduced in 2018 to minimise interactions with bird species. Fishing is prohibited within any of the red shaded and bounded area until the 1<sup>st</sup> May. Outside this area fishing can begin (subject to the other spatial constrictions shown) on the 16<sup>th</sup> April (GSGSSI, 2018).**

**Table 8: Observed number of seabirds killed in the longline fishery in Subarea 48.3, 2001-13**  
[Source: CCAMLR, 2013c; 2016ja; GSGSSI, pers comm.].

Fishing season	Grey-headed Albatross	Black-browed Albatross	White chinned petrel	Other
	<i>Thalassarche chrysostoma</i> (DIC)	<i>Thalassarche melanophrys</i> (DIM)	<i>Procellaria aequinoctialis</i> (PRO)	
2001		2		10
2002				7
2003	2	1	2	1
2004	1	1		3
2005				1
2006				
2007				
2008				
2009	1	1		
2010	1	1		
2011			1	
2012		1		1
2013			1	
2014			77	
2015			1	
2016			30	
2017*			20	

\* GSGSSI, pers comm.

A review of the status of seabirds at South Georgia and the need for further management action was commissioned by GSGSSI in 2010 (Wolfaardt & Christie, 2010). This report considered that the management of bird mortality in fisheries within the SGSSI Maritime Zone is good, and that there was consequently no need for a National Plan of Action. Nevertheless, populations of some seabirds on South Georgia have continued to decline – it is thought because of mortality in fisheries outside the SGSSI Maritime Zone, and also a result of the impacts of Norway rats and reindeer on nesting sites. The GSGSSI has recently taken action to eliminate rats and reindeer from South Georgia (Black et al, 2012; GSGSSI, 2014).

The GSGSSI has recently published a Conservation Action Plan for Albatrosses breeding at South Georgia, which sets out five priority actions for conservation of these species, focussed on encouraging action to reduce bird bycatch in fisheries outside the South Georgian Maritime Zone (GSGSSI, 2016b).

The GSGSSI has also joint-funded an officer (in partnership with the Falkland Islands) to produce and implement an Implementation Plan for the Agreement on the Conservation of Albatrosses and Petrels (ACAP) for the period 2016-2020 (GSGSSI, 2016c). This

implementation plan identifies the main threats facing these seabirds at South Georgia, and sets out actions to address these threats (principally rat and reindeer eradication).

In 2008 some concerns were raised about the historically high incidence of hook ingestion among seabirds in the area. Huin & Croxall (1996) estimated that 10% of the Bird Island breeding population of wandering albatross had swallowed hooks in the 1993/4 fishing season. A high incidence of hooks in wandering albatross chick stomach contents and nest sites was also reported in 2006/07. The response of the GSGSSI was to monitor the incidence of hooks in nesting areas, using specimen hooks to determine the source of any hooks found (Wolfaardt & Christie, 2010). Since 2011, all longline vessels have been required to use hooks bearing a unique identification mark on the shank so that any hooks can be traced back to the vessel. Only 8 marked hooks have subsequently been recovered from bird nests in the area (see section 5.2.4 of this report).

Any incidents of gear or hook loss are recorded by observers, and vessel operators are required to report losses to CCAMLR. Gear loss is reported to be very infrequent, and vessels take steps to recover any lost gear.

#### **5.5.4.1.1 Status of white-chinned petrels**

From the evidence available, the only seabird which currently seems to be directly affected by this fishery is the white-chinned petrel, *Procellaria aequinoctialis*. A total of 128 white-chinned petrel mortalities have been observed in the past 4 years, which is more than the total mortality of all birds in the previous 10 years (Table 8).

The IUCN red list website reports that the white chinned petrel population status is “Vulnerable” (IUCN, 2016). The current population is estimated at 2.4 million mature individuals and is considered to be decreasing. The breeding population of white chinned petrels at South Georgia represents over half of the global population of this species (Martin et al, 2009).

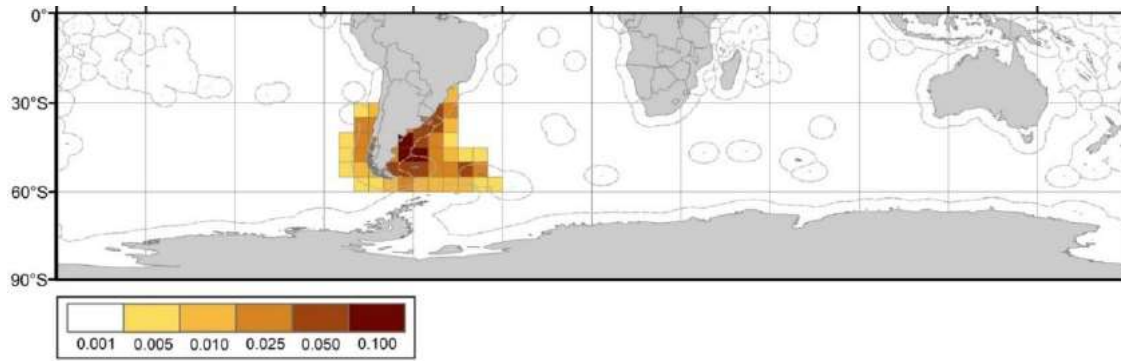
The main human impacts on this species are reported by the IUCN to arise from bycatch in longline fisheries and from injuries caused by warp strikes in trawl fisheries. Other impacts include predation on nests by introduced species such as rats on South Georgia<sup>1</sup> and other species such as cats on the Kerguelen Islands). Breeding habitats have also been degraded by other species such as the reindeer on South Georgia<sup>2</sup> and also the expanding population of Antarctic fur seals *Austrocephalus gazella* at South Georgia).

A recent assessment of risks to South Georgia albatrosses and petrels (Clay et al, 2017) found that the main risk from fishing activity arises outside the South Georgia Maritime Zone (Figure 11). Catches of many thousands of white chinned petrels per year are reported by the IUCN for the South American and longline fisheries, and historically this species has been impacted by the South African trawl fishery. Where introduced, mitigation measures are reported to have been successful (IUCN, 2016)

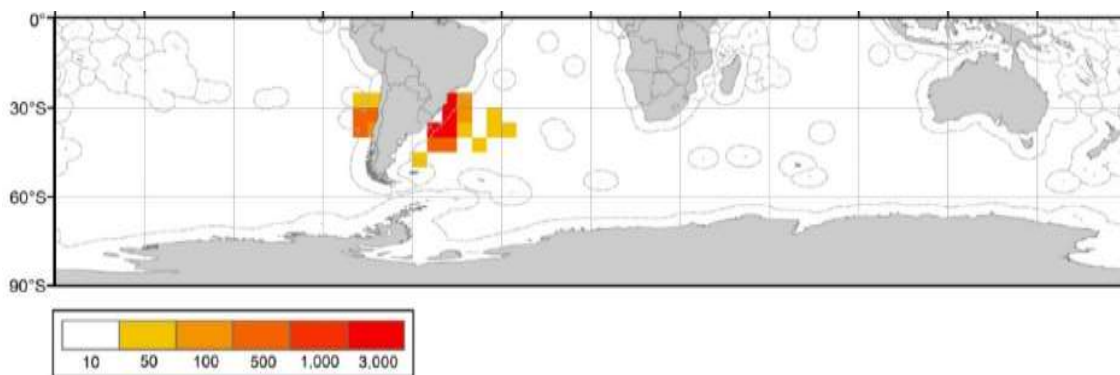
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<sup>1</sup> Note that these rats have subsequently been eradicated by GSGSSI.

<sup>2</sup> Note that these reindeer have subsequently been eradicated by GSGSSI.



**Figure 10:** Annual population of white chinned petrels from South Georgia per 5°x5° grid square averaged across months and years, 1990-2009. The colour gradient refers to the proportion of the population within each square. [Source: Clay et al, 2017].



**Figure 11:** Annual overlap score (percentage of species distribution multiplied by number of hooks per 5°x5° grid and divided by 1,000) averaged across months and years, 1990-2009 for white chinned petrel. The colour gradient shows the degree of overlap within each grid square. [Source: Clay et al, 2017].

A recent review of the conservation status and priorities for albatrosses and large petrels found that the main challenge to the conservation of these species is the implementation of bycatch mitigation measures (such as those that have been successful in South Georgia); managing predation by introduced species; and also the impact of avian cholera (Phillips et al, 2016).

As well as examining these wider management issues, researchers and GSGSSI are continuing to look at options for improving management of fishery interactions around South Georgia, such as options for better spatial management of fishing activity (Tancell et al, 2016).

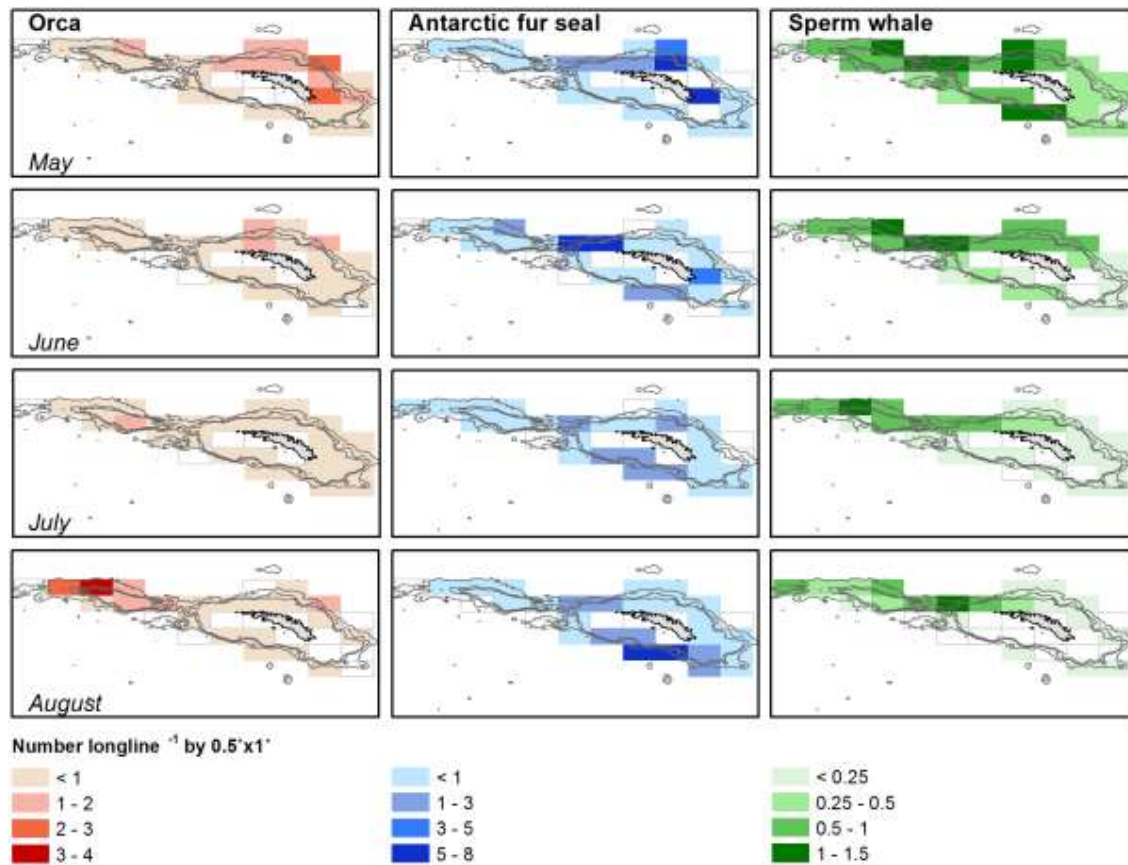
#### 5.5.4.2 Marine Mammals

There are occasional records of marine mammal mortality associated with the toothfish longline fishery in Subarea 48.3.

Observer records show that 3 pinnipeds have been caught in the fishery since 2007. These included two southern elephant seals (*Mirounga leonina*) and one Antarctic fur seal (*Arctocephalus gazella*). All of these animals were reported to have been released alive.

In 2012 a single sperm whale was caught in a longline. The animal was dead when the line was hauled, and it was not clear whether it had died as a result of entanglement or had died and become entangled subsequently. There are no observer records of any entanglement with cetacean species before or since this single incident.

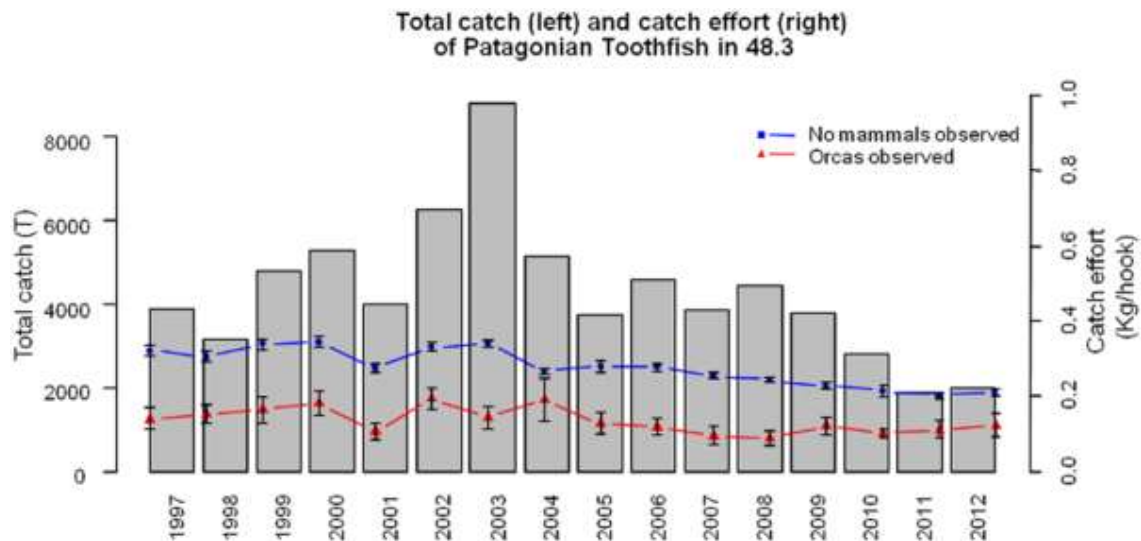
Benign interactions with whales, particularly killer whales (*Orcinus orca*) and sperm whales (*Physeter macrocephalus*) are reported to occur regularly. On average over the period 1997-2012, 4.7% of line sets interacted with killer whales, 8.9% with fur seals and 25.4% with sperm whales (Söffker et al, 2015). The spatial and temporal extent of interactions with marine mammals is illustrated in Figure 12.



**Figure 12: Observations of interactions (observations per longline per 0.5° 1° box) with Orcas, Antarctic fur seals and Sperm whales. [Source: Söffker et al, 2015].**

The whale species may congregate around fishing vessels and remove fish from the longlines as they are recovered, an activity known as “depredation”. The majority of longlines set around within 48.3 do not encounter any mammals at all. At the sets that do encounter mammals, the most frequently observed are sperm whales (25%), while orcas are observed at only ~5% of longlines. However, orcas are responsible for the majority of the catch loss (CCAMLR SAM-15-27). Depredation by killer whales can reduce CPUE by around 50% when orcas are present (Figure 13). It is estimated that whale depredation may amount to around 3.6% of the declared annual toothfish catch, but it may cause greater losses on individual lines (Söffker et al 2015). Where whale depredation levels are high, fishing vessels may cease operations and move to other areas to avoid the whales.

Evidence for “cryptic depredation” is currently being examined. It has been found that whales preferentially depredate on toothfish, so that the ratio of non-target species to toothfish is higher when depredation is known to have taken place. The toothfish: non-target species ratio may also provide an indication of whale depredation in instances where whales have not been sighted by the fishing vessel. These studies may help to provide a better understanding of the location and significance of the depredation issue.



**Figure 13: Historic total catch and catch rates of toothfish in the South Georgia fishery. Blue line shows the catch rate (kg per hook) when no mammals are observed; red line shows catch rates when Orcas have been observed. [Source: Söffker et al, 2015].**

The economic significance of whale depredation has prompted research into this issue throughout the CCAMLR area (Soeffker & Tixier, 2015; Gasco et al, 2016ja). This research is looking at evidence of cetacean attraction to fishing boats and possibilities for reducing depredation through various mitigation measures as well as establishing consistent methodologies throughout the CCAMLR area for recording interactions.

In some other toothfish longline fisheries a net umbrella has been successfully used to reduce whale depredation (this is referred to as the “*cachalotera*” longline system). This fishing method is not permitted in the South Georgia fishery because of concerns about the effect of this fishing method on post-capture survival of tagged fish, which could compromise the reliability of the stock assessment (Faulkner et al, 2015). In other fisheries acoustic deterrents have been trialled, but with little success because killer whales appear to habituate rapidly to these devices (Tixier et al, 2014b).

The current emphasis on mitigating depredation losses to cetaceans lies in managing the spatial and temporal pattern of fishing activity to avoid places and times where killer whales are most abundant (Tixier et al, 2014b; Faulkner et al, 2015).

During 2015 the GSGSSI commissioned a project to investigate the ecology and behaviour of killer whales and sperm whales around South Georgia using a combination of satellite tagging, photo identification and biopsy sampling. At the time of writing this report the results of this work are not yet available.

#### 5.5.4.3 Other species

As noted above, directed fishing is prohibited for sharks throughout the CCAMLR area and certain fish species within subarea 48.3. There is no evidence of any directed fishing for the species concerned in the fishery under assessment, and observer records indicate a very low level of accidental capture (see Table 5).



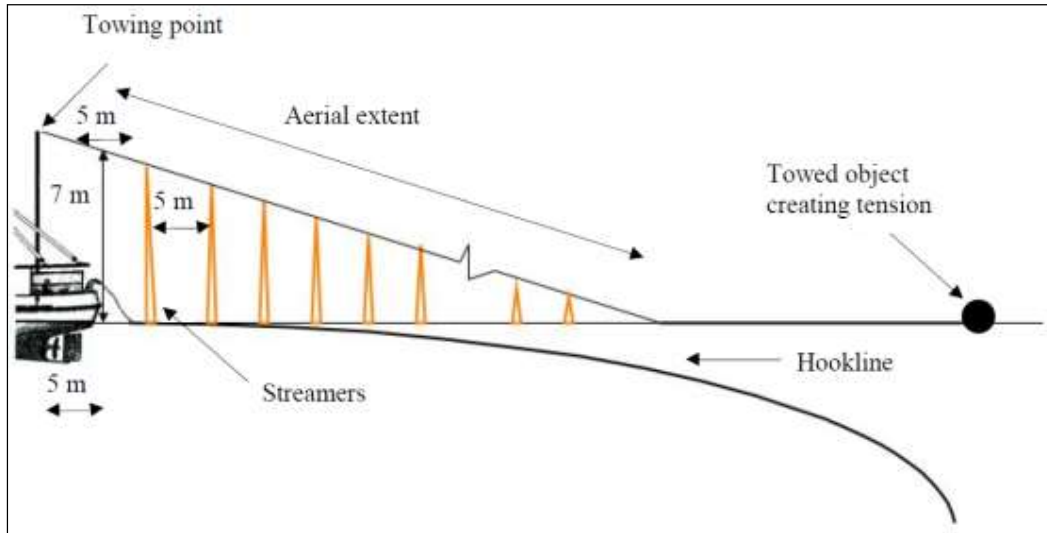


Figure 14: Diagram of the streamer line that must be used in all longline fisheries in the CCAMLR area. [Source: CCAMLR, 2012, Annex 25-02A].



Figure 15: Photograph of a bird exclusion device (BED) of the type required for all vessels operating in CCAMLR Subarea 48.3 (note that this photograph was taken in daylight, and that night-setting of gear is required by CCAMLR and GSGSSI) [Source: CCAMLR, 2014]

### 5.5.5 Marine habitats

Some information is available about the marine habitats and ecosystems in the deep waters along the continental shelf edge where the fishery is conducted. Research into potential impacts was initiated by GSGSSI in response to a condition of certification when the fishery was first certified in 2004. This work has been continued, and an update on recent progress is presented below.

The South Georgia & South Sandwich Islands Maritime Zone is remote, deep, exposed and located at a high latitude. It is a difficult environment for marine research. Nevertheless the Government of South Georgia and the South Sandwich Islands (GSGSSI) have been proactive in using all of the available sources of information to identify the extent and character of marine habitats, and have also implemented a comprehensive and precautionary management strategy to ensure that marine habitats are protected and that the area is sustainably managed. As a result, the GSGSSI MZ is presently designated as one of the world's largest Marine Protected Areas, covering over 1 million km<sup>2</sup> of coastal, shelf and oceanic habitats. This MPA covers the entire MZ, spanning both CCAMLR sub-areas 48.3 (the UoA) and 48.4 (South Sandwich Islands), which form a contiguous bioregion.

This section of the report briefly sets out the information available about marine habitats and benthic species from both scientific surveys and from monitoring of longline catches in the area.

The British Antarctic Survey (BAS) has compiled a bathymetric map of the seabed around South Georgia, using data gathered from different research vessels (see Figure 16). The GSGSSI has used observer data to provide information about the distribution of marine habitats, and in particular Vulnerable Marine Ecosystems (VMEs) around South Georgia (see Figure 17, taken from a report by Martin et al, 2012).

Benthic bycatch observations made by fishery observers have included a wide variety of taxonomic groups. Cnidarians comprise the greatest proportion (~80%) of the bycatch and include anemones, gorgonians, hydroids, hydrocorals, stony corals and black corals. Phylogenetic studies have revealed that the bycatch has included 10 families, 37 genera (three yet to be described) and at least 62 species (8 of which are new to science) (GSGSSI, 2012b).

Observations of the fishery reported in Martin et al (2012) indicate that the bycatch of gorgonians is highest in waters shallower than 600m (now closed to fishing). The bycatch falls to less than 1 gorgonian per 1,000 hooks in waters more than 1,000m deep. There are also indications that bycatch is lower for vessels using autolines than for Spanish gear types.

The GSGSSI responded to the information about benthic bycatch by taking management action. In 2008 the GSGSSI established 3 Reduced Impact Areas (RIAs) around South Georgia (see Figure 18). These areas were established in response to research into the distribution of deep water corals and benthos and stakeholder consultation in 2007 (Agnew et al, 2007). The RIAs were all implemented to protect deep water corals, and in addition to this the West Gully RIA protects a key toothfish spawning ground and the North East South Georgia Gully (NESG) was established to reduce rajid bycatch in the fishery.

In February 2012 the GSGSSI announced the creation of a Marine Protected Area (MPA) covering the GSGSSI maritime zone north of 60°S (GSGSSI, 2012a). This created a 1.07 million km<sup>2</sup> MPA within which all bottom trawling is banned, and no bottom fishing is permitted in waters shallower than 700m. Within this area, 11 No Take Zones were established where no fishing is permitted (within 12nm of South Georgia, Clerke Rock, Shag and Black Rocks, and 3nmi of the South Sandwich Islands) in addition a further ten benthic closed areas were

established where no bottom fishing is permitted. The No Take Zones cover a total area of 20,341km<sup>2</sup> (see Figure 19).

In April 2012 a workshop was held to discuss whether any further protection should be incorporated into the MPA. As a result further measures were introduced in June 2013 which included a ban on bottom fishing in waters deeper than 2,250m; the creation of some benthic closed areas in the depths fished for toothfish; and also the seasonal closure of the krill fishery. A notable feature of the management plan for the MPA area is the closure of several areas (Benthic Closed Areas, BCAs) to protect benthic habitats on a precautionary basis (seamounts to the south of South Georgia; the East South Georgia BCA; the North East Georgia Rise). BCAs have also been established at the South Sandwich Islands (Protector Shoals and the Kemp Seamount).

The combination of depth restrictions on bottom fishing and BCAs means that of the total SGSSI MZ of 1.07 million km<sup>2</sup>, only 7.8% of the area is open to fishing. The area of seabed lying between 700 and 2250m is 97,496 km<sup>2</sup>. The BCAs within this depth range cover 13,998 km<sup>2</sup>. The total area available to any form of bottom fishing is thus 83,498 km<sup>2</sup>. This means that just over 92% of the SGSSI MZ is closed to bottom fishing.

The GSGSSI has also implemented a ban on the use of mesh bags to contain the stone weights that were previously used in the fishery. This action has been taken to reduce possible impact on marine benthos resulting from entanglement with the mesh bags, and also to eliminate the risk of any lost mesh bags entangling marine animals in the area.

Following the revision of the MPA in June 2013 a revised MPA management plan was produced. The management plan and the MPA protection measures are subject to formal review every 5 years. The current version of the management plan (v2.0) was implemented in August 2013. The management plan sets out the following objectives and restrictions:-

### **Objectives**

*Conserve marine biodiversity, habitats and critical ecosystem function;*

- Ensure that fisheries are managed sustainably, with minimal impact on associated and dependent ecosystems;*
- Manage other human activities including shipping, tourism and scientific research, to minimise impacts on the marine environment;*
- Protect the benthic fauna from the destructive effects of bottom trawling;*
- Facilitate recovery of previously over-exploited marine species;*
- Increase the resilience of the marine environment to the effects of climate change;*
- Prevent the introduction of non-native marine species.*

### **Restrictions**

*Within the MPA the following restrictions apply:*

- Commercial bottom trawling is banned throughout;*
- Fishing for krill is not permitted between November 1<sup>st</sup> and 31<sup>st</sup> March to minimise competition between the fishery and krill dependent predators;*
- Fishing activity is highly regulated and only allowed subject to licences issued by GSGSSI;*
- No disposal of plastic, fishing materials, or other inorganic waste is allowed.*

[Source: GSGSSI, 2013c]

GSGSSI is due to be conducting a comprehensive review of the effectiveness of the management plan during 2018. This review started in August 2017 with an invitation for written submissions, and continued in November 2017 with a two day workshop at the British Antarctic Survey (GSGSSI, 2017jx). A report on the review of the management plan is due to be submitted by an advisory group in May 2018.

The GSGSSI has participated in and funded several research projects to inform the MPA management plan over recent years. These projects include:-

- An investigation of the use of the bottom longline fishery as a source of benthic biodiversity information around South Georgia (Benedet, 2016). This work concluded that observer data and electronic monitoring of the bycatch of benthos on longlines can provide additional scientific information to assist with management of the MPA.
- Marine Biodiversity of South Georgia field guide for scientific observers – this publication has been produced to help scientific observers to gather data that will help to characterise the marine benthos around South Georgia, recognising that the area is large and remote and the bycatch of benthos by fishing vessels provides a valuable source of information (Hogg & Collins, 201X).
- Methane South Georgia – this research cruise, led by Professor Gerhard Bohrmann from the Centre for Marine Environmental Sciences in Bremen (MARUM), examined methane emissions from the seabed, and scientists from the British Antarctic Survey working with GSGSSI participated in this cruise in order to examine whether methane seabed emissions affected benthic communities. The cruise took place in March 2017 and results of this work are not yet available.
- Biogeographical and ecological patterns in benthic biodiversity: GSGSSI are funding research by BAS to use a mixture of biological, geophysical and oceanographic data to characterise marine benthic habitats. This approach is being investigated as a tool to help with the future management of the South Georgia MPA area. Some preliminary results of this work have been published (Hogg et al, 2016), and benthic landscape maps produced from this work are shown in Figure 20 of this report.
- Underwater cameras are being used in summer 2017-18 and 2018-19 to record the benthic species within and outside Benthic Closed Areas. Additional work with underwater cameras is due to be carried out during the fishing season, using smaller cameras attached to fishing gear.

This research is being carried out as part of the work programme under the GSGSSI Biodiversity Action Plan Objective 7. The specific objectives of the BAP that relate to the South Georgia MPA are:-

*7.3 In accordance with the MPA management plan, undertake a review of the MPA in 2018 to ensure that it is fit for purpose*

*7.3.1 Continue to monitor populations of target and by-catch fish in commercial fisheries, and manage the impact of fisheries on benthic species and habitats through science and industry collaborative research as set out in Fisheries Management Plans.*

*7.3.2 Develop programs to monitor the efficacy of benthic closed areas.*

*7.3.3 Identify new species and habitat priorities within the MPA for monitoring, particularly in data poor regions.*

*7.3.4 Maintain monitoring of krill dependent predators to ensure that the krill fishery has minimal impact on populations.*

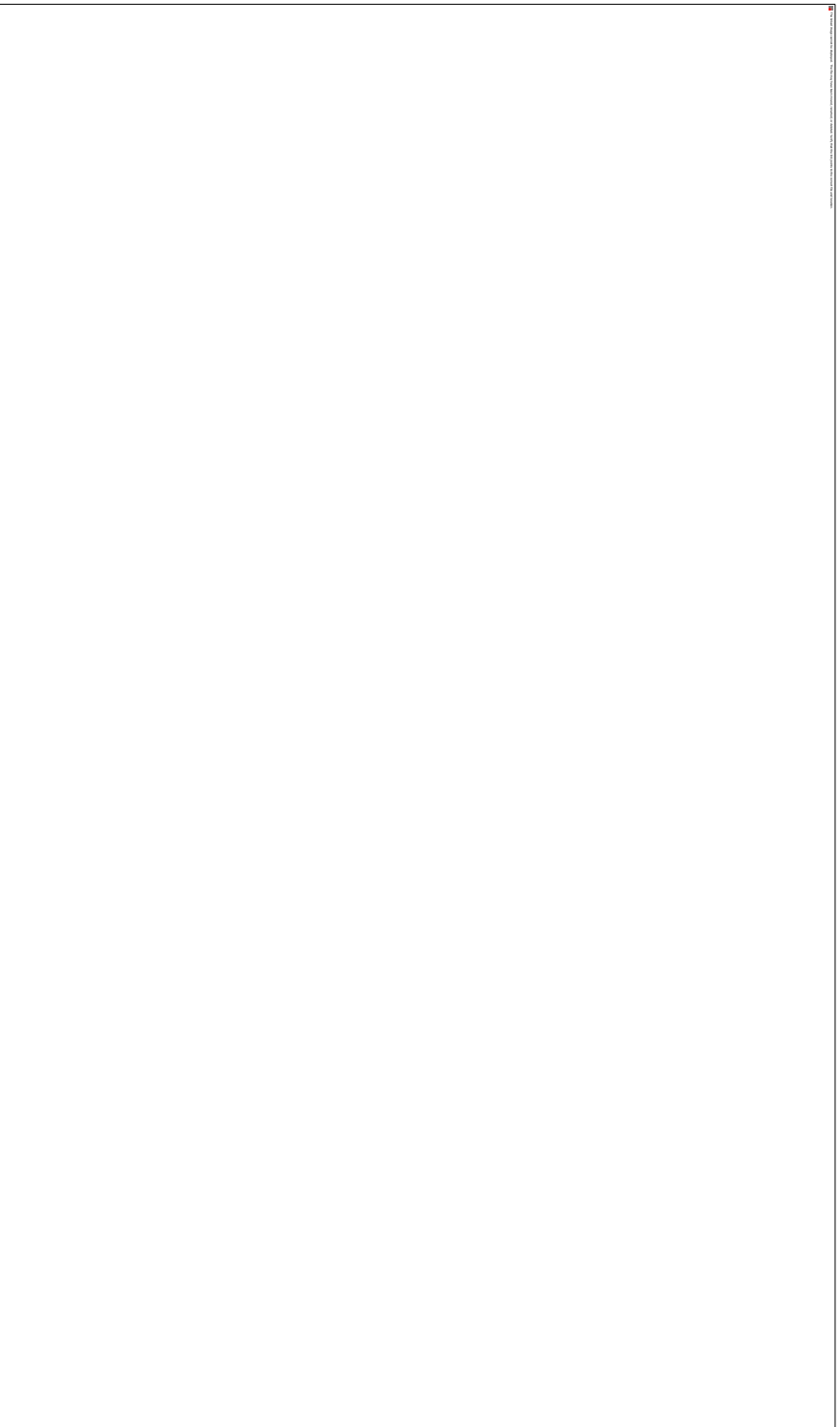
*7.3.5 Undertake a comprehensive review in 2018 of the effectiveness of the MPA, using the best available scientific data, and consulting independent experts and stakeholders. Publish a comprehensive review with conclusions and recommendations as necessary.*

*7.3.6 Based on the MPA review, consider, as appropriate, the evidence for potential changes in the way the MPA is managed.*

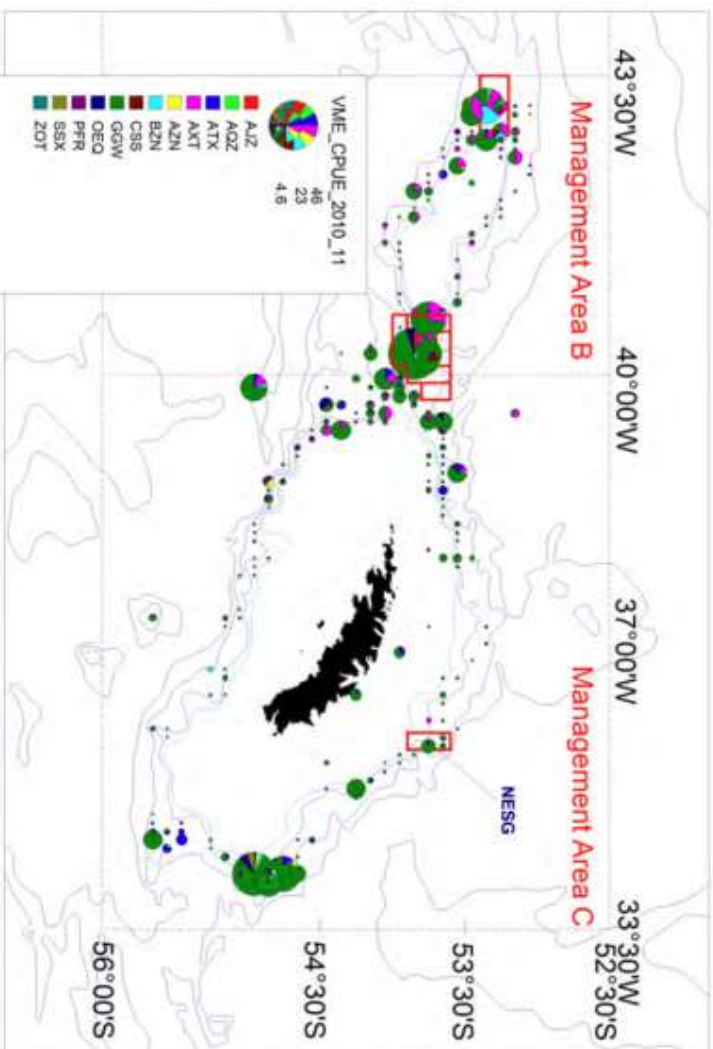
[Source: GSGSSI, 2016a]

The assessment team note that the BAP objectives and the research that is being carried out are necessary both for the management of the MPA and also to equip this fishery for meeting

the changes to the MSC standard under FCR v2.0 which places a greater emphasis on understanding the distribution of, and fishery impacts on, marine habitats and vulnerable marine ecosystems.



**Figure 16: Bathymetry of the seabed around South Georgia, derived from swath bathymetric surveys [Source: BAS, 2014].**



**Figure 17: Catch per unit effort of vulnerable marine ecosystem (VME) taxa caught in the longline fishery in 2010 and 2011 (Key --- AJZ: Alcyonacea; AQZ: Antipatharia; ATX: Actiniaria; AXT: Styasteridae, AZN: Anthoathecatae, BZN: Bryzoa, CSS: Scleractinia; GGW: Gorgonacea; OEQ: Euryalida; PFR: Porifera; SSX: Ascidacea; ZOT: Zoanthidea) [Source: Martin, et al, 2012]**

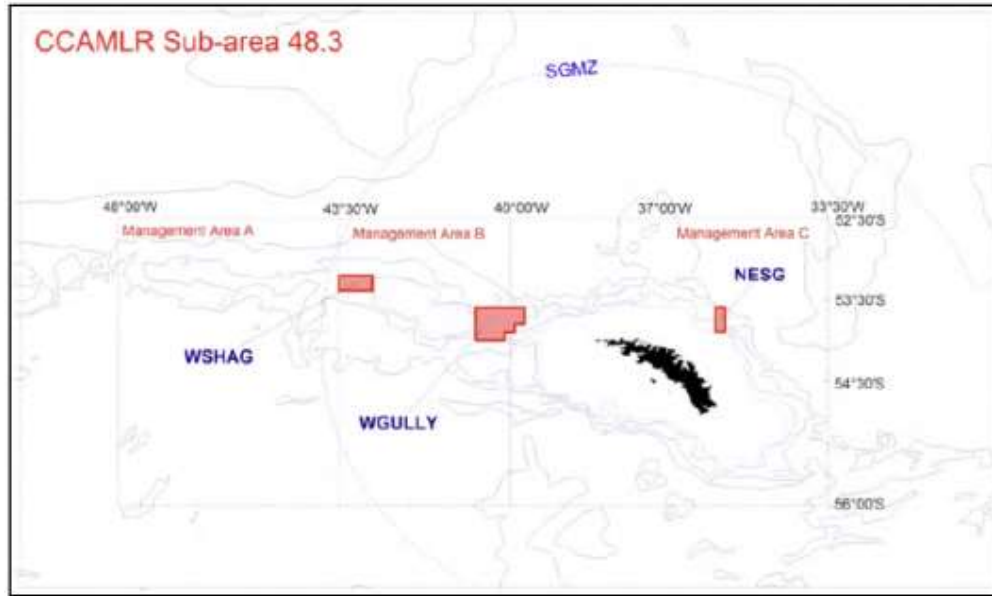


Figure 18: Location of Reduced Impact Areas (RIAs) initially established in the South Georgia toothfish fishery in 2008. Limited fishing has been allowed in these areas in order to tag toothfish. [Source: GSGSSI, 2012a]

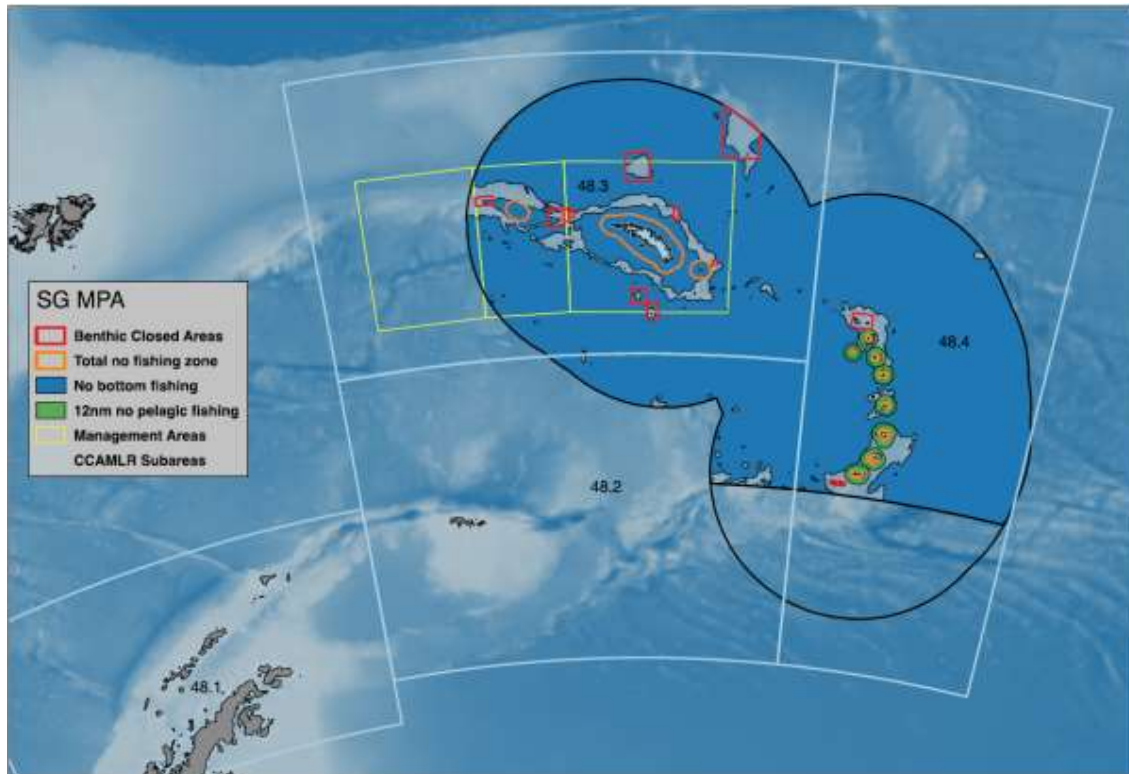
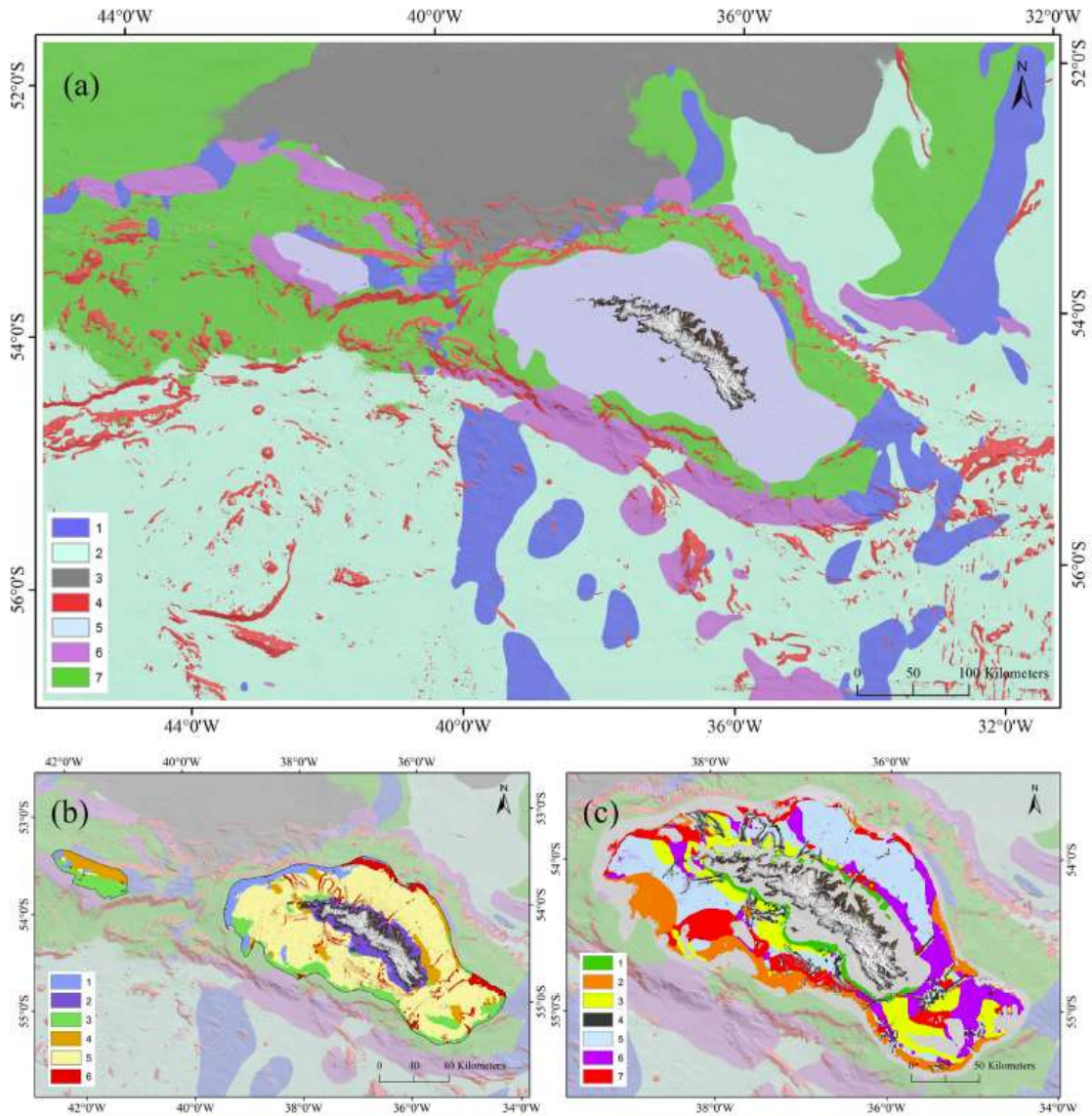


Figure 19: Map showing the South Georgia and South Sandwich Islands Marine Protected Area with additional benthic and pelagic closed areas that were established in 2013. [Source: GSGSSI, 2012b]





**Figure 20: Hierarchically nested marine landscape maps reproduced from Hogg et al, 2016. Showing (a) distribution of 7 cluster classes across the whole study region as defined by k-means cluster analysis; (b) re-clustering of cluster 5 taken from first k-mean partition (Fig. 5a) whereby the shelf (previously a single cluster) is now split into 6 sub-clusters; and (c) re-clustering of cluster 5 – sub-cluster 5 (Fig. 5b) whereby sub-cluster 5 is partitioned into 7 further third-tier clusters. [Source: Hogg et al, 2016]**

## 5.6 Principle Three: Management System Background

Principle 3 of the Marine Stewardship Council standard states that:

*The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.*

In the following section of the report a brief description is made of the key characteristics of the management system in place to ensure the sustainable exploitation of the fishery under assessment.

### 5.6.1 Management Background and Legal Framework

South Georgia and the South Sandwich Islands are a UK Overseas Territory. There is no indigenous population, and currently no permanent population. The islands are inhabited by staff from the British Antarctic Survey and South Georgia and South Sandwich Islands Government.

Executive authority is exercised by the Commissioner, a post that is held by the Governor of the Falkland Islands, on behalf of the Queen. A Chief Executive Officer deals with policy matters and is Director of SGSSI Fisheries, responsible for the allocation of fishing licences. Other staff includes an Operations Director, Environment Officer (part-time), Marine Environment and Fisheries Manager, Visitor Management Officer and Administration and Logistics Officer. The Financial Secretary and Attorney General of the territory are appointed *ex officio* similar appointments in the Falkland Islands' Government.

The Fisheries Ordinance 2000 (amended in 2005) sets out formal mechanisms for addressing disputes, and also the scale of penalties that might result from a breach of fisheries regulations. Legal disputes are addressed in the Falkland Islands by a resident Senior Magistrate and a non-resident Chief Justice.

The GSGSSI has set out its objectives for the management of the fishery in a Management Plan (GSGSSI, 2017c). The current management plan covers the period 2018-2022. It sets out the conservation and management objectives for the fishery, and also lists the administrative basis for fishery management (in terms of legislation, the annual timetable of management activities, and harvest control measures); it also identifies science, research and monitoring priorities for the fishery.

A review of fisheries legislation by GSGSSI is underway, with a planned public consultation phase, which will lead to new/updated fisheries legislation and a new Compliance and Enforcement policy for breaches of regulations/license conditions coming into force by the end of 2018.

#### 5.6.1.1 Administrative boundaries

The administrative boundaries for the SGSSI toothfish fisheries are the 200 mile maritime zone (MZ) extending from South Georgia and the South Sandwich Islands (see Figure 1). Exclusive management jurisdiction is exercised within that boundary. All vessels fishing within those boundaries are considered to be subject to all administrative and management regulations implemented by the Director of Fisheries for South Georgia (and SSI). Surveillance and enforcement by SGSSI authorities is exercised fully within those boundaries as well.

### 5.6.1.2 Sovereignty

The assessment team note that UK sovereignty over South Georgia and the South Sandwich Islands is disputed by Argentina. This dispute does not materially affect the management of the fishery, which is conducted in accordance with international (CAMLR) regulations that are independent of the sovereignty of SGSSI. The sovereignty dispute does not have any direct bearing on the status of the fishery with respect to MSC certification; and equally MSC assessment is carried out independent of sovereignty claims (providing of course that the fishery and its management meets the MSC Certification Requirements).

### 5.6.2 CAMLR, COLTO and Dissostichus Catch Document Scheme

All of the SGSSI Maritime Zone falls within the boundaries of the Convention on the Conservation of Antarctic Marine Living Resources (CAMLR), conservation measures for which are set by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), a multinational organisation. Although the Maritime Zone covers three CCAMLR statistical subareas, the entire catch for this fishery comes from within only one: subarea 48.3.

The CAMLR convention was adopted in 1980 and entered into force in 1982. Currently 25 members have subscribed to the Commission (the executive body), including the United Kingdom and the European Community. A further 11 countries have acceded to the Convention (meaning that they have agreed to be legally bound by its terms). Information on CCAMLR convention and its membership is provided on the CCAMLR website ([www.ccamlr.org](http://www.ccamlr.org)).

The aim of the Convention is the conservation of Antarctic marine life. Conservation is defined to include rational use, although there is no activity directed at management of seals and whales as harvestable resources, these being covered by other conventions. Fisheries management in South Georgia waters is therefore based directly on the annual scientific advice and recommended management measures of CCAMLR.

As an Overseas Territory of the UK, GSGSSI has no formal direct contact with CCAMLR, but is represented at CCAMLR by the Polar Regions Section of the Overseas Territories Directorate, Foreign and Commonwealth Office of the UK. Enforcement is conducted by the GSGSSI patrol vessel “*Pharos SG*”, operating consistent with CCAMLR standards and procedures. GSGSSI puts into effect the conservation measures set by CCAMLR, which is advised by its Scientific Committee (SC-CCAMLR), which is in turn advised by its Working Group on Fish Stock Assessment. Some conservation measures are aimed at preservation of the target stock while others are aimed at the reduction of direct or incidental impacts on other species. Conservation measures for target species of fisheries include the setting of annual Total Allowable Catches (TACs) for each species according to individual sub-areas.

In the late 1990s CCAMLR established a traceability scheme for toothfish (*Dissostichus*) fisheries in order to address a problem with Illegal, Unlicensed and Unregulated (IUU) fishing activity which was at that time posing a threat to the viability of some toothfish stocks. Under this Catch Documentation Scheme (CDS), the signatories to CCAMLR agreed to only allow toothfish imports that were accompanied by a “*Dissostichus* Catch Document” (DCD) which certifies the legality and provenance of the fish at the point of landing, and a “*Dissostichus* Export Document” (DED) which accompanies each subsequent consignment of exported fish. These documents are issued by the relevant State Authorities and can be inspected throughout the supply chain both as a hard copy and online.

The CDS documentation system is supported by at-sea monitoring of vessel activity using dedicated VMS equipment required by CCAMLR regulations. Any vessel fishing in CCAMLR

waters is required to transmit VMS data directly to CCAMLR, in addition to any requirements for VMS tracking imposed by national legislation.

The companies participating in the DCD / DED scheme have formed an alliance, the Coalition of Legal Toothfish Operators (COLTO) which promotes this scheme and acts as an independent industry watchdog to drive good compliance and eliminate IUU fishing for toothfish.

### **5.6.3 Administration of the fishery**

The administration of the fishery by the Government of South Georgia and the South Sandwich Islands (GSGSSI) is briefly described in the sections below.

#### **5.6.3.1 Licensing of fishing vessels**

Fishing by any means within the SGSSI Marine Protected Area is only permissible under the authority of a licence issued by the GSGSSI. The number of licences issued is restricted and adjusted in response to changes in stock status and CCAMLR management advice. Licences are issued in accordance with strict administrative criteria, set out in documentation issued to applicants by the GSGSSI (GSGSSI, 2017a). Some of the key licensing criteria are summarised below:-

- Licences are only issued to vessels from Flag States that are signatories to the CAMLR Convention, have an IMO number, have a tamperproof VMS, and comply with the Torremolinos protocol for the safety of fishing vessels.
- Only autoliners and Spanish longliners are considered for licences.
- Vessels are required to pay a licence fee and a quota fee (paid in advance) per tonne of toothfish caught.
- Vessels must have accommodation available for the independent fishery observer.
- The Director of Fisheries will rank applications on the basis of their track record of compliance; welfare & safety; raising fishery standards and experience (see section 5.6.1.2).

All vessels are required to report to the Government Officer at King Edwards Point (KEP) on South Georgia for a pre-season licensing inspection before being issued with a licence and beginning any fishing. These inspections are carried out before a vessel starts fishing.

A quota is allocated with each fishing licence. This quota must not be exceeded. Quota is not transferable between vessels. Any unused quota may be sold back to the GSGSSI during the fishing season, and can then be sold by the GSGSSI to other fishing vessels.

In 2018, following consultation with stakeholders, the GSGSSI altered the duration of licences from biennial to quadrennial. This reasons for this change included to provide scope for enhanced investment and raising of standards across the fisheries by providing greater operational security over a longer timeframe; support the long-term precautionary management of the fishery; reduce the administrative burdens on both industry and Government inherent in operating competitive licensing rounds; and allow industry to plan their operations more effectively, allowing more thorough preparations and an enhanced contribution to scientific research.

The regime retains the facility to adjust and manage fishing activity in response to changes in stock status or bycatch issues within any licensing periods, so the level of precaution in management of the fishery has not been affected by this administrative change (GSGSSI, 2013b).

### 5.6.3.2 Fishery Management objectives

Long term objectives for the management and administration of the fishery are set out in documents from both the GSGSSI and also in the CAMLR Convention.

The overall objective of the CAMLR Convention is set out in Article II:-

#### **Article II**

1. *The objective of this Convention is the conservation of Antarctic marine living resources.*
2. *For the purposes of this Convention, the term 'conservation' includes rational use.*
3. *Any harvesting and associated activities in the area to which this Convention applies shall be conducted in accordance with the provisions of this Convention and with the following principles of conservation:*
  - (a) *prevention of decrease in the size of any harvested population to levels below those which ensure its stable recruitment. For this purpose its size should not be allowed to fall below a level close to that which ensures the greatest net annual increment;*
  - (b) *maintenance of the ecological relationships between harvested, dependent and related populations of Antarctic marine living resources and the restoration of depleted populations to the levels defined in sub-paragraph (a) above; and*
  - (c) *prevention of changes or minimisation of the risk of changes in the marine ecosystem which are not potentially reversible over two or three decades, taking into account the state of available knowledge of the direct and indirect impact of harvesting, the effect of the introduction of alien species, the effects of associated activities on the marine ecosystem and of the effects of environmental changes, with the aim of making possible the sustained conservation of Antarctic marine living resources.*

[Source: CAMLR, 1980]

South Georgia is located within the CAMLR zone, and the UK Government is a signatory to the CAMLR Convention. This commitment is made directly applicable to the activities of the GSGSSI through the Environment Charter of 2001 (GSGSSI, 2001).

Management objectives that guide the actions of the Government of South Georgia are set out in the “South Georgia & South Sandwich Island Strategy 2016-2020” (GSGSSI, 2016). This document sets out the “Headline” objective of “*World-class environmental management underpinned by the highest standards of governance*” along with overall objectives for managing the environment of the Islands, their fisheries, tourism, the built environment and cultural heritage, research, government finances, and also the inhabited facilities at King Edward Point and Grytviken.

The strategic objectives for each area of activity have informed more specific objectives for the duration of the Strategy. The hierarchy of SG Government objectives relevant to the toothfish fishery are summarised in Table 9. The annual GSGSSI Business Plan sets out the actions that will be carried out each year by GSGSSI officers to deliver these objectives (GSGSSI, 2017f).

The South Georgia Government’s strategic objectives have also been transposed into actions for the fishery through the setting of appropriate management controls in line with the specific objectives for management of the stock (set out in the GSGSSI Management Plan for the fishery described in section 5.4.3 of this report) and also proposals for protection of marine habitats and species (described in section 5.5.5 of this report).

**Table 9: Summary of South Georgia Government Strategic Objectives relevant to the management of the toothfish fishery [Source: GSGSSI, 2016].**

Level	Objective (selected)
<b>Fisheries objectives</b>	
<b>Strategic</b>	To manage SGSSI fisheries to the highest international standards of operation, stewardship and sustainability
<b>Key Objectives</b>	<p>3.1 Manage SGSSI fisheries in a precautionary manner, to the highest international standards and consistent with all CCAMLR requirements, to ensure long-term sustainability.</p> <p>3.2 Collaborate with stakeholders to develop fishery management plans to guide our management and research, with clear and transparent policy and updated fisheries legislation.</p> <p>3.3 Establish arrangements for monitoring and assessing the performance of the MPA to provide evidence for future management decisions in the context of the MPA review in 2018.</p> <p>3.4 Continue raising standards in the fisheries and ensure best practice is adopted, including by developing a plan to phase out heavy fuel, restricting bunkering activity, and introducing a minimum ice-classification standard in the toothfish fishery.</p> <p>3.5 Support the UK delegation to CCAMLR to represent SGSSI's interests and seek the highest standards of marine management and conservation in the Scotia Sea and wider Southern Ocean.</p> <p>3.6 Improve public awareness about the high standards and sustainability of SGSSI fisheries, and enhance two-way knowledge and best practice information sharing with other fisheries.</p> <p>3.7 Maintain a strong, enforceable policy on Illegal, Unreported and Unregulated (IUU) vessels, deterring IUU activity through fishery patrolling while exploring scope for additional remote sensing options.</p>
<b>Environmental objectives</b>	
<b>Strategic</b>	To conserve the Territory's environment, minimise human impacts and, where practicable, restore the native biodiversity and habitats.
<b>Key Objectives</b>	<p>2.1 Integrate principles of environmental sustainability into Government policies and ensure that environmental management practices are fully transparent and conform to, or exceed, global standards.</p> <p>2.2 Increase SGSSI's environmental global reach through collaboration and knowledge sharing with our stakeholders including the UK and other UK Overseas Territory governments and non-governmental organisations.</p> <p>2.3 Ensure that our obligations under multilateral environmental agreements are met.</p> <p>2.4 Develop standardised environmental assessment procedures which are scalable and commensurate with the potential impact the activity may have on the environment.</p> <p>2.5 Enhance knowledge of the biodiversity and habitats of SGSSI through research, monitoring and review, including to establish scientific baselines from which to assess environmental change including the potential effects of climate change.</p> <p>2.6 Effectively manage invasive alien species and work along the entire biosecurity continuum to implement best practice biosecurity protocols, post-border monitoring and emergency response measures.</p> <p>2.7 Adopting an evidence-based approach and using the best</p>

	<p>available data, ensure appropriate protection of the terrestrial and marine environments through a suite of protected areas, ensuring that activities are managed sustainably and with minimal impacts on the environment.</p> <p>2.8 Understand and, where possible, mitigate the risks from substances that have the potential to harm the environment such as heavy fuel oil and pollutants present in old whaling stations.</p>
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### 5.6.3.3 Incentives for sustainable fishing

The GSGSSI has established both incentives to fish sustainably and disincentives (penalties) for any unsustainable fishing activities that are detected.

Incentives to fish sustainably are provided by the licensing regime for the fishery, which favours applicants with a good track record of compliance with all regulations in place to sustain the toothfish stock and to protect the marine environment.

Penalties for unsustainable fishing are provided in the Fisheries (Conservation and Management) Ordinance 2000 (as amended). This legislation provides the GSGSSI with the power to take action against any vessels that breach fisheries regulations and licence conditions or fish illegally in the South Georgia Maritime Zone. The Fisheries Ordinance enables the GSGSSI to seize and confiscate fishing vessels, gear and catches, and to fine operators up to UK£250,000.

The SG fisheries legislation review that is taking place in 2018 will result in new & updated fisheries legislation, and a new Compliance and Enforcement policy.

### 5.6.3.4 Compliance monitoring

Compliance with fisheries regulations and licence conditions is monitored by the GSGSSI. Fishery protection officers (which include any UK military personnel in the SGMZ) are empowered to board and inspect fishing vessels and instigate enforcement action (such as the seizure of catch, fishing gear and vessels).

All toothfish vessels are required to carry a CCAMLR fishery observer, who monitors the catch and compliance with CCAMLR regulations (CCAMLR, 2011). Vessels are required to report when they are due to start and end fishing in the SGMZ, and whilst fishing are required to make daily reports of their activities to the GSGSSI (at King Edward Point).

Remote surveillance of the fishery is important. All vessels are required to carry two VMS transponders to report their position to CCAMLR (via their flag-state) and to GSGSSI. In addition, all vessels operating in the GSGSSI fisheries have also been required since 2007 to carry a Class A Automatic Identification System (AIS) which can be used to monitor fishing vessel movements as well.

The GSGSSI fishery patrol vessel, *Pharos SG*, carries out extensive patrols in the area. Since the vessel came into service in 2006 it has spent between 201 and 249 days per year on patrol in CCAMLR Sub Area 48.3. In the most recent complete year (2016), the *Pharos SG* carried out 11 patrols over 201 days in Sub Area 48.3.

GSGSSI representatives have participated in several "Operation Coldstare" aerial reconnaissance flights from the Falkland Islands in the past 3 years. The purpose of these flights is to verify that there are no IUU vessels operating covertly in the GSGSSI MZ.



Records of compliance monitoring findings have been provided to the assessment team. These provide evidence of both the operation of the compliance monitoring system and a good level of compliance with regulations. Various minor offences are detected each year (the most frequent being a few instances of unsafe boarding ladders). One vessel was found to be using net bags for its longline weights in 2011 after the use of these was prohibited, and promptly took action to replace these bags (subsequently verified in a later inspection). Another vessel was given an Administrative penalty and fined in 2014 for discarding fishing hooks in offal

The GSGSSI is constantly vigilant for signs of IUU fishing in the area. In the mid-late 1990s IUU fishing was a major concern in this area. The compliance and enforcement regime that has been established by the GSGSSI and CCAMLR has eliminated IUU fishing in the area. The last IUU vessel detected in the area was the *Elqui*, which was apprehended in 2006, seized and subsequently scuttled off the Falkland Islands by the GSGSSI (see Figure 21).



**Figure 21: The longliner *Elqui* being scuttled by the GSGSSI near the Falkland Islands after being found to have fished illegally in South Georgia waters in 2006 (note that all hazardous materials and potential pollutants were removed before the vessel was scuttled). [Source: GSGSSI, 2012b].**

#### **5.6.3.5 Observer programme**

All of the vessels operating in the fishery are required to carry one observer at all times on all trips. In addition to this, the GSGSSI has implemented a “roaming observer” programme since 2014. The “roaming observer” transfers between vessels operating in the fishery for a period of time, to supplement the observer already on board.

The aim of the “roaming observer” programme is to improve standards and consistency of scientific observations and conservation practices across the South Georgia toothfish fleet.

The tasks carried out by the observers aboard fishing vessels are specified by CCAMLR (CCAMLR, 2011, 2013e), and are briefly summarised in the list below, duplicated from a CCAMLR observer report for a vessel operating in the South Georgia fishery:-

- (i) record details of the vessel's operation (e.g. partition of time between searching, fishing, transit etc., and details of hauls);*
  - (ii) take samples of catches to determine biological characteristics;*
  - (iii) record biological data by species caught;*
  - (iv) record by-catches, their quantity and other biological data;*
  - (v) record entanglement and incidental mortality of birds and mammals;*
  - (vi) record the procedure by which declared catch weight is measured and collect data relating to the conversion factor between green weight and final product in the event that catch is recorded on the basis of weight of processed product;*
  - (vii) prepare reports of their observations using the observation formats approved by the Scientific Committee and submit them to CCAMLR through the Designating Member;*
  - (viii) assist, if requested, the captain of the vessel in the catch recording and reporting procedures;*
  - (ix) undertake other tasks as may be decided by mutual agreement of the parties involved;*
  - (x) collect and report factual data on sightings of fishing vessels in the Convention Area, including vessel type identification, position and activity;*
  - (xi) collect information on fishing gear loss and garbage disposal by fishing vessels at sea.*
- [Source: CCAMLR Observer Cruise Report, FV Rambla, 9<sup>th</sup> April – 18<sup>th</sup> June 2016]

The GSGSSI also identify additional priorities for observer work. During 2016 the key priorities have been improving the consistency of the conversion factor between the headed gutted & tail removed (HGT) product that is landed and the green weight of the fish that are caught, and also additional recording of any VME species that are caught during experimental fishing in Benthic Closed Areas.

Observer reports for the vessels working in the South Georgia fishery have been provided for the past 3 years (2014-16). The observer reports follow the CCAMLR template, and provide a comprehensive account of each fishing trip. Many of the reports are illustrated with photographs taken by the observers as well, to show the nature of the fishing gear and illustrate events observed on the trip. An example of some of the photographic evidence submitted in the observer reports is provided in Figure 22.



Figure 1 A 'box' of baited hooks and monofilament fishing line and the rock weights

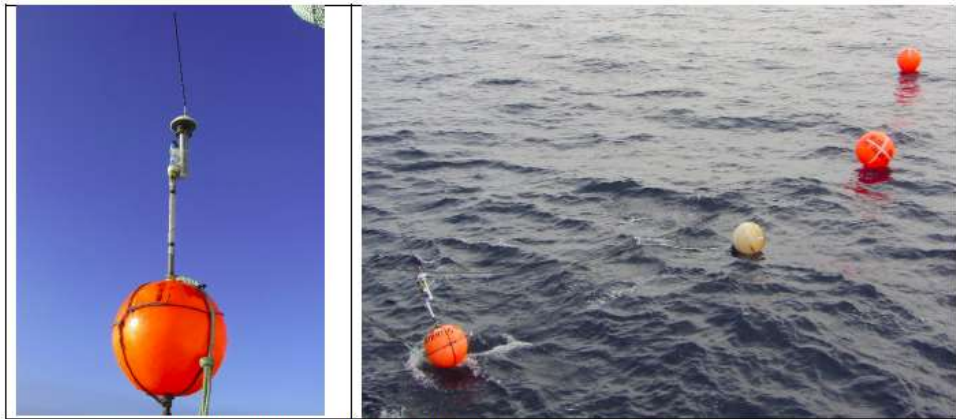


Figure 2 GPS-compatible beacon buoy and buoy configuration

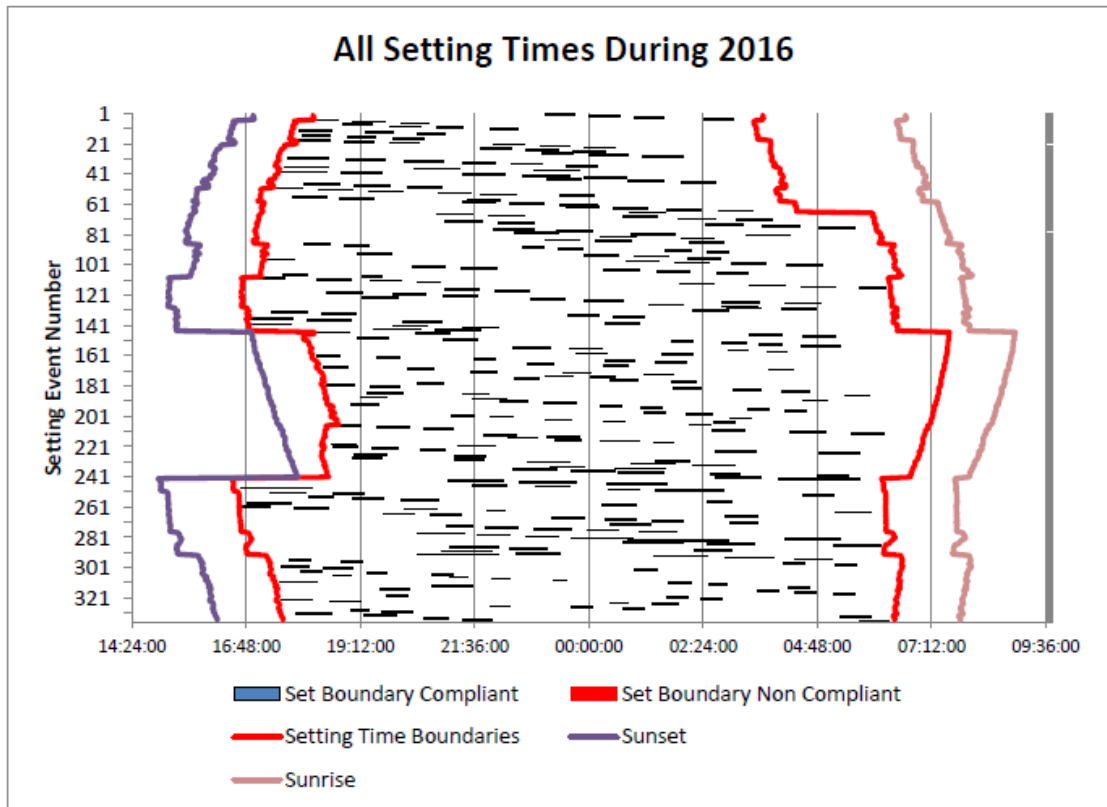
**Figure 22:** Examples of photographic evidence submitted in the observer report for FV Antarctic Bay during 2016. The photographs show the baited longline, rock weights and buoys. [Source: GSGSSI, 2016jz].

#### 5.6.3.5.1 Electronic monitoring

Some of the vessels operating in the fishery have been trialling the use of electronic monitoring (EM) equipment, including closed circuit TV (CCTV). The use of this hardware is still being evaluated by GSGSSI and the operators in the fishery.

A particular challenge for monitoring this fishery is that all fishing activity takes place at night to minimise bird interactions, which makes CCTV observations of fishing activity quite difficult. Monitoring of Tori line deployment has been a major focus of the trials. After problems verifying this from CCTV data in 2014 & 2015, trials of “night vision” cameras and infrared lamps were conducted in 2016. This increased detection of tori line deployment to 100%. For the 2018 season, all vessels are now equipped with CCTV.

These trials have shown some other potential uses of EM for the fishery, such as automatically verifying that the line setting times comply with licence requirements over the fishing season (see Figure 23).



**Figure 23: Output from Electronic Monitoring (EM) trials aboard vessels working in the South Georgia fishery demonstrating 100% compliance with line setting at night (red lines show the start and end of legal fishing hours, corresponding to the end and start of nautical twilight for the day and location of fishing activity) [Source: Archipelago, 2016]**

### 5.6.3.6 Research

The research priorities for the fishery and the marine environment are set out in the GSGSSI Management Plan for the fishery (GSGSSI, 2017c). The GSGSSI core research priorities for the period 2018-2022 are set out as:-

1. **Marine Protected Area research:** developing an evidence base for the Marine Protected Area including through benthic closed area and shallow line survey work conducted by operators licenced to fish at South Georgia. The aim of this work is to establish the impact of measures in place and collect better data on tagging and recruitment.
2. **By-catch interactions in the fishery:** exploring options to reduce bird, whale and benthic interactions to tackle issues of depredation and by-catch underpinned by research and monitoring.
3. **Technology to support fishery management:** deployment of depth and temperature loggers, CCTV systems and longline cameras to support collection and analysis of data to enhance the management of the fishery.

[Source: GSGSSI, 2017c]

Fish stock assessment work is carried out for the GSGSSI by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) and environmental monitoring work is carried out by the British Antarctic Survey (BAS) at King Edward Point on South Georgia. Progress with

scientific research work is documented in the annual “*South Georgia Project Liaison Committee Science Report*” (Belchier, 2017ja). The most recent report identifies the information that has been gathered to support stock assessments; monitoring of benthic closed areas; and higher predator monitoring.

The GSGSSI and its scientific advisors produce research protocols for fishery observers which are reviewed annually (the latest protocol is GSGSSI, 2017e). These protocols specify that data collection methods that the observers must follow for the target and bycatch species, and also for ETP species and marine benthos. The protocols ensure that the data gathered contributes to the overall objectives of the research plan.

The findings of research work commissioned by GSGSSI are reported in publications on the GSGSSI website. These include environmental and fisheries monitoring work. A summary of progress is presented in the GSGSSI Annual Report, and is reported at the GSGSSI Fisheries-Science workshop held in London every year. A summary of progress with research work and plans for future is provided to the fishing industry annually (see for instance GSGSSI, 2015a). Much of the research carried out in the area is also published in peer-reviewed journals which brings it to a wide audience and is testament to the quality of the research carried out in the area (four peer reviewed publications were produced in 2017, and several reports to CCAMLR (Belchier, 2017ja)).

The GSGSSI actively supports and participates in the research work carried out by CCAMLR. GSGSSI have also provided financial support to the creation of the South Atlantic Environmental Research Institute, which is conducting research and building research capacity among the UK Overseas Territories in the South Atlantic.

### **5.6.3.7 Monitoring & evaluation of management performance**

The administration of the fishery by the GSGSSI is subject to regular scrutiny at the annual CCAMLR Scientific Committee meetings, which consider recent landings and stock assessment data before advising on future management action for the fishery. This provides the fishery with a regular system for external review of management performance with respect to the stock, non-target species, and ETP species.

An independent expert review of the South Georgia toothfish fishery was commissioned by the GSGSSI in 2014. The review was conducted by two independent experts: Stuart Hanchet (Programme Leader, Fisheries, National Institute of Water & Atmospheric Research Ltd, New Zealand) and Dirk Welsford (Australian Antarctic Division, Department of Sustainability, Environment, Water, Population & Communities, Australia). They produced a report setting out their findings (Hanchet & Welsford, 2014).

The independent review found that the South Georgia toothfish fishery is effectively managed. The report identified areas where research was ongoing or should be focussed to assist stock management and better management of marine environmental impacts. The key findings of the review and the GSGSSI response to these findings are summarised in Table 10.

The performance of the management system has also been subject to ad hoc scrutiny through Judicial Review proceedings that were brought against the GSGSSI by fishing vessel operators. These actions resulted from certain operators being refused licences to fish for toothfish. In each case, the Courts have upheld the actions taken by the GSGSSI, indicating that the management system has operated fairly.

**Table 10:** Summary of recommendations from the 2014 review of management strategy performance (Hanchet & Welsford, 2014) and the subsequent GSGSSI response to each recommendation.

Recommendation	GSGSSI Response / Action
<p>Concise statement of management objective/s for the South Georgia fishery, an explicit harvest strategy, and a strategic plan for research to support the achievement of these management objectives over the medium to long term (5-10 years).</p>	<p>The GSGSSI has compiled a document entitled <i>"The history and evolution of the Patagonian toothfish fishery in South Georgia waters"</i> which:-</p> <ul style="list-style-type: none"> <li>• Sets out the management objectives for the fishery.</li> <li>• Summarises the history of the development of management processes and the underlying rationale.</li> <li>• Catalogues the evolution of the stock assessment and management system for the target species.</li> </ul>
<p>The history of the development of management processes and their rationale</p>	<p>Research priorities for the fishery are set out in the <i>"South Georgia &amp; the South Sandwich Islands: Toothfish Fishery (48.3 &amp; 48.4) Management Plan 2018"</i>.</p>
<p>Historical record of research to support management decision making including assessment procedures, parameter estimation, and evaluation of management targets and decision rules.</p>	<p>Progress with research activities is documented in annual South Georgia Project Liaison Committee Science Reports.</p>
<p>Summary of data holdings, data ownership and 'life-cycle' workflows describing purpose of collection, collection protocols, at-sea and on-land storage and management, error checking and quality assurance, delivery for analysis and archiving.</p>	
<p>Several issues noted above are sufficiently cross cutting to require a view of the effect of the overall management procedure, particularly as it affects the spatial and temporal extent of fishing activity. We therefore recommend the development of methods to evaluate:</p>	
<p>Trade-offs between fishery efficiency, depredation and bird bycatch rates.</p>	<ul style="list-style-type: none"> <li>• Depredation rates and the behaviour of the depredating species are being studied; management options that would reduce depredation (such as modifying fishing strategies) are being considered. See section 5.5.4.2 of this report).</li> <li>• Bird bycatch rates are monitored. The length of the fishing season has been altered to minimise bird bycatch (see section 5.5.4.1 of this report).</li> </ul>
<p>Potential bias in assessments using tag recapture data.</p>	<p>WG-FSA has recommended further exploration in the stock assessment on this matter.</p>
<p>Current and projected impacts of bottom fishing and performance of the MPA in achieving its objectives.</p>	<ul style="list-style-type: none"> <li>• Impacts of bottom fishing are being assessed (see section 5.5.5 of this report).</li> <li>• Performance of the MPA is currently being reviewed as part of the 2018 quinquennial review of the MPA management strategy.</li> </ul>
<p>Effects of fishing on bycatch and important trophic indicator species</p>	<p>The effects of fishing on bycatch species is being kept under review (see section 0 of this report).</p>

## 6 Evaluation Procedure

### 6.1 Harmonised Fishery Assessment

At the time of this re-assessment there are 7 fisheries for toothfish (*Dissostichus* spp) in the MSC programme. Six of these fisheries are for *Dissostichus eleginoides*, of which 5 (including this fishery) are currently certified. The sixth fishery (Argentine Patagonian toothfish) was withdrawn from the MSC programme. The Ross Sea toothfish longline fishery targets the congeneric species *D. mawsoni* and shares many characteristics with the *D. eleginoides* fisheries. The fisheries are all listed in Table 11 of this report.

There is no spatial overlap between the South Georgia toothfish longline fishery and the other MSC-certified fisheries. The South Georgia toothfish stock is separate to the other toothfish stocks in the MSC programme. The management regime and the body of scientific information available for the South Georgia are different to that for the other fisheries.

The common ground between the South Georgia toothfish fishery and the others within the MSC scheme lies in the fishing method, and also in the co-location of this fishery and four of the other certified fisheries in the CAMLR area, as a result of which there are some shared aspects of the management regime at the international level.

Acoura Marine have concluded that whilst it is appropriate to have regard to the outcome of the other toothfish assessments, there is no need for close harmonisation of Principle 1 & Principle 2 assessment outcomes because of the separation between the units of certification in terms of stock boundaries, and areas fished.

All of the MSC-certified toothfish fisheries with the exception of the Falkland Islands toothfish fishery operate within the CCAMLR area. The scores awarded for Principle 3 of all of these CCAMLR fisheries are very similar and the conclusions of the assessments are identical.

The assessment team has therefore concluded that no further harmonisation activity is required.



**Table 11 : List of fisheries for toothfish (*Dissostichus* spp) listed in the MSC programme. [Source: MSC Website]**

Fishery	Species	Gear types	Locations	MSC status	Tonnage
<a href="#">Argentine Patagonian toothfish</a>	Toothfish (Patagonian) ( <i>Dissostichus eleginoides</i> )	Hooks And Lines – Longlines Traps Trawls – Bottom ...	Southwest Atlantic (FAO Area 41)	Withdrawn	
<a href="#">Ross Sea toothfish longline</a>	Toothfish (Antarctic) ( <i>Dissostichus mawsoni</i> )	Hooks And Lines – Set longlines	Antarctic & Pacific (FAO Area 88)	Certified	2153
<a href="#">Falkland Island toothfish</a>	Toothfish (Patagonian) ( <i>Dissostichus eleginoides</i> )	Hooks And Lines – Set longlines	Southwest Atlantic (FAO Area 41)	Certified	1123
<a href="#">SARPC Toothfish</a>	Toothfish (Patagonian) ( <i>Dissostichus eleginoides</i> )	Hooks And Lines – Set longlines	Antarctic and Southern & Indian Ocean (FAO Area 58)	Certified	5323
<a href="#">South Georgia Patagonian toothfish longline</a>	Toothfish (Patagonian) ( <i>Dissostichus eleginoides</i> )	Hooks And Lines – Set longlines	Atlantic & Antarctic (FAO Area 48)	Certified	2194
<a href="#">Macquarie Island (MI) toothfish</a>	Toothfish (Patagonian) ( <i>Dissostichus eleginoides</i> )	Hooks And Lines – Set longlines Trawls – Bottom tr...	Southwest Pacific (FAO Area 81)	Certified	413
<a href="#">Australian Heard Island and McDonald Islands Toothfish &amp; Icefish fisheries</a>	Mackerel icefish ( <i>Champsoscephalus gunnari</i> ), Toothfish (Patagonian) ( <i>Dissostichus eleginoides</i> )	Hooks And Lines – Set longlines Trawls – Bottom tr...	Antarctic and Southern & Indian Ocean (FAO Area 58)	Certified	3144

## 6.2 Previous assessments

The second re-assessment of the fishery was completed in September 2014. The results of the re-assessment are summarised in Table 12.

**Table 12: Reassessment 2: 2014 Allocation of weighted scores at Sub-criteria, Criteria and Principle levels**

Prin- ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	UoC 1		
One	1	Outcome	0.5	1.1.1	Stock status	100		
				1.1.2	Reference points	100		
				1.1.3	Stock rebuilding	NA		
		Management	0.5			1.2.1	Harvest strategy	100
						1.2.2	Harvest control rules & tools	100
						1.2.3	Information & monitoring	90
						1.2.4	Assessment of stock status	90
Two	1	Retained species	0.2	2.1.1	Outcome	80		
				2.1.2	Management	85		
				2.1.3	Information	90		
		Bycatch	0.2			2.2.1	Outcome	80
						2.2.2	Management	95
						2.2.3	Information	90
		ETP species	0.2			2.3.1	Outcome	100
						2.3.2	Management	100
						2.3.3	Information	100
		Habitats	0.2			2.4.1	Outcome	80
						2.4.2	Management	90
						2.4.3	Information	80
		Trophic function	0.2			2.5.1	Outcome	100
						2.5.2	Management	100
						2.5.3	Information	100
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	100		
				3.1.2	Consultation, roles &	100		
				3.1.3	Long term objectives	100		
				3.1.4	Incentives for sustainable fishing	100		
		Fishery specific management system	0.5			3.2.1	Fishery specific objectives	100
						3.2.2	Decision making processes	100
						3.2.3	Compliance & enforcement	100
						3.2.4	Research plan	90
						3.2.5	Management performance	90

Overall weighted Principle-level scores	
Principle 1 - Target species	97.5
Principle 2 - Ecosystem	91.3
Principle 3 - Management	98.0

Sourced from original assessment

The high scores awarded for the fishery at reassessment 2:2014 resulted in no conditions being set for the fishery. Four recommendations were made which, whilst not obligatory, the client is encouraged to act upon within the spirit of the certification. This recommendation is detailed in Section 6.2.1 of this report.

### 6.2.1 Conditions and recommendations from previous assessments

There were no conditions of certification at the re-assessment of the fishery in 2014. Only one recommendation was raised. The status of this recommendation is reviewed in the table below.

**Table 13: Summary of status of recommendations raised at the previous 2014 re-assessment of this fishery.**

Recommendations	Descriptions	Status of Progress
Recommendation 1	It was noted under the assessment of bait species under PI 2.1.1 that the stocks of all of the bait species currently used in this fishery are in good condition. The scoring of this PI could be made more secure if the fishery adopted a policy that will ensure that bait continue to be sourced from stocks that meet the SG80 requirements (i.e. that the bait stock status is above a level at which recruitment may be impaired).	On target
Surveillance audit 1 findings	At this audit clear evidence of progress was presented. The requirement to source bait sustainably is now a licence requirement, and the GSGSSI is gathering information to verify that vessels are complying with this requirements.	On target
Surveillance audit 2 findings	The requirement to source bait sustainably remains a licence requirement, and the GSGSSI continues to gather information to verify that vessels are complying with this requirements.	On target
Surveillance audit 3 findings	The requirement to source bait sustainably remains a licence requirement, and the GSGSSI continues to gather information to verify that vessels are complying with this requirements.	On target
Surveillance audit 4 findings	The requirement to source bait sustainably remains a licence requirement, and the GSGSSI continues to gather information to verify that vessels are complying with this requirements.	On target

### 6.3 Assessment Methodologies

This fishery was assessed using the Standard Requirements defined within the MSC Certification Requirements (CR) v1.3 and the Process Requirements defined within the MSC Fishery Certification Requirements (FCR) v2.0. This means that all of P-Annexes set out in the FCR apply to this assessment, and that the S-Annexes do not. The rationale for this approach is set out in the FCR.

The MSC Certification Requirements (v2.0 at §7.8.4-7.8.5) specify that the assessment methodology shall be stated in the assessment report. This information is set out in the table below.

**Table 14: Summary of methodology used in this fishery re-assessment**

Item	Detail
Version of MSC Certification Requirements Methodology Used	CR Version 2.0, 1 <sup>st</sup> October 2014.
Version of Full Assessment Reporting Template	Version 2.0 (modified to suit CRv1.3 Assessment Tree)
Version of MSC Assessment Tree Used	CR Version 1.3, 14 <sup>th</sup> January 2013
Default Assessment Tree Used	Yes
Adjustments made to Assessment Tree	Not applicable.
Risk Based Framework	Not used

Stakeholders were informed of the assessment methodology in the notice issued by Acoura Marine on 17<sup>th</sup> August 2017. No comments were received.

## 6.4 Evaluation Processes and Techniques

### 6.4.1 Site Visits

A site visit was conducted in London, UK, over the period 13<sup>th</sup>-15<sup>th</sup> September 2017. This date and location was chosen to coincide with the annual stakeholder meetings organised by the GSGSSI, which are attended by fishing industry representatives, scientists and NGOs. Both of the assessors attended the meetings held over this period.

London was chosen as the venue for the meeting because it is more accessible than South Georgia; and because all of the key stakeholders with an interest in South Georgia would be present for the annual stakeholder meetings and those that were distant could contact the team by telephone or electronic means.

**Table 15: List of meetings carried out during the site visit, with date, activity and attendance.**

Date	Activity	Attendance
13 <sup>th</sup> September 2017	Fisheries Science – Industry Stakeholder meeting.	Assessment team. Over 40 participants including:- UK Foreign & Commonwealth Office representatives GSGSSI representatives Cefas scientists British Antarctic Survey scientists Fishing industry representatives NGO representatives
14 <sup>th</sup> September 2017	South Georgia Stakeholder meeting	Assessment team. Over 40 participants including:- UK Foreign & Commonwealth Office representatives GSGSSI representatives

Date	Activity	Attendance
		Cefas scientists Fishing industry representatives NGO representatives
15 <sup>th</sup> September 2017	Meeting with client & scientists	<b>Government of South Georgia &amp; the South Sandwich Islands (GSGSSI)</b> Sue Gregory, Fisheries Manager <b>Centre for Environment, Fisheries &amp; Aquaculture Science (Cefas)</b> Chris Darby, Scientist Marta Soffker, Scientist Timothy Earl, Scientist

#### 6.4.2 Consultations

At the Fisheries Science meeting on the 13<sup>th</sup> September the Lead Assessor gave a presentation to the stakeholder meeting (of over 40 individuals and organisations) about the re-assessment of the fishery (see agenda in section 14.1.1 of this report). Stakeholders were invited to provide feedback to the assessment team.

A meeting with the client and their scientific advisors was held on the 15<sup>th</sup> September. A record of the meeting is included at section 14.1.2 of this report.

#### 6.4.3 Evaluation Techniques

This assessment was announced through direct e-mail sent directly to stakeholders by Acoura Marine, notification on the MSC website, and through the Fishery Updates sent by the MSC to interested parties globally. The GSGSSI also alerted stakeholders to the re-assessment by including an item about this in the information circulated prior to the site visit. These multiple approaches were considered likely to reach all of the key stakeholders with an interest in this fishery.

##### 6.4.3.1 Methodology for information gathering

The information used in this assessment to provide a working knowledge of fishery and management operations was gathered by reference to published material before, during, and following the site visit. Information about the at-sea operation of the fishery was obtained through discussions with the client and scientists who have worked aboard the vessels operating in this fishery.

##### 6.4.3.2 The scoring process

Scoring was discussed by the team during the site visit and formally completed afterwards when information requested during the site visit had been made available by the clients and other stakeholders.

The scores were determined using the methodology set out in the MSC CRv2.0 at section 7.10 and set out in Table 4 of the CRv2.0. In summary, the MSC Principles and Criteria set out the requirements of a certified fishery. The certification methodology adopted by the MSC involves the interpretation of these Principles and Criteria into specific Performance Indicators and Scoring Guideposts against which the performance of Fishery can be measured. In order

to make the assessment process as clear and transparent as possible, these identify the level of performance necessary to achieve 100, 80 (a pass score), and 60 scores for each Indicator. A summary of the hierarchy of MSC Principles and Performance Indicators is provided in section 10.1 of this report.

For each Performance Indicator, the performance of the fishery is assessed as a 'score'. In order for the fishery to achieve certification, an overall score of 80 is considered necessary for each of the three Principles, 100 represent ideal best practice and 60 a measurable shortfall. A fishery cannot be certified if a score below 60 is recorded for any PI. As it is not considered possible to allocate precise scores, a scoring interval of five is therefore used in evaluations.

A procedure for determining scores was agreed before scoring took place. In all cases, the team would aim to agree a score (a consensus approach). In situations where team members could not agree on the score that should be awarded for a PI, the lowest score proposed was used as a precautionary measure.

#### **6.4.3.3 Scoring elements**

Scoring elements were identified and agreed by the team prior to scoring the fishery. The scoring elements considered in this assessment under Principles 1 and 2 are listed in Table 16 below.

**Table 16: Scoring elements considered in this assessment.**

Component	Scoring elements	Main / not main species*	Data-deficient or not
1.1.1 – Stock Status	<i>Dissostichus eleginoides</i>	Main	No
2.1.1 – Retained non-target species	<b>Bait species:</b> Humboldt squid ( <i>Dosidichus gigas</i> ) Sardines ( <i>Sardina pilchardus</i> )	Main	No No
	<b>Catch species</b> Grenadiers ( <i>Macrourus spp</i> ) Blue antimora ( <i>Antimora rostrata</i> ) Antarctic toothfish ( <i>D. mawsoni</i> )  <b>Bait species</b> North Sea herring ( <i>Clupea harengus</i> ) NE Atlantic mackerel ( <i>Scomber scombrus</i> ) S. Atlantic squid ( <i>Ilex argenticus</i> ) NZ Jack mackerel ( <i>Trachurus spp</i> )	All Minor	No No No  No No No No
2.2.1 – Discarded non-target species	Grenadiers ( <i>Macrourus spp</i> ) Blue antimora ( <i>Antimora rostrata</i> ) Crab species	All Minor	No Yes Yes
2.3.1 – ETP species	Marine birds	NA	NA
	Marine mammals		
2.4.1 – Habitats	Pelagic habitats	NA	NA
2.5.1 – Ecosystems	Ecosystem function	NA	NA

\* The MSC make a distinction in some Performance Indicators between “main species” (typically those forming 5% or more of the catch) and “minor species” (less than 5%). The MSC rules for identifying main species are set out in MSC Guidance on Certification Requirements v1.3 at section GCB3.5.2. (Note that this still applies when CRv2.0 procedures are used along with a CRv1.3 assessment tree).

## 7 Traceability

### 7.1 Eligibility Date

The Eligibility Date for this assessment will be the date of recertification.

### 7.2 Traceability within the Fishery

A description of the procedures in place that prevent non-certified fish from being mixed with certified fish prior to entering the MSC Chain of Custody is presented in Table 17 below.

**Table 17: Traceability Factors within the Fishery**

Traceability Factor	Description of risk factor if present. Where applicable, a description of relevant mitigation measures or traceability systems (this can include the role of existing regulatory or fishery management controls)
Potential for non-certified gear/s to be used within the fishery	<p>All of the vessels operating in the fishery are purpose-built longline vessels. They are not capable of fishing with any other fishing gear.</p> <p>Prior to fishing in the SGSSI MZ, all vessels are inspected by fishery officers at King Edwards Point, South Georgia. The inspection includes verification that the longlines, weights and ancillary fishing equipment are compatible with licence requirements.</p> <p>During all fishing activities there are observers aboard the fishing vessels who record and report on the type of fishing gear in use.</p> <p>The risk of non-certified gear being used within the fishery is therefore considered to be low.</p>
Potential for vessels from the UoC to fish outside the UoC or in different geographical areas (on the same trips or different trips)	<p>The UoC vessels are inspected at KEP before starting fishing and in Port Stanley at the end of fishing activities. Holds are sealed on arrival in Stanley and only unlocked when the catch verification team is present to observe any movement of fish on or off the vessel. GSGSSI inspects the vessel at the end of verification to ensure no fish remains on board.</p> <p>The inspections verify that no toothfish from outside the UoC are aboard the vessel at the start of fishing activities, and document the quantity of toothfish aboard the vessel at the end of fishing activities.</p> <p>The UoC vessels are equipped with two VMS transmitters that transmit its position (one VMS transmitter to meet CCAMLR DCD requirements and the other to meet GSGSSI requirements). They are</p>



Traceability Factor	Description of risk factor if present. Where applicable, a description of relevant mitigation measures or traceability systems (this can include the role of existing regulatory or fishery management controls)
	<p>also equipped with AIS. The position of the vessels within the UoC is therefore known at all times.</p> <p>Any movements of the vessels outside the UoC (or into any closed areas within the SGSSI MZ) would be detected by the GSGSSI.</p> <p>Two vessels are licensed to fish at CCAMLR Sub-Area 48.4 prior to the South Georgian (48.3) season. In 2017 two vessels were also licensed to conduct research fishing as part of a 3-year survey programme in subareas 48.2 and 48.4 (continuing in 2018 and 2019). All of the vessels fishing in 48.2/48.4 are also licensed to fish in 48.3.</p> <p>It is a licensing requirement for South Georgia (48.3) that all catch from 48.4 and 48.2 is packaged differently from that caught in 48.3, and is ideally stored separately. At catch verification (mid season and/or end of season) any fish from 48.2 and/or 48.4 is weighed separately and checked against the catch logs for each of those fisheries.</p> <p>The risk of any of the UoC vessels fishing outside the UoC in different geographical areas, either on the same trip or different trips is therefore considered to be very low.</p>
<p>Potential for vessels outside of the UoC or client group fishing the same stock</p>	<p>The only vessels targeting toothfish within the SGSSI MZ are longline vessels, all of which are within the UoC.</p> <p>The only other fisheries operating in the MZ are for mackerel icefish, and for krill, both caught in pelagic trawls (which don't catch toothfish, a demersal species).</p> <p>The toothfish stock within the SGSSI MZ is remote and distinct from other toothfish stocks in the Southern Ocean. There are no overlapping fisheries. IUU fishing was once a concern in this fishery but has now been addressed (see section 5.6.3.4 of this report).</p> <p>The risk of vessels outside the UoC or client group fishing the same stock is therefore considered to be negligible.</p>

Traceability Factor	Description of risk factor if present. Where applicable, a description of relevant mitigation measures or traceability systems (this can include the role of existing regulatory or fishery management controls)
Risks of mixing between certified and non-certified catch during storage, transport, or handling activities (including transport at sea and on land, points of landing, and sales at auction)	<p>The only non-certified catch which may be retained on board the toothfish longlining vessels from time to time is a small quantity of grenadier (<i>Macrourus holotrachys</i>). The grenadiers are easily distinguished from toothfish.</p> <p>MSC and non-MSC fish aboard the vessel are kept in clearly labelled packaging (boxes for most fish and bags for larger fish), to enable them to be kept separate throughout the supply chain.</p> <p>The risk of mixing certified toothfish with non-certified grenadier is considered to be very low.</p>
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	<p>The only non-certified catch which may be retained on board the toothfish longlining vessels from time to time is a small quantity of grenadier (<i>Macrourus holotrachys</i>). The grenadier are easily distinguished from toothfish.</p> <p>The risk of mixing certified toothfish with non-certified grenadier is considered to be very low.</p>
Risks of mixing between certified and non-certified catch during transshipment	There is no transshipment of fish at sea in this fishery.
Any other risks of substitution between fish from the UoC (certified catch) and fish from outside this unit (non-certified catch) before subsequent Chain of Custody is required	<p>Fish are unloaded from UoC vessels in Stanley. Landings of fish are reconciled with the hold inventory and catch records before dispatch to customers.</p> <p>The unloading of vessels is supervised by an independent 3<sup>rd</sup> party observer, whose job is to verify the effective implementation of the CCAMLR DCD and DED requirements.</p> <p>The fish are dispatched from the landing points in sealed transport containers. Each consignment of fish is accompanied with documentation including a bill of lading which records the species, weight of fish, and the point of capture (as well as the documentation required by the CCAMLR DCD &amp; DED).</p> <p>The risk of substitution of UoC fish with non-UoC fish before it reaches subsequent Chain of Custody is therefore considered to be very low.</p>

### **7.3 Eligibility to Enter Further Chains of Custody**

Acoura Marine has evaluated the eligibility of fish from this fishery to enter into further chains of custody as required by MSC Fisheries Certification Requirements at §7.12 below.

#### **a) Eligibility to enter further certified chains of custody**

Tracking and traceability information for this fishery is considered sufficient for product to be eligible to enter further chains of custody.

#### **b) Parties eligible to use the fishery certificates**

The only fishing companies eligible to use the fishery certificate are those licensed to fish in the SGSSI Maritime Zone by the Government of South Georgia and the South Sandwich Islands.

#### **c) Eligible points of landing**

The eligible point of landing is Port Stanley.

#### **d) Point of change of ownership from which Chain of Custody certification is required**

The point of change of ownership for product from the fishery is the point of landing in Stanley, Falkland Islands. All merchants and processors wishing to sell MSC certified fish that has been landed from this fishery will therefore require their own Chain of Custody certification.

### **7.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) to Enter Further Chains of Custody**

There are no IPI stocks involved in the certification.

## 8 Evaluation Results

### 8.1 Principle Level Scores

The performance of this fishery in relation to MSC Principles 1, 2, and 3 is summarised in the table below.

Table 18: **Summary of MSC Principle level scores for the South Georgia Patagonian Toothfish longline fishery.**

Final Principle Scores	
Principle	Score
Principle 1 – Target Species	98.1
Principle 2 – Ecosystem	91.3
Principle 3 – Management System	99.0

### 8.2 Summary of Scores

The scores assigned to each Performance Indicator for this fishery are shown in Table 19.

### 8.3 Summary of Conditions

All of the Performance Indicators for this fishery scored 80 or more. There are therefore no conditions of certification.

#### 8.3.1 Recommendations

Recommendations are not mandatory requirements of certification, but address any areas where the performance of the fishery against the MSC standard could be improved. The assessment team has made four recommendations for this fishery:-

- 1. Non-target species (PI2.1.1 & 2.2.1):** the fishery meets all of the requirements for non-target (retained and discarded) species under MSC CRv1.3. When the fishery is re-assessed, it will need to meet the requirements of FCRv2.0 (or its successor). MSC FCRv2.0 considers “primary” and “secondary” non-target species. It is recommended that the status of the non-target species and management measures in place are reviewed in order to ensure that the fishery is compatible with this change to the MSC Certification Requirements.
- 2. Non target species - review of alternative measures:** although the fishery meets all of the MSC CR v1.3 requirements with respect to managing impacts on non-target species, it is a requirement under MSC FCR v2.0 to review the potential effectiveness and practicality of alternative measures to reduce UoA-related mortality of unwanted catches of both primary and secondary species (PI2.1.2e & 2.2.2e). The SG80 standard requires that there is a **regular review** of such measures, and that they are implemented as appropriate. It is recommended that a system for regular review of unwanted mortality is established during this period of certification in order to ensure that the fishery is compatible with this change to the MSC Certification Requirements.
- 3. Bait (PI2.1.2):** At the last re-assessment the Assessment Team recommended that in order to make the score under this SI more secure, it would be appropriate for the fishery to adopt a policy that will ensure that bait are sourced from stocks that meet the SG80

requirements (i.e. that the stock status is above a level at which recruitment may be impaired). This is particularly relevant to the sardines used as bait in the fishery, as the status of one of the Spanish sardine stocks (27.8c/9a) has recently been reviewed and is now considered to be below its LRP.

In order to ensure that the fishery remains compliant with the current and any future versions of the MSC Certification Requirements, the Assessment team recommend that this commitment to sourcing bait from stocks that meet the SG80 requirements for this SI (or its successor) is maintained.

4. **Habitat management (PI2.4.2)** – the fishery meets all of the requirements for habitat management under MSC CR v1.3. The management plan for the fishery is currently undergoing its quinquennial review. The scoring of the PIs relating to habitat management under CRv1.3 (and looking ahead, to reassessment under FCRv2.0) would be improved if the new management plan took account of emerging norms for habitat management, including the adoption of a “move-on rule” for vulnerable marine ecosystems.
5. **Habitat outcome & information (PI2.4.1 & 2.4.3):** again, while the MSC CR v1.3 requirements are fully met for these PIs, the information required to allow the assessment of the fishery against PI2.4.1 in CR v2.0 is more onerous. In particular the new CR required that there is an understanding of impacts on “commonly encountered” habitats and “vulnerable marine ecosystems”. The scoring of these PIs under CR v1.3 (and looking ahead, to reassessment under CRv2.0) would be improved by the work currently being carried out to investigate the extent and character of benthic habitats.

#### **8.4 Determination, Formal Conclusion and Agreement**

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any Indicators.

Acoura Marine has therefore determined that the South Georgia Patagonian Toothfish Longline Fishery (as defined in this report) should therefore be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

Acoura’s decision making entity confirm that the fishery is re-certified.

#### **8.5 Changes in the Fishery Prior to and Since Pre-Assessment**

This section is not applicable to this fishery. There has been no pre-assessment prior to this assessment.

**Table 19: Scores for the South Georgia Patagonian Toothfish Longline Fishery. Scores shaded green attain the unconditional pass level.**

Prin- ciple	Wt (L1)	Component	Wt (L2)	PI No.	Performance Indicator (PI)	UoC 1	
One	1	Outcome	0.5	1.1.1	Stock status	100	
				1.1.2	Reference points	100	
				1.1.3	Stock rebuilding	NA	
	Management	0.5			1.2.1	Harvest strategy	100
					1.2.2	Harvest control rules & tools	100
					1.2.3	Information & monitoring	90
					1.2.4	Assessment of stock status	95
Two	1	Retained species	0.2	2.1.1	Outcome	80	
				2.1.2	Management	85	
				2.1.3	Information	90	
	Bycatch	0.2			2.2.1	Outcome	80
					2.2.2	Management	95
					2.2.3	Information	90
	ETP species	0.2			2.3.1	Outcome	100
					2.3.2	Management	100
					2.3.3	Information	100
	Habitats	0.2			2.4.1	Outcome	80
					2.4.2	Management	90
					2.4.3	Information	80
	Trophic function	0.2			2.5.1	Outcome	100
					2.5.2	Management	100
					2.5.3	Information	100
Three	1	Governance and policy	0.5	3.1.1	Legal & customary framework	100	
				3.1.2	Consultation, roles &	100	
				3.1.3	Long term objectives	100	
				3.1.4	Incentives for sustainable fishing	100	
	Fishery specific management system	0.5			3.2.1	Fishery specific objectives	100
					3.2.2	Decision making processes	100
					3.2.3	Compliance & enforcement	100
					3.2.4	Research plan	90
					3.2.5	Management performance	100

Overall weighted Principle-level scores	
Principle 1 - Target species	98.1
Principle 2 - Ecosystem	91.3
Principle 3 - Management	99.0

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# 10 Appendix 1: Performance Indicator Scores and Rationale

## 10.1 MSC Principles & Criteria

Below is a much-simplified summary of the MSC Principles and Criteria, to be used for overview purposes only. For a fuller description, including scoring guideposts under each Performance Indicator, reference should be made to the full assessment tree, complete with scores and justification, contained in this report. Alternatively a fuller description of the MSC Principles and Criteria can be obtained from the MSC website ([www.msc.org](http://www.msc.org)).

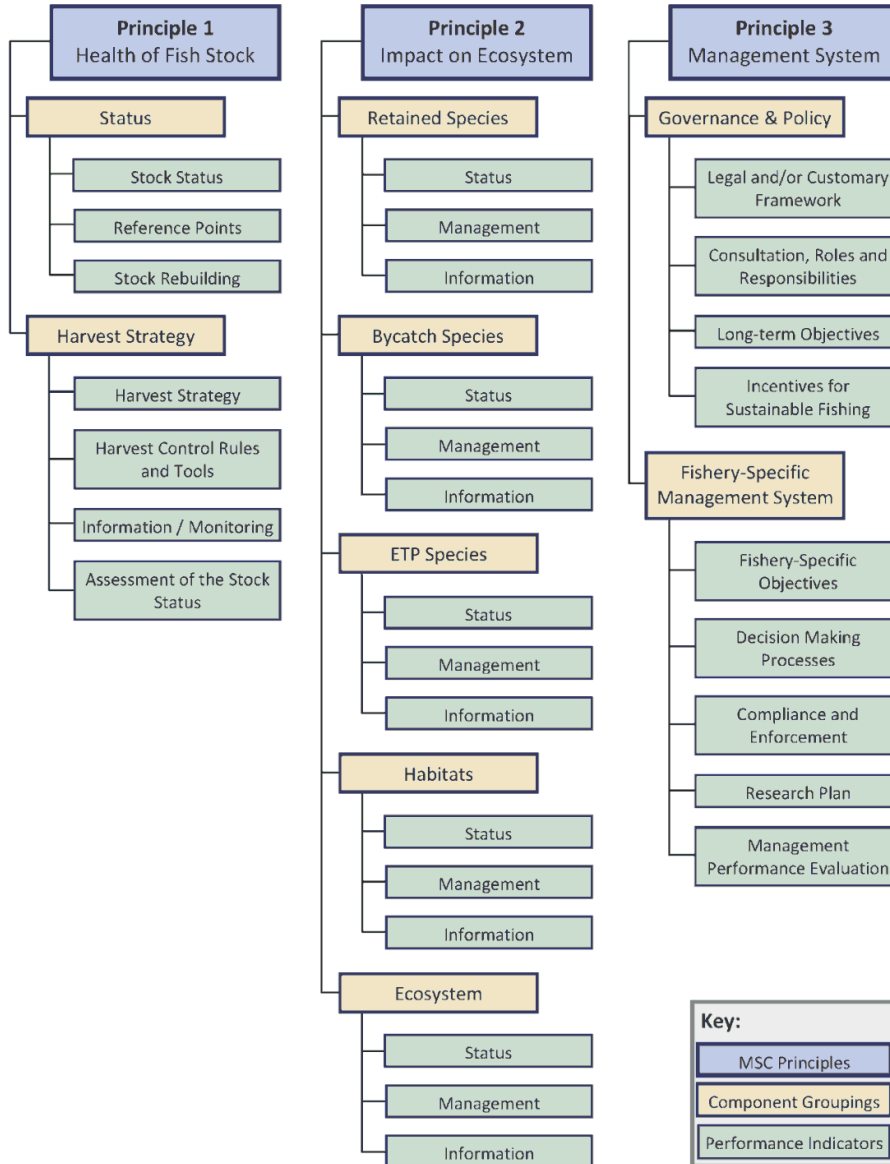


Figure A1 – Graphic of MSC Principles and Criteria



## Principle 1

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

### Intent:

The intent of this Principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short-term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

### Status

- » The stock is at a level that maintains high productivity and has a low probability of recruitment overfishing.
- » Limit and target reference points are appropriate for the stock (or some measure or surrogate with similar intent or outcome).
- » Where the stock is depleted, there is evidence of stock rebuilding and rebuilding strategies are in place with reasonable expectation that they will succeed.

### Harvest strategy / management

- » There is a robust and precautionary harvest strategy in place, which is responsive to the state of the stock and is designed to achieve stock management objectives.
- » There are well defined and effective harvest control rules in place that endeavour to maintain stocks at target levels.
- » Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
- » The stock assessment is appropriate for the stock and for the harvest control rule, takes into account uncertainty, and is evaluating stock status relative to reference points.

## Principle 2

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends

### Intent:

The intent of this Principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

### Retained species / Bycatch / ETP species

- » Main species are highly likely to be within biologically based limits or if outside the limits there is a full strategy of demonstrably effective management measures.
- » There is a strategy in place for managing these species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species.
- » Information is sufficient to quantitatively estimate outcome status and support a full strategy to manage main retained / bycatch and ETP species.

### Habitat & Ecosystem

- » The fishery does not cause serious or irreversible harm to habitat or ecosystem structure and function, considered on a regional or bioregional basis.
- » There is a strategy and measures in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types.
- » The nature, distribution and vulnerability of all main habitat types and ecosystem functions in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery and there is reliable information on the spatial extent, timing and location of use of the fishing gear.

### Principle 3

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

#### Intent:

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

### Governance and policy

- » The management system exists within an appropriate and effective legal and/or customary framework that is capable of delivering sustainable fisheries and observes the legal & customary rights of people and incorporates an appropriate dispute resolution framework.
- » Functions, roles and responsibilities of organisations and individuals involved in the management process are explicitly defined and well understood. The management system includes consultation processes.
- » The management policy has clear long-term objectives, incorporates the precautionary approach and does not operate with subsidies that contribute to unsustainable fishing.

### Fishery specific management system

- » Short and long term objectives are explicit within the fishery's management system.
- » Decision-making processes respond to relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner.
- » A monitoring, control and surveillance system has been implemented. Sanctions to deal with non-compliance exist and there is no evidence of systematic non-compliance.
- » A research plan provides the management system with reliable and timely information and results are disseminated to all interested parties in a timely fashion.

### 10.3 Principle 1 Evaluation Tables

#### 10.3.1 Evaluation Table for PI 1.1.1

<b>PI 1.1.1</b>		<b>The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The limit reference point, defined in the CCAMLR harvest control rule and used here as the point where recruitment would be impaired, is 20% of the unexploited spawning stock biomass (20% B<sub>0</sub>). The current stock status is well above this point.</p> <p>The 2017 assessment of the Patagonian toothfish (<i>D. eleginoides</i>) in Subarea 48.3 estimated that the 2017 status of the stock was 51% B<sub>0</sub> (49%-53% 95%CI) and that spawning biomass had been increasing in recent years. The lower 95% credible interval was estimated in 2017 to be 38900t, which is significantly larger than the limit reference point of 16640t, and implies that the probability that the stock is at or below the limit reference point is much less than 2.5%. Therefore there is a high degree of certainty (CB2.2.1.3) the stock is above the limit reference point.</p>		
<b>b</b>	<b>Guidepost</b>		The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	<p>The target reference point is the median SSB of 41600t (50% B<sub>0</sub>). The 2017 biomass was estimated to be slightly above the target level. The estimate of the median stock size has never fallen below the target level for the assessment period (1985-2017). The stock size has been slightly increasing in recent years and the lower 95% credible interval was just below the target in 2017, so there is a high degree of certainty that the stock has been above or around its target since 1985.</p>		
<b>References</b>		Earl and Fischer, 2017; CCAMLR 2016; CCAMLR 2017a, b.		
<b>Stock Status relative to Reference Points</b>				

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
	Type of reference point	Value of reference point	Current stock status relative to reference point
<b>Target reference point</b>	Probability based $B_{MSY}$	50% $B_0$ 41600t median SSB	For 2017: 51% $B_0$ (49%–53% 95% CI) 45400t median SSB
<b>Limit reference point</b>	Probability based $B_{lim}$	20% $B_0$ 16640t SSB	For 2017: 51% $B_0$ (49%–53% 95% CI) 38900t SSB lower 95% CI
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>			<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>			

### 10.3.2 Evaluation Table for PI 1.1.2

PI 1.1.2		Limit and target reference points are appropriate for the stock		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	
	<b>Met?</b>	Y	Y	
	<b>Justification</b>	Reference points are based on spawning stock biomass estimates. They are estimated relative to the unexploited stock. This is appropriate for this type of stock. Reference points are routinely estimated as part of each biennial stock assessment. Full information about the determination of the reference points is provided in section 5.4.4 of this report.		
b	<b>Guidepost</b>		The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.
	<b>Met?</b>		Y	N
	<b>Justification</b>	The limit reference point is interpreted as being 20%B <sub>0</sub> , which is used as part of the harvest control rule. The point itself is a generic value used in CCAMLR for toothfish among other species. The reference point has been tested as part of the harvest control rule making reasonable assumptions about the stock-recruitment relationship. Given the life-history characteristics of this species, a reduction to 20% B <sub>0</sub> should not impair recruitment significantly. Therefore, this is set above the point where risk to reproductive capacity would be appreciable, meeting SG80. However, the point has not been developed considering specific biological, ecological or other issues to this stock and fishery, and the reference point remains untested except in a very general way. There is therefore insufficient evidence to justify meeting the SG100.		
c	<b>Guidepost</b>		The target reference point is such that the stock is maintained at a level consistent with B <sub>MSY</sub> or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B <sub>MSY</sub> or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.
	<b>Met?</b>		Y	Y

<b>PI 1.1.2</b>		<b>Limit and target reference points are appropriate for the stock</b>	
	<b>Justification</b>	The target reference is set such that the stock should be maintained at a value consistent with $B_{MSY}$ . $B_{MSY}$ has not been estimated, but the 50% $B_0$ target has the same intent, consistent with CCAMLR's stated purpose (Article II.3.a). A target of 50% $B_0$ (SSB) is relatively precautionary (e.g. it is higher than 40% $B_0$ default; CB2.3.3.1). The robustness of reference points has been previously tested through simulation. Patagonian toothfish has no known special low trophic or other role requiring additional precaution. In practice, the TAC is set to maintain the stock above the target. Although no specific reason has been given for this greater precaution, it does address issues such as the ecological role of the stock. Therefore, the current level should maintain the stock at highly productive levels with a high degree of certainty.	
<b>d</b>	<b>Guidepost</b>		For key low trophic level stocks, the target reference point takes into account the ecological role of the stock.
	<b>Met?</b>		Not Relevant
	<b>Justification</b>	Patagonian toothfish is not a key low trophic species.	
<b>References</b>		CCAMLR 2016; CCAMLR 2017a, b.; Constable & de la Mare, 1996; Constable et al, 2000.	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>			<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>			

### 10.3.3 Evaluation Table for PI 1.1.3

The stock is at or above the target reference point and does not require rebuilding, so PI 1.1.3 is not scored.

### 10.3.4 Evaluation Table for PI 1.2.1

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The harvest strategy is based on setting catch limits for management areas. The overall total allowable catch is set based on 35 year stochastic projections of the stock assessment, following a well-defined decision rule. The biennial stock assessment allows for adjustment of the catch limit every two years, although the catch limit is reviewed annually. The procedure for setting a harvest strategy in response to the stock state is outlined in section 5.4.3 of this report. Evidence of the adjustment of both the TAC and the number of vessels permitted to operate in the fishery in response to changes in stock status is provided in Table 4 of this report.</p> <p>As well as catch limits, there are area controls and controls on fishing and other activities designed to keep ecosystem impacts to acceptable levels. There is a season limit with fishing allowed from 1<sup>st</sup> May until 31<sup>st</sup> August with a provisional opening date of 16<sup>th</sup> April, primarily to minimize seabird by-catch. No fishing is allowed (unless for research purposes) in depths shallower than 700m or greater than 2250m or within the No-take Zones or Benthic Closed Areas of the South Georgia and South Sandwich Islands Marine Protected Area. These are defined as part of the licence agreement with the objective of reducing bycatch, and other unwanted impacts on the ecosystem, as well as on juvenile and spawning components of the target stock.</p> <p>Therefore the TAC and other measures respond to perceived impacts and to changes in stock status. The harvest control rule sets the harvest level to achieve the target reference point, and avoid falling below the limit reference point. The strategy is explicitly designed to achieve the CCAMLR and SGSSI management objectives and therefore meets the SG100.</p>		
<b>b</b>	<b>Guidepost</b>	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to

<b>PI 1.2.1</b>		<b>There is a robust and precautionary harvest strategy in place</b>		
				maintain stocks at target levels.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The current harvest strategy has been implemented since at least 2000 and evidence has been accumulating to test whether it is working as intended. The harvest strategy has undergone some changes over this time in response to evaluations of its performance. The harvest control rule has also undergone simulation testing. Subsequently, the biennial stock assessments have indicated that the stock has been decreasing towards the target reference point over these years at a rate consistent with that required by the harvest strategy. The 2017 stock assessment suggested that the stock has been increasing slightly in the most recent years due to more precautionary setting of the TAC. Although uncertainties remain, the stock assessment has become more reliable with longer time series and an increasing range of data, making it a valid evaluation tool. The simulation testing, empirical assessment and review through the working group system constitutes a full evaluation. The assessment provides clear evidence that the harvest strategy is working and objectives are being achieved. This meets the SG100.</p>		
<b>c</b>	<b>Guidepost</b>	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	<b>Met?</b>	Y		
	<b>Justification</b>	<p>The fishery applies a cycle of assessment and review to monitor its performance. The review includes international monitoring through CCAMLR requirements, such as the WG-FSA review of the assessment, and monitoring of vessel activity through VMS and international observers. There is also intensive monitoring of the stock through data collection from catches, surveys and tagging. The primary tool for assessing the harvest strategy is the stock assessment, which is carried out every two years. In addition, the responsible management authority and fisheries scientists consider a wide range of other issues and impacts, as shown by scientific and meeting reports. Information gathered is sufficient to determine whether the harvest strategy is achieving its objectives.</p>		
<b>d</b>	<b>Guidepost</b>			The harvest strategy is periodically reviewed and improved as necessary.
	<b>Met?</b>			Y
	<b>Justification</b>	<p>There is evidence of review of the harvest strategy and adaptation to improve its performance or apply precautionary controls to prevent problems occurring. A primary task of CCAMLR is to review harvest strategies for fisheries within its jurisdiction, and identify appropriate interventions. The various CCAMLR reports document discussions of the various fisheries and changes that have occurred over time. These fisheries include the South Georgia toothfish. This has, for example, led to area closures, such as that around Shag Rocks and to the creation of minimum depth limits to prevent harvesting juveniles. Although these management interventions are also to prevent wider impacts on the ecosystem, they often have recognisable benefits for the target stock. This process is ongoing, as indicated by research programme to understand problems and identify</p>		



<b>PI 1.2.1</b>	<b>There is a robust and precautionary harvest strategy in place</b>	
		if any response is required. For example, in 2013 WG-FSA requested a paper on stock structure between 48.3 and 48.4 for discussion by WG-SAM, and this could lead to further changes to the strategy. Therefore there is evidence of both review and response as part of the harvest strategy, meeting SG100.
<b>References</b>	CCAMLR 2013a, b, c; Constable & de la Mare, 1996; Constable et al, 2000; GSGSSI, 2014a, 2017b, 2017c; Hanchet & Welsford 2014; CCAMLR 2016; CCAMLR 2017a, b	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>		<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>		

### 10.3.5 Evaluation Table for PI 1.2.2

PI 1.2.2		There are well defined and effective harvest control rules in place		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	Generally understood harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	
	<b>Met?</b>	Y	Y	
	<b>Justification</b>	<p>Clear documented harvest control rules are in place and are applied annually in CCAMLR advice on TACs. The decision rule procedure requires Monte Carlo simulations of the population trajectory over 35 years under a constant catch. A TAC is found such that if this catch is applied over 35 years in a projection, there is a 10% chance or less of the spawning stock falling below 20% of the pre-exploitation level <b>and</b> the median spawning biomass is at or above 50% of its pre-exploitation level. The projections are based on the current stock assessment, and are reviewed and agreed by the Working Group for Fish Stock Assessment (WG-FSA).</p> <p>For the 2017 meeting, the WG-FSA recommended that the catch limit for <i>D. eleginoides</i> in Subarea 48.3 should be set at 2600t for 2017/18 and 2018/19 based on the outcome of the assessment. This catch limit is further subdivided between the Management Areas (A: 0%; B: 30% and C: 70%), which are designed to protect juveniles and the spawning stock as well as minimize other unwanted ecosystem effects.</p>		
b	<b>Guidepost</b>		The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules takes into account a wide range of uncertainties.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	<p>The harvest control rules are generic for toothfish fisheries in the CCAMLR region. They were designed to be robust to a wide range of uncertainties, and tested through stochastic population simulations before being implemented.</p> <p>The target reference point and the way the decision rule is applied are precautionary. The projections are carried out over a long time period with log-normal recruitment, so the resulting catch levels should be biased to lower values.</p> <p>The harvest control rule requires a choice in the configuration of the model used for the projections. For example, the WG-FSA 2013 agreed to use the recruitment mean and variance estimates from 1992 to 2011 period for the stock projections as providing a reasonable representation of likely future recruitment.</p>		

<b>PI 1.2.2</b>		<b>There are well defined and effective harvest control rules in place</b>		
		<p>This avoided over-estimating stock productivity since overall higher average recruitment was evident before 1992.</p> <p>Uncertainties are incorporated in the HCR which uses the output of the stock assessment to decide upon action taken. The stock assessment model is a statistical model that accounts for various sources of error and compares stock status with reference points. This is standard good practice. It does not identify specific risk factors, such as IUU or climate change, but would respond to decreasing abundance for whatever reason by reducing catches. This is all that the fishery management can be realistically expected to do on these issues.</p> <p>Therefore, the harvest control rule has been designed and is implemented to be precautionary, taking into account a wide of uncertainties. This meets the SG100.</p>		
<b>c</b>	<b>Guidepost</b>	There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The TAC appears to apply an effective control on fishing mortality. Retained catches are checked at Port Stanley where all catches are unloaded. Daily catch and position reports are made to the Government Officer at King Edward Point and all vessels carry VMS. All vessels must record in the electronic logbook (CCAMLR C2v2017c) all catch, including toothfish, other fish by-catch, any incidental seabird mortality and benthos. These logbooks are also submitted monthly to the Government Officer. Therefore, careful watch is made on the use of quota.</p> <p>Fishery patrols are regularly conducted, and there is no evidence of recent IUU in the area. For example, where IUU activity targeting toothfish occurs, abandoned longline gear is usually found even if the vessels themselves are not caught.</p> <p>The feedback from the scientific assessment indicates that the expected fishing mortality is being achieved. Indicators of stock abundance suggest that the stock size is stable and the current catch, and therefore the limit on exploitation, is less than or equal to the maximum productivity of the resource. This meets SG100.</p>		
<b>References</b>		CCAMLR 2013a; Constable & de la Mare, 1996; Constable et al, 2000; GSGSSI, 2014a, 2017b, 2017c; CCAMLR 2016; CCAMLR 2017a, b		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

### 10.3.6 Evaluation Table for PI 1.2.3

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>Data are becoming increasingly comprehensive. Extensive information now exists on growth, mortality, stock distribution and abundance. Information is complete on the fleet and fishery removals. There is a long history of information on the environment as well as important components of the ecosystem, such as krill abundance. Although, these are not used directly in the harvest strategy, they are used to inform discussions of the working groups, among others, and do influence decision making.</p> <p>Significant information that is collected ostensibly for the stock assessment has wider value in understanding life-history and stock productivity. Of particular note, there is a substantial on-going tagging programme carried out as part of the commercial fishing operations.</p> <p>The main uncertainty of concern is <i>D. eleginoides</i> and <i>D. mawsoni</i> stock structure within area 48. <i>D. eleginoides</i> fisheries are managed as different stocks between 48.3 (South Georgia) and 48.4 (South Sandwich Islands). The South Sandwich Islands stock is much smaller than the South Georgia stock, so the main threat would be on the 48.4 stock; uncontrolled catches of fish from this population in the 48.3 quota could lead to its depletion. There has been an appropriate management response with much higher tagging rates by any vessel fishing in 48.4 (5 fish per tonne as opposed to 1.3 fish per tonne in 48.3). during 2005-2016, of the 3394 tagged fish released, 313 have been recaptured in 48.4 and 11 in 48.3 A review of available information supported management of these areas as separate stocks. Whereas different growth rates and maturity suggest that there is no regular exchange between the two areas, tag recapture data clearly show small numbers of toothfish moving between the two areas. Further research is being undertaken on links between various subareas within area 48.</p> <p>Information is comprehensive and will continue to improve as the current research plans are undertaken. In addition, where information gaps threatening the harvest strategy have been identified, there has been an appropriate response. This meets SG100.</p>		
b	<b>Guidepost</b>	Stock abundance and fishery removals are	Stock abundance and fishery removals are	All information required by the harvest control

PI 1.2.3		Relevant information is collected to support the harvest strategy		
		monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>All information required by the harvest control rule is monitored with high frequency, but not with a high degree of certainty. Catch-at-age, catch rates, tag-recapture and survey abundance data are available for the stock assessment. Monitoring is carried out in accordance with the CCAMLR scheme of observation, requiring 100% observer coverage, and using CCAMLR protocols (e.g. fish tagging). These protocols are set out in the CCAMLR Scientific Observers manual, and specific sampling requirements are set for the Dissostichus fisheries in the Antarctic. These data are sufficient to produce a valid stock assessment and therefore to support the harvest control rule. This meets SG80.</p> <p>The catch, catch age and length composition, catch rates and tagging information are all monitored with both high-frequency and high degree of accuracy. In particular, tagging was started in 2000, required of commercial fishing since 2004 and vessels now must achieve a tagging a rate of 1.3 toothfish for every tonne caught in Subarea 48.3 (i.e. approximately tag and release every 130th fish caught). Tagging provides very valuable accurate information on abundance, mortality and growth. Uncertainties associated with these data are low and well understood.</p> <p>However, the survey data are not entirely consistent with other sources of information, and uncertainties associated with the survey are not well understood. Among other problems, there is a historical anomaly in the 1990 survey, which was directed at icefish and is not used in the assessment. The survey data have patterns not explained by the model and it is not clear that the survey is providing a good recruitment index. In addition, there are trends apparent in the tagging data which remain unexplained.</p> <p>Therefore, while a number of data sources do meet the SG100, the uncertainties associated with at least one important source are not well understood. Because not <b>all</b> information is monitored with a good understanding of inherent uncertainties, SG100 is not met.</p>		
<b>c</b>	<b>Guidepost</b>		There is good information on all other fishery removals from the stock.	
	<b>Met?</b>		Y	

<b>PI 1.2.3</b>		<b>Relevant information is collected to support the harvest strategy</b>
	<b>Justification</b>	Catches are complete and information on them is well recorded. IUU has not been detected since 2006 (see section 5.6.3.4), and given the level of control (commercial fishery activity and fishery patrols), is not considered significant. Previous IUU was likely related to changes in management regime within the CCAMLR region, which has not been a recent factor recently.
	<b>References</b>	Agnew, et al 2002; CCAMLR, 2011, 2013a, e, 2016; GSGSSI 2014a, c; Roberts, 2012, CCAMLR 2017a, b; Earl and Fischer 2017; Soeffker, Belchier & Laptikhovsky, 2015; Soeffker & Belchier 2017.
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>		<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>		

### 10.3.7 Evaluation Table for PI 1.2.4

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>		The assessment is appropriate for the stock and for the harvest control rule.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	The stock assessment is based on a statistical catch-at-age model implemented in well-developed and well tested software (CASAL). The CASAL assessment model is designed to use the catch, age and size compositions, catch rates, tag-recapture and survey abundance data. It is particularly suited to model this sort of fishery, and can account for some detail in the life characteristics of toothfish, such as growth and mortality rates. For example, the model takes account of size-dependent tag mortality. This meets SG100.		
b	<b>Guidepost</b>	The assessment estimates stock status relative to reference points.		
	<b>Met?</b>	Y		
	<b>Justification</b>	The stock assessment clearly estimates stock status relative to reference points. The stock status forms a critical part of the routine management advice and harvest control rule.		
c	<b>Guidepost</b>	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The harvest control rule is explicitly probabilistic, so the probabilities calculated from the model are used in making the decision on the TAC. This does not necessarily account for structural uncertainties, but because the biennial stock assessment responds to changes in abundance for whatever reason, the management system should be robust to these uncertainties. Longer term changes in productivity would require on-going evaluation and research in.</p> <p>More generally, IUU and climate change would exhibit detectable changes in the population dynamics, including, but not limited to, changes in distribution, growth, natural mortality and recruitment. Recruitment is estimated and distribution of the catch is monitored (observers records, vessel catch returns, VMS). Growth is monitored through tagging. Changes in natural mortality, IUU and catchability would produce retrospective bias which could be detected in the</p>		

<b>PI 1.2.4</b>		<b>There is an adequate assessment of the stock status</b>		
		<p>model diagnostics. IUU would also most likely be detected directly (by licensed fishing vessels, patrol vessels or military aircraft &amp; vessels in the area).</p> <p>These uncertainties have always formed part of the stock assessment review and evaluation. The stock assessment therefore meets all of the SG60, 80 and 100 requirements.</p>		
<b>d</b>	<b>Guidepost</b>			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	<b>Met?</b>			N
	<b>Justification</b>	<p>The assessment has been tested and shown to be robust. CASAL is a standard software tool for catch-at-age models and can use all information routinely produced for the assessment of these fisheries.</p> <p>It is less clear that all alternative hypotheses and assessment approaches have been rigorously explored. CASAL is the standard model used by CCAMLR. It can be used to model a variety of alternative hypotheses related to different population processes, including structuring populations based on time-of-year, area, size, sex, maturity, and growth-path. Other software, including a bespoke model, might be necessary to consider alternative hypotheses. Different hypotheses could have implications for the harvest strategy, and while difficult to fit to the available data, might be used to explain survey anomalies or used in simulations to test the harvest control rule. Although some research has been carried out on stock structure, there is no evidence that a rigorous assessment of alternative hypotheses and stock assessment approaches have been conducted for this stock.</p> <p>Therefore, although the current assessment has been tested and appears robust, because there is insufficient evidence that alternative hypotheses have been fully explored, SG100 is not met.</p>		
<b>e</b>	<b>Guidepost</b>		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	<p>The stock assessment has been subject to internal peer review through internal quality assurance mechanisms within CEFAS and within CCAMLR through WG-FSA. The software which implements the model has been extensively reviewed and tested on many fisheries.</p> <p>Evidence of a process of effective review is available in the working group reports. There is a consideration of the model and alternative configurations are discussed. For example, in 2017, the WG-FSA noted that the likelihood profiles</p>		



<b>PI 1.2.4</b>	<b>There is an adequate assessment of the stock status</b>	
		<p>from the tagged fished cohorts of showed a declining trend in the maximum likelihood estimate of <math>B_0</math>, which required further evaluation as it could indicate a problem with the model or data. Therefore, there is clear evidence of review.</p> <p>An external review has been completed in 2014 which covered certain technical issues of the stock assessment as well as wider issues related to the non-target bycatch species and ecosystem effects. The scientists conducting the review are involved in SC-CCAMLR and therefore most likely have had the opportunity to contribute to comments made by WG-FSA, but otherwise have not been involved with the SG fishery. The review deals with specific SG fishery issues, including technical issues to do with South Georgia data, the model and its interpretation, as well as making clear recommendations for further stock assessment work. This complements CCAMLR activities and is sufficiently independent to form an external review, meeting SG100.</p>
<b>References</b>	<p>CCAMLR 2016, 2017a; Hillary et al, 2006; Roberts, 2012; Earl and Fischer 2017.                  Hanchet, S. Welsford, D. 2014. Independent expert review of the South Georgia toothfish fishery.</p>	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>		<b>95</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>NA</b>

## 10.4 Principle 2 Evaluation Tables

### 10.4.1 Evaluation Table for PI 2.1.1

<b>PI 2.1.1</b>		<b>The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).	Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).	There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>The MSC define “main” retained species as those that make up 5% or more of the total catch (unless the retained species have a high value, are vulnerable, or the fishery is large (MSC GCR at §GCB3.5.2).</p> <p>For fisheries that used bait, the MSC also require that bait species used in the fishery are assessed as “retained” species. Both retained catch and bait are considered separately below.</p> <p>The MSC also require that where several scoring elements (species) are relevant to a Performance Indicator, the scoring of each shall be distinguished and the overall score awarded bases on their combined performance (MSC CR at §27.10.7 <i>et seq.</i>)</p> <p>The scoring rationale addresses these MSC requirements by considering retained catch and bait species separately, and then awarding a score that is appropriate for the combination of “main retained species” involved in the fishery.</p> <p><b><u>Retained catch</u></b></p> <p>Applying the MSC definition, there are no “main” retained species in this fishery. Over the past 5 years observer and landing records show the retention of only 4 types of non-target species (grenadiers (<i>Macrourus</i> spp.), blue antimora (<i>Antimora rostrata</i>) and other Rajiformes, Antarctic toothfish (<i>D. mawsoni</i>) and crab species (Lithodidae). Except for Antarctic toothfish, all these species are predominantly discarded and are considered under performance indicators 2.2 below.</p> <p>Antarctic toothfish is predominantly found further south, so any <i>D. mawsoni</i> encountered in 48.3 is at the edge of its range, making up less than 0.1% of the total catch during 2012-2016. It is therefore not a main species. No target reference point has been set for this species.</p> <p><b><u>Bait</u></b></p> <p>The fishery currently uses less than 550t of bait per year (see section 5.5.3.4). Two of the bait species are used in quantities that may exceed 5% of the toothfish catch. These are Humboldt squid (<i>Dosidicus gigas</i>) from the Pacific Ocean (FAO Area 87) and sardines (<i>Sardina pilchardus</i>) from the North East Atlantic.</p>		

<b>PI 2.1.1</b>		<b>The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species</b>		
		<p><b>Humboldt squid</b></p> <p>Target and limit reference points have not been established for <i>D. gigas</i>, but recent estimates of stock status suggest that the biomass is above <math>B_{MSY}</math> and that recent exploitation rates are below the MSY level. Therefore the South Pacific stock is considered to be fished within biologically based limits. The total quantity of <i>D. gigas</i> used in the fishery is expected to be currently around 225t annually.</p> <p><b>Sardines</b></p> <p>There are two stocks of Spanish sardine exploited in ICES subarea VIII, one of which is MSC certified and above its limit reference point (27.8ab,d), while the other has in 2017 been declared below its limit reference point (27.8c/9a). Before 2017, it was above its limit reference point. Total landings of sardines from these stocks was estimated at 30,000t and 23,000t respectively. The fishery expects to use around 100t of sardines as bait annually.</p> <p>While one of the sardine stocks which may be sourced for bait has been identified as over exploited in 2017, this would only apply to future bait purchases. The relatively small quantity used by this fishery would not hinder the success of any recovery plan, but the fishery is not sustainably managed and it is recommended that bait from the 27.8c/9a sardine stock should be avoided until a management plan is in place and shown to be effective.</p> <p>The SG60 and SG80 requirements are fully met for all elements of the “retained non-target species” (there are no “main” retained species in the catch, and those that are retained are caught within CCAMLR limits; for the “main” retained species used as bait, both are considered highly likely to be above biological limits).</p> <p>The SG100 requirements are not met because there are no target reference points in place for <u>all</u> of the retained non-target species.</p>		
<b>b</b>	<b>Guidepost</b>			Target reference points are defined for retained species.
	<b>Met?</b>			N
	<b>Justification</b>	Target reference points have been defined for four of the bait species (North Sea herring, NEA mackerel, Argentine shortfin squid and sardines) but not any of the other species (NZ jack mackerel, Humboldt squid, Antarctic toothfish). The SG100 requirements cannot therefore be met.		
<b>c</b>	<b>Guidepost</b>	If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.	If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.	
	<b>Met?</b>	NA	NA	

<b>PI 2.1.1</b>		<b>The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species</b>		
	<b>Justification</b>	The only “main” retained species in this fishery are sardines and Humboldt squid. Neither species were outside biological limits. If sardines are sourced in future from the Spanish 27.8c/9a stock, this scoring issue may need to be addressed. Given that only 100t is used by this fishery and rebuilding catches would likely remain over 10,000t, this issue is not likely to score less than 60 because it does not hinder any measures (i.e. TAC). At this time, this scoring issue is not applicable.		
<b>d</b>	<b>Guidepost</b>	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.		
	<b>Met?</b>	Y		
	<b>Justification</b>	<p>There are a number of measures in place to ensure that the fishery does not adversely impact retained non-target species (whether caught in the fishery or used as bait).</p> <p>For the retained species caught in the fishery, the measures and practices include the CCAMLR annual catch limit; a “move on” rule; and spatial closures (RIAs and the 12nm NTZ) established by the GSGSSI.</p> <p>For bait species, the measures and practices in place include national and international management measures that control and record their exploitation. Bait use is monitored and bait sourced from sustainable fisheries forms part of the licence conditions.</p>		
<b>References</b>		CCAMLR, 2013d; GSGSSI 2012a,b; ICES, 2017a,b,c,d; FAO, 2005; Xu et al. 2017; Morales-Bojórquez et al. 2012; NZ MPI 2017; Agnew et al. 2005. ; section 5.5.3.2; section 5.5.3.4.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

### 10.4.2 Evaluation Table for PI 2.1.2

<b>PI 2.1.2</b>		<b>There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing retained species.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>As with PI 2.1.1. above, “main” retained species are those which make up 5% or more of catches, and may also include species used as bait in the fishery. Again, the performance of the different scoring elements (species) with respect to this SI is considered in turn below.</p> <p><b>Species retained in the fishery</b></p> <p>Although there are no “main” retained species in this fishery (there are no non-target species making up 5% or more of catches) and thus no requirement for management under this SI, there is a strategy in place for managing retained species catch. This includes:-</p> <ul style="list-style-type: none"> <li>• An annual catch limit (currently 120t) for macrourids and also for rajids.</li> <li>• A “move on rule” to discourage fishing in areas where non-target species are caught (whether retained or discarded).</li> <li>• No take zones around South Georgia, Shag Rocks, and Clerke Rocks, which are spawning grounds for many fish species.</li> <li>• Benthic Closed Areas (BCAs) where longline fishing can only be carried out as part of the stock tagging programme (at 15 fish per tonne; one of these areas being chosen specifically as a refuge for non-target species).</li> <li>• Restriction of the longline fishery to depths greater than 700m.</li> </ul> <p>These measures form a strategy that has been implemented by CCAMLR and GSGSSI for the specific purpose of managing the catch of retained species.</p> <p><b>Bait species</b></p> <p>For all of the bait species used in the fishery, a key consideration is that the fishery uses a very small total quantity of bait (a total of 555t annually, (see Table 7).</p> <p>There are national and international management strategies in place for managing the fin fish (sardines, herring, mackerel, shortfin squid and jack mackerel) used as bait in this fishery, which are outlined in section 5.5.3.4 of this report, and which meet the SG80 requirements.</p>		

		<p>There is no equivalent strategy in place for the Humboldt squid; managers consider that the short life span of this species and its high sensitivity to environmental factors (such as El Niño) has so far prevented developing a full management strategy (see Rodhouse, 2001). However, in the absence of a strategy the small quantity used as bait in this fishery (~225t pa) relative to the total catch of this species (400,000-500,000t pa) would ensure that the fishery does not pose any risk to its population status, meeting the SG80 requirements..</p> <p><b>Summary</b></p> <p>The performance of the fishery exceeds the SG60 and SG80 requirements for both the “main” retained species and for those that form less than 5% of landings. The existence of a strategy for several of the “retained” species (four of the five bait species and also two of the five non-target species retained by the fishery) meets the SG100 requirements for these scoring elements. Overall a score of at least 80 is indicated.</p> <p><b>Recommendation</b></p> <p>At the last re-assessment the Assessment Team recommended that in order to make the score under this SI more secure, it would be appropriate for the fishery to adopt a policy that will ensure that bait are sourced from stocks that meet the SG80 requirements (i.e. that the stock status is above a level at which recruitment may be impaired).</p> <p>In order to ensure that the fishery remains compliant with the current and any future versions of the MSC Certification Requirements, the Assessment team recommend that this commitment to sourcing bait from stocks that meet the SG80 requirements for this SI (or its successor) is maintained.</p>		
<b>b</b>	<b>Guidepost</b>	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>As before, the separate scoring elements (species) are considered in turn below, grouped into the species retained by the fishery and those used as bait.</p> <p><b>Species retained in the fishery</b></p> <p>For the non-target species retained in the fishery, the evidence that retained catches are significantly lower than the CCAMLR TACs for these species in subarea 48.3 provides an objective basis for confidence that the strategy in place will work, meeting the SG80 requirements. There is no evidence, however, that there has been testing of the strategy as required at the SG100 level.</p> <p><b>Bait species</b></p> <p>For the bait species, there is also an objective basis for confidence that the various management strategies and measures in place will work. For the finfish (sardines, herring, jack mackerel), TACs are set and landings monitored and assessed against management objectives. For the North Sea herring and Argentine shortfin squid fisheries, the management strategies have been tested and there is a high level of confidence that they will work. For the other fisheries (NEA mackerel,</p>		

		<p>sardine 27.8ab,d, NZ jack mackerel), there is some confidence that they will work as long as various conditions are met and precautionary TACs are enforced.</p> <p>Although there are no stock assessments or management objectives for the <i>D. gigas</i> fishery, the information about the species, the fishery (annual landings of up to 4-500,000t pa) and consistent assessment results suggesting that the stock is not over-exploited, coupled with the observation that this fishery only uses ~225t of squid per year, provides an objective basis for confidence that the current management strategy, maintaining current catches and fishing capacity will work. However, the harvest strategy appears to fall well short of a full management strategy, and arguable currently is only a partial strategy. There appears to be no direct control on harvest or general international agreement on how to harvest this stock. Nevertheless, the stock is currently considered to be above <math>B_{MSY}</math> and fishing mortality at a level consistent with MSY, so there is an objective basis for confidence that this partial strategy is presently working and that the SG80 requirements are met.</p> <p><b>Scoring</b></p> <p>All of the species that are “retained” by the fishery in any significant quantity meet the SG60 and SG80 requirements. Overall a score of 80 is indicated.</p>		
c	<b>Guidepost</b>		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	There is a high level of independent observer coverage in this fishery and close monitoring of all landings (under the DCD scheme). This level of surveillance provides clear evidence that reported catch and landing levels are accurate. These data indicate that the fishery is compliant with the strategy and that it is being implemented successfully.		
d	<b>Guidepost</b>			There is some evidence that the strategy is achieving its overall objective.
	<b>Met?</b>			N
	<b>Justification</b>	Management objectives are not clearly defined for all of the “retained” species in this fishery, so this SI is not met.		
e	<b>Guidepost</b>	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	<b>Met?</b>	Not relevant	Not relevant	Not relevant
	<b>Justification</b>	There is no evidence of any shark finning taking place in this fishery.		

<b>References</b>	CCAMLR 2016; CCAMLR, 2017c; GSGSSI 2012a,b; ICES, 2017a,b,c,d; Xu et al. 2017; Morales-Bojórquez et al. 2012; NZ MPI 2017; Agnew et al. 2005.; Observer reports.
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>	<b>85</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>NA</b>



### 10.4.3 Evaluation Table for PI 2.1.3

PI 2.1.3		Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	Qualitative information is available on the amount of main retained species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>Accurate and verifiable information is available on the quantities of all of the species retained as catch in the fishery (from on-board observers) and also for the bait species used in the fishery.</p> <p>The population status of all of the affected species is monitored by the relevant authorities (such as CCAMLR, ICES, the South Pacific RFMO and the New Zealand Government) and the consequences of all fishery removals, including those associated with the fishery under assessment are taken into account.</p> <p>For sardines (a “main” bait species), there is an accurate measure of the quantity of sardines used as bait, and also a robust stock assessment for the sardine stocks concerned. The consequences of this fishery using approximately 100t of sardines as bait from stocks where the combined annual harvest is in excess of 50,000t can be evaluated.</p> <p>For Humboldt squid (also a “main” bait species), the quantity used as bait in the fishery is around 225t per year from a fishery that is evaluated to be exploited at a level compatible with MSY with an annual yield that is typically in excess of 300000t.</p> <p>The SG60, 80 and 100 requirements are met for all species because there is accurate and verifiable information available about both the quantity of retained non-target species taken in this fishery (as catch and as bait) and the status of the affected populations.</p>		
b	<b>Guidepost</b>	Information is adequate to qualitatively assess outcome status with respect to biologically based limits.	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>For several of the retained non-target species there is a high degree of certainty about outcome status (such as for North Sea herring, NEA mackerel and sardines where there are independent ICES assessments). For other species there is less certainty, but information is available (from CCAMLR, the New Zealand Government and the South Pacific RFMO) to allow the status of the affected species to be determined with respect to biologically based limits. Information about the status of each bait species stock is provided in section 5.5.3.4 of this report.</p> <p>In summary, the only stock which does not have a recent stock assessment is the New Zealand jack mackerel species. In addition, assessments for <i>D. gigas</i></p>		

<b>PI 2.1.3</b>		<b>Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species</b>		
		<p>have not necessarily been reviewed and accepted, so it is not clear status has been estimated with a high degree of certainty.</p> <p>The SG60 and SG80 requirements are therefore met for all species, but the SG100 requirements are not satisfied.</p>		
<b>c</b>	<b>Guidepost</b>	Information is adequate to support measures to manage main retained species.	Information is adequate to support a partial strategy to manage main retained species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>For all of the retained non target species (both retained catch and bait) there is sufficient information available to support at least a partial strategy for management (information about the status of each bait species stock is provided in section 5.5.3.4 of this report). This information is in the form of records from the fishery of the quantity of each species that may be affected, and also information about the status of the species. The SG60 and SG80 requirements are therefore met.</p> <p>For some of the retained / bait species whether the fishery is achieving its objective can be determined with a high degree of certainty.</p> <p>For the macrourids and rajids, the catches meet CCAMLR requirements which have been set in accordance with a precautionary strategy. North Sea herring, NEA mackerel, Argentine shortfin squid and Spanish sardines are regularly assessed. However, this is not the case for jack mackerel and Humboldt squid.</p> <p>No clear management objectives have been defined for Humboldt squid, and although there are ostensibly clear management objectives for the jack mackerel stocks, data are insufficient to evaluate clearly whether these are being met. The SG100 requirements are not, therefore, met for <u>all</u> species, so this SG is not achieved.</p>		
<b>d</b>	<b>Guidepost</b>		Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)	Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	<p>Evidence has been presented to show that the catch of all retained species is monitored, and that the quantity and source of bait used in the fishery is also monitored. The status of these bait species stocks is also monitored. These data would detect any increase in risk (either to retained or bait species), and meet the SG80 requirements.</p>		

<b>PI 2.1.3</b>	<b>Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species</b>
	The ongoing monitoring of retained catch and the bait used in the fishery is conducted in sufficient detail to assess ongoing mortalities to all retained species, meeting the SG100 requirements.
<b>References</b>	CCAMLR 2016; CCAMLR, 2017c; GSGSSI 2012a,b; ICES, 2017a,b,c,d; Xu et al. 2017; Morales-Bojórquez et al. 2012; NZ MPI 2017; Agnew et al. 2005.; Observer reports.
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>	<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>NA</b>

#### 10.4.4 Evaluation Table for PI 2.2.1

<b>PI 2.2.1</b>		<b>The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below).	Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below).	There is a high degree of certainty that bycatch species are within biologically based limits.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>For the purposes of MSC assessments, the term “bycatch” refers to those non-target species that are not retained. The term “discarded species” or “discards” is often used to describe this aspect of the catch with greater precision and is preferred here.</p> <p>As with PI 2.1.1 above, “main” discarded species are considered by the MSC to be those which make up 5% or more of the total catch (CR 1.3 GCB3.5). Again, the performance of the different scoring elements (species) with respect to each SI is considered in turn where appropriate.</p> <p>There are no “main” discarded species in this fishery. This is partly due to the nature of the fishing method, which is designed to target toothfish; and also due to management measures that act to minimise bycatch (such as spatial and temporal closures and a “move on rule”).</p> <p>The species discarded in the greatest quantities are macrourids (averaging around 61.5t pa in catch records). This represents around 2.8% of the catch. The other species that are predominantly discarded in non-trivial amounts are blue antimora (<i>Antimora rostrata</i>) and other rajids, making up 0.6% and 0.1% of the catch respectively.</p> <p>Because there are no “main” discarded species in the fishery the S60 and SG80 standards are met.</p> <p>The SG100 requirements are not met because the stock status of the discarded species is not known.</p>		
<b>b</b>	<b>Guidepost</b>	If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding.	If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	
	<b>Met?</b>	NA	NA	

<b>PI 2.2.1</b>		<b>The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups</b>		
	<b>Justification</b>	There are no “main” bycatch species (none of the discarded species in the fishery make up 5% or more of the catch). This scoring issue is not applicable.		
<b>c</b>	<b>Guidepost</b>	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery.		
	<b>Met?</b>	Y		
	<b>Justification</b>	<p>The fishery discards a small proportion (and also a small quantity) of non-target species.</p> <p>There are measures in place to ensure that the level of discarding in the fishery will remain at a low level that will not impact non-target species. These include the measures and practices include the CCAMLR annual catch limit; a “move on” rule; and spatial closures (BCAs and the 12nm NTZ) established by the GSGSSI. A further incentive to maintain low levels of discarding is provided by the licensing system in place for the fishery, which scrutinises the efficiency of vessels (in terms of the target: non-target species ratio in the catch) and encourages efficient fishing practices. Inefficient vessels are less likely to receive new fishing licences.</p>		
<b>References</b>		CCAMLR, 2017c; GSGSSI 2012a,b; Laptikhovsky et al. 2014; Darby 2017; Hanchet and Welsford 2014; Soeffker & Walker 2017; Soeffker et al. 2014.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

### 10.4.5 Evaluation Table for PI 2.2.2

<b>PI 2.2.2</b>		<b>There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing and minimizing bycatch.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>As noted for PI 2.2.1 above, “main” bycatch (discarded) species are considered by the MSC to be those making up 5% or more of the catch.</p> <p>There are no “main” bycatch species in this fishery. The species discarded in the largest quantity are macrourids, making up 2.8% of the catch over the period 2012-16, of which 85.4% was discarded. Discarding is at a low level due to a combination of management measures implemented by CCAMLR and GSGSSI, as well as the intrinsic nature of the fishing activity.</p> <p>The retained catch limits imposed by CCAMLR do not apply to discarded species; but the “move on rule” that requires vessels to move away from areas where more than 1 tonne of non-target species are caught in a haul acts to minimise bycatch.</p> <p>In addition to these controls, the GSGSSI established three “Reduced Impact Areas” (RIAs) in 2008, which became BCAs with the creation of the SGSSI MPA in 2013. These areas are closed to fishing (apart from fishing as part of the stock tagging programme), and cover over 6,000km<sup>2</sup>. One of these areas (North East South Georgia) was specifically established to provide a refuge for grenadiers and rajids. More recently, GSGSSI has established a no take zone within 12 nautical miles of South Georgia, and fishing for toothfish is only permitted within the depth range of 700-2250m (see Figure 19).</p> <p>In addition to these measures, the GSGSSI has a licensing regime in place that takes account of the efficiency of fishing operations, and rewards those vessels that catch a low proportion of non-target species.</p> <p>The CCAMLR, GSGSSI actions represent a strategy that is designed to minimise the capture of non-target species, which applies to all discards. The SG100 requirements are therefore met.</p>		
<b>b</b>	<b>Guidepost</b>	The measures are considered likely to work,	There is some objective basis for confidence that	Testing supports high confidence that the

<b>PI 2.2.2</b>		<b>There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations</b>		
		based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	the partial strategy will work, based on some information directly about the fishery and/or species involved.	strategy will work, based on information directly about the fishery and/or species involved.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>The observer data for the fishery provides an objective basis for confidence that the management strategy is working. Discarding is at a consistently low level for all of the non-target species caught in this fishery. The SG60 and SG80 requirements are therefore met.</p> <p>There is no evidence available to demonstrate that the management strategy has been formally tested, so the SG100 requirements are not met.</p>		
<b>c</b>	<b>Guidepost</b>		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	<p>Clear evidence is available that the strategy for managing discards is being implemented successfully. This evidence is in the form of observer records showing low levels of discarding, and also the absence of any infringements of the spatial and temporal closures in place to protect non-target species.</p> <p>The evidence available meets the SG100 requirements for this SI.</p>		
<b>d</b>	<b>Guidepost</b>			There is some evidence that the strategy is achieving its overall objective.
	<b>Met?</b>			Y
	<b>Justification</b>	<p>The evidence of very low levels of catches (including discards and lost fish) by species from observer records provides evidence that the strategy for minimising catch of non-target species (and hence discarding) is achieving its overall objective and has been doing so for a sustained period of time.</p>		
<b>References</b>		CCAMLR, 2017c; GSGSSI 2012a,b; Laptikhovsky et al. 2014; Darby 2017; Hanchet and Welsford 2014; Soeffker & Walker 2017; Soeffker et al. 2014.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>95</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>





### 10.4.6 Evaluation Table for PI 2.2.3

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	Qualitative information is available on the amount of main bycatch species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery.	Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>Accurate and verifiable information on the level of discarding for all species from the observer programme in place for this fishery. This provides quantitative information on the amount of each species taken by the fishery. This information is provided through the CCAMLR independent observer programme and the catch declaration of vessels participating in the fishery (see section 5.5.3 of this report and the information presented in Table 5).</p> <p>The consequences of the catch for population status has been assessed for some of the affected populations (such as macrourids, rajids and crabs), but not for all of the discarded species.</p> <p>The SG60 and SG80 requirements are fully met. The information available from the observer programme meets the SG100 requirements, but the absence of information about the status of all affected populations means that the SG100 is not fully met.</p>		
b	<b>Guidepost</b>	Information is adequate to broadly understand outcome status with respect to biologically based limits	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>The information available from the observer programme demonstrates that there is a consistently low level of discarding from this fishery, both in terms of proportion of the catch and biomass. This information is sufficient to estimate outcome status with respect to biologically based limits. CCAMLR have done this for the more abundant non-target species in the fishery (macrourids and rajids), but have noted that the available data have limitations which prevent the status of these species being determined with a high degree of certainty. Thus the SG60 and SG80 requirements are met, but not the SG100 level of performance.</p>		
c	<b>Guidepost</b>	Information is adequate to support measures to manage bycatch.	Information is adequate to support a partial strategy to manage main bycatch species.	Information is adequate to support a strategy to manage retained species, and evaluate

<b>PI 2.2.3</b>		<b>Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch</b>		
				with a high degree of certainty whether the strategy is achieving its objective.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The high level of observer coverage in the fleet and the quality of information produced by the observer programme is adequate to inform the management strategy in place. This information is also adequate to demonstrate with a high degree of certainty that the management measures designed to minimise the capture and discarding of non-target species are achieving their objective.</p> <p>The performance requirements at the SG60, SG80 and SG100 levels are all therefore met.</p>		
<b>d</b>	<b>Guidepost</b>		Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).	Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	<p>The observer programme continues to provide detailed information about the catch of all species in the fishery and the level of discarding of all species throughout the fishing season. Any change in risk level would be detected, and the observer data can be used to assess ongoing mortality for all non-target species caught in the fishery. Both the SG80 and SG100 requirements are fully satisfied.</p>		
<b>References</b>		CCAMLR, 2017c; GSGSSI 2012a,b; Laptikhovsky et al. 2014; Darby 2017; Hanchet and Welsford 2014; Soeffker & Walker 2017; Soeffker et al. 2014.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

**10.4.7 Evaluation Table for PI 2.3.1**

<b>PI 2.3.1</b>		<b>The fishery meets national and international requirements for the protection of ETP species</b> <b>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.	There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>For the purposes of MSC assessments, ETP species are considered to be those that are recognised by national ETP legislation and / or listed in Appendix I of the Convention on International Trade in Endangered Species (CITES). (MSC CR, §CB3.11.1).</p> <p>The species that meet this definition and which the fishery under assessment may interact with include seabirds and marine mammals. Mortality rates for seabirds and marine mammals in this fishery are monitored by independent observers aboard all fishing vessels on all trips, and are very low indeed.</p> <p><b>Seabird mortality</b></p> <p>The low incidence of seabird interactions in the fishery is a result of management intervention to address problems of high bird mortality that were seen during the 1980s. The management actions that were introduced included seasonal and temporal restrictions on fishing activity, requirements to weight longlines so that they sink rapidly, restrictions on offal discharging, and the requirement to use bird scaring devices.</p> <p>The level of bird bycatch was negligible for many years, and zero from 2005-08. In the past few years there have been some bycatch incidents involving white chinned petrels. A total of 128 bycatch mortalities have been observed from 2014-2017.</p> <p>In response to these incidents the trial of an early start to the season has been terminated. In addition to the termination of the early start to the season, in 2018 an Early Season Closed Area will be trialled which prohibits fishing in the most vulnerable areas (North and West of the island) at the most vulnerable times (the first 2 weeks of the season: 16-30 April).</p> <p>Neither CCAMLR nor the GSGSSI have stipulated acceptable mortality levels for bird species; they have instead stipulated management measures that are designed to achieve the lowest possible level of mortality.</p> <p>The detection of the recent bird mortality incidents coupled with the presence of observers on all fishing trips to monitor the use of bird mitigation measures, and the swift and decisive management response taken on the rare occasions when non-compliance has been detected (outlined in PI2.3.3) provide confidence that the fishery is operating within national and international requirements.</p> <p>The consequence of bird mortality for the white chinned petrel population globally (estimated at around 2.4 million birds) and locally at South Georgia (estimated population of over 770,000 breeding pairs) is highly unlikely to be significant</p>		

<b>PI 2.3.1</b>		<b>The fishery meets national and international requirements for the protection of ETP species</b> <b>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species</b>		
		<p><b>Marine mammals</b></p> <p>Records of marine mammal mortality in the fishery show that any adverse interactions are very rare indeed. In the past 5 years three seals have been caught in the fishery and released alive, and one dead sperm whale has been recorded (the cause of death was uncertain).</p> <p>The only significant interaction between the fishery and marine mammals arises from the depredation of toothfish from longlines as they are being hauled. Both sperm whales and orcas are attracted to fishing vessels as they are hauling their lines and take toothfish from the line as it is hauled to the surface.</p> <p>There is no evidence of any adverse interactions between marine mammals and the toothfish longline fishery.</p> <p><b>Overall</b></p> <p>The observer programme for the South Georgia toothfish fishery is designed to record any interactions with these ETP species. The accuracy of this information and the level of observer coverage exceed the SG60 and SG80 requirements, and provide the level of certainty required to meet the SG100 requirement that the fishery is within the limits of national and international protection of ETP species.</p>		
<b>b</b>	<b>Guidepost</b>	Known direct effects are unlikely to create unacceptable impacts to ETP species.	Direct effects are highly unlikely to create unacceptable impacts to ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	The information available from the observer programme, coupled with assessment of seabird populations and monitoring of cetacean interactions provides a high degree of confidence that the fishery has no significant detrimental direct effects on ETP species. Records show that impacts are detected and reported, and that these are at a very low level. This meets the SG60, 80 and 100 requirements.		
<b>c</b>	<b>Guidepost</b>		Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	<p>Indirect effects (such as the ingestion of hooks by young birds at nesting sites and entanglement of pinnipeds with lost fishing gear) have been considered and management measures introduced to either allow detection of any effect or to eliminate the risk.</p> <p>The marking of fish hooks with vessel ID has enabled the risk of ingestion of hooks by young birds to be assessed. To date, it appears that the fishery under</p>		

<p><b>PI 2.3.1</b></p>	<p><b>The fishery meets national and international requirements for the protection of ETP species</b>  <b>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species</b></p>	
	<p>assessment is very unlikely to impact seabirds in this manner (only 8 marked hooks have been recovered from nesting sites to date).</p> <p>The use of mesh bags to contain long line weights has recently been prohibited, both to minimise impacts on marine benthos and to eliminate the risk of any lost mesh bags becoming entangled with pinnipeds in the area.</p> <p>The issue of competition for resources with ETP species has also been considered. Sperm whales are the only species capable of foraging for toothfish in the depth range that the fishery operates (killer whales cannot dive deeper than 265m). For killer whales, the habit of feeding on toothfish from longlines as they are recovered represents a feeding opportunity that would not otherwise arise. Although sperm whales are known to feed on toothfish, the main component of the sperm whales' diet in the area is known to be squid.</p> <p>The information available demonstrates that indirect effects of the fishery on ETP species have been examined, and that there is a high degree of confidence that such indirect effects are not arising. The SG80 and SG100 requirements are fully met.</p>	
<p><b>References</b></p>	<p>ACAP, 2009; Martin et al, 2009Moir Clark &amp; Agnew, 2010; Söffker et al, 2015, section 5.5.4.</p>	
<p><b>OVERALL PERFORMANCE INDICATOR SCORE:</b></p>		<p><b>100</b></p>
<p><b>CONDITION NUMBER (if relevant):</b></p>		<p><b>NA</b></p>

### 10.4.8 Evaluation Table for PI 2.3.2

<b>PI 2.3.2</b>		<p><b>The fishery has in place precautionary management strategies designed to:</b></p> <ul style="list-style-type: none"> <li>• <b>Meet national and international requirements;</b></li> <li>• <b>Ensure the fishery does not pose a risk of serious harm to ETP species;</b></li> <li>• <b>Ensure the fishery does not hinder recovery of ETP species; and</b></li> <li>• <b>Minimise mortality of ETP species.</b></li> </ul>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	There are measures in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>CCAMLR and GSGSSI management actions provide a comprehensive strategy for managing impacts on ETP species. The components of this strategy include CCAMLR Conservation Measure 25-02 which specifies mitigation measures that must be implemented in the toothfish fishery and also GSGSSI legislation, licence conditions, and action plans for the protection of seabirds.</p> <p>The strategy in place has been designed specifically for the toothfish longline fishery and ETP species found around South Georgia, taking into account both national and international requirements for the protection of these species.</p> <p>The strategy for the fishery stipulates temporal and spatial closures, the type of fishing gear that may be used, acceptable fishing methods, and also mitigation measures to prevent interactions taking place. The management strategy is also adaptive, containing actions to be taken in the case of ETP mortality arising (such as closures in the event of bird mortality).</p> <p>Evidence of the implementation of the management strategy has been provided in the period since 2014. At that time CCAMLR had authorised an extension to the start of the toothfish longline fishing season. This extension was dependent on low bird bycatch rates. When these bycatch rates were breached, the extension to the fishing season was rescinded and has now reverted to the 16<sup>th</sup> April of each year.</p> <p>In addition to the formal strategy in place, the GSGSSI licensing scheme works to drive constant improvements in the performance of the fishery, by favouring access to the fishery by vessels with a track record of low ETP interactions.</p> <p>The ETP management strategy for this fishery exceeds the SG60 &amp; 80 requirements and satisfies the SG100 standard of performance.</p>		
<b>b</b>	<b>Guidepost</b>	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative

<b>PI 2.3.2</b>		<p><b>The fishery has in place precautionary management strategies designed to:</b></p> <ul style="list-style-type: none"> <li>• <b>Meet national and international requirements;</b></li> <li>• <b>Ensure the fishery does not pose a risk of serious harm to ETP species;</b></li> <li>• <b>Ensure the fishery does not hinder recovery of ETP species; and</b></li> <li>• <b>Minimise mortality of ETP species.</b></li> </ul>		
		comparison with similar fisheries/species).	and/or the species involved.	analysis supports high confidence that the strategy will work.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The management strategy in place is designed specifically for the toothfish longline fishery and to minimise mortality of the ETP species that may be affected by it. Observer records provide ongoing and quantitative information about the effectiveness of the strategy, the implementation of mitigation measures, and observer reports of any ETP species interactions confirm whether these are working. The fishery meets all of the SG60, 80 and 100 requirements.</p>		
<b>c</b>	<b>Guidepost</b>		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	<p>Inspections of fishing vessels at sea and at port (to ensure that vessels are carrying and using all appropriate equipment and that they are implementing bird interaction mitigation measures correctly), as well as observer records (which show low levels of interaction with ETP species) have been provided to the assessment team.</p> <p>These reports provide clear evidence that the strategy in place for monitoring the fishery and the strategy for mitigating adverse interactions with ETP species are both being implemented successfully, meeting the SG80 and SG100 requirements.</p>		
<b>d</b>	<b>Guidepost</b>			There is evidence that the strategy is achieving its objective.
	<b>Met?</b>			Y
	<b>Justification</b>	<p>Observer data provides direct independent and verifiable evidence that the fishery has a very low level of interaction with ETP species. Independent assessment of the risks to the vulnerable seabird species in the area indicate that this fishery is achieving its objective of minimising interactions, meeting the SG100 requirements.</p>		
<b>References</b>		<p>The Fisheries (Conservation and Management) Ordinance 2000 (as amended); the Convention on the Conservation of Antarctic Marine Living Resources; SGSSI Environment Charter; Biodiversity Action Plan for South Georgia &amp; South Sandwich Islands 2016-2020.</p>		

<p><b>PI 2.3.2</b></p>	<p><b>The fishery has in place precautionary management strategies designed to:</b></p> <ul style="list-style-type: none"> <li>• <b>Meet national and international requirements;</b></li> <li>• <b>Ensure the fishery does not pose a risk of serious harm to ETP species;</b></li> <li>• <b>Ensure the fishery does not hinder recovery of ETP species; and</b></li> <li>• <b>Minimise mortality of ETP species.</b></li> </ul>
	<p>GSGSSI 2016 jc, jd; 2017jc; Martin et al, 2009; IUCN, 2016;Wolfaardt &amp; Christie, 2010; Phillips et al, 2016; Clay et al, 2016; section 5.5.4.</p>
<p><b>OVERALL PERFORMANCE INDICATOR SCORE:</b></p>	
	<p><b>100</b></p>
<p><b>CONDITION NUMBER (if relevant):</b></p>	



### 10.4.9 Evaluation Table for PI 2.3.3

<b>PI 2.3.3</b>		<b>Relevant information is collected to support the management of fishery impacts on ETP species, including:</b> <ul style="list-style-type: none"> <li>• <b>Information for the development of the management strategy;</b></li> <li>• <b>Information to assess the effectiveness of the management strategy; and</b></li> <li>• <b>Information to determine the outcome status of ETP species.</b></li> </ul>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The main species of concern in this fishery are seabirds (grey headed albatross, black browed albatross, and white chinned petrels) and cetaceans (sperm whales and killer whales).</p> <p>Observer data from the fishery provides quantitative information about the extent of any interactions with ETP species. Any mortality of any ETP species is accurately recorded.</p> <p>Breeding populations of the bird species are monitored in the area, and observations made of any evidence of indirect effects (such as the occurrence of discarded hooks in bird nests – hooks from this fishery being marked with vessel ID). Indirect impacts would therefore be detected.</p> <p>The information available meets the SG60, 80 and 100 requirements.</p>		
<b>b</b>	<b>Guidepost</b>	Information is adequate to broadly understand the impact of the fishery on ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.	Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>Observer data from the fishery, coupled with monitoring of bird colonies at South Georgia, provide accurate and verifiable information on impacts. Mortalities and injuries are detected, and the information available has enabled bird experts to conclude that this fishery has negligible impact on ETP species. The SG60, 80 and 100 requirements are fully met.</p>		
<b>c</b>	<b>Guidepost</b>	Information is adequate to support measures to manage the impacts on ETP species.	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.

<b>PI 2.3.3</b>		<b>Relevant information is collected to support the management of fishery impacts on ETP species, including:</b> <ul style="list-style-type: none"> <li>• <b>Information for the development of the management strategy;</b></li> <li>• <b>Information to assess the effectiveness of the management strategy; and</b></li> <li>• <b>Information to determine the outcome status of ETP species.</b></li> </ul>		
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>Information directly from the fishery (from observers) is adequate to inform a comprehensive strategy for managing impacts on all ETP species. The data available on bird and cetacean interactions provides a high degree of certainty that the strategy is achieving its objectives.</p> <p>Following the accidental capture of 77 white chinned petrels during 2014 the vessel concerned admitted liability and was given an Administrative Penalty and fined £30,000 by GSGSSI. The GSGSSI subsequently conducted a review of the line setting data provided by all other vessels for the previous two fishing seasons, and detected two incidents when lines were sent in breach of night-setting regulations (though no bird bycatch ensued). The vessel concerned was given an Administrative Penalty and fined £20,000.</p> <p>This event demonstrates that there is information available that supports a strategy for managing impacts, and that this strategy is implemented effectively, meeting the SG60, 80 and 100 requirements for this SI.</p>		
<b>References</b>		GSGSSI, 2014, 2016jc, 2016jd, 2017jc ; SGSSI Environment Charter; Moir Clark & Agnew, 2010; Varty et al, 2008; Wolfaardt & Christie, 2010; section 5.5.4.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

**10.4.10 Evaluation Table for PI 2.4.1**

<b>PI 2.4.1</b>		<b>The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>The GSGSSI observers aboard fishing vessels have recorded the bycatch of benthos in the fishery as part of an ongoing programme to improve understanding of marine habitats in the area. In 2008 the GSGSSI established 3 Reduced Impact Areas (RIAs) in response to these studies. The RIAs were established to protect deep water corals and became Benthic Closed Areas in the Marine Protected Area in 2013 (with additional areas added).</p> <p>In 2013, further benthic protection measures were announced as part of a strategy that is intended to protect marine habitats in the SGSSI maritime zone. This strategy is based upon further information gathered from the fishery. As well as closures of specific areas, the GSGSSI has established a No Take Zone in the waters within 12 nautical miles of South Georgia, and a prohibition on fishing in waters shallower than 700m in order to protect both non-target fish species and Vulnerable Marine Ecosystems (which are concentrated in shallower waters). In 2013 a maximum depth restriction of 2250m was placed on fishing activities. As a result, only 7.8% of the SGSSI MZ is open to fishing (97,496km<sup>2</sup>).</p> <p>It has been estimated that the longline fishery impacts, at most, 1km<sup>2</sup> per year. Within this area, the impacts on marine habitats may arise from the physical impact of the fishing gear. Static fishing gear, such as longlines, is known to have very low impact on marine habitats. To reduce potential impacts still further, the GSGSSI has prohibited the use of mesh bags to enclose line weights (weights in mesh bags are more likely to snag and damage marine animals).</p> <p>Taken together, the small area impacted, the intrinsically low impact of the fishing gear, coupled with the proactive management measures implemented by the GSGSSI in response to the best available information mean that the fishery is highly unlikely to have serious or irreversible impacts on marine habitats. This level of performance meets the SG60 and 80 requirements.</p> <p>The SG100 requirements are not considered to be met at present because there is no evidence available from direct observation of the fishery or experimental studies to demonstrate that it is highly unlikely to cause serious or irreversible harm.</p> <p>The assessment team note that the GSGSSI is currently undertaking research work to better understand the distribution of marine habitats and VMEs in the SGSSI MZ. It is anticipated that this work and the review of the MPA management plan in 2018 will contribute to an improved score against this and the other habitat-related Performance Indicators.</p>		
	<b>References</b>	BAS, 2014; Benedet, 2016; GSGSSI, 2012a, b, 2016ja; Hogg et al, 2016; Agnew et al, 2007; Martin et al, 2012, section 5.5.5.		

<b>PI 2.4.1</b>	<b>The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function</b>
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>	<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>NA</b>

### 10.4.11 Evaluation Table for PI 2.4.2

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of the fishery on habitat types.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>Since 2008 the GSGSSI has taken a range of management actions as part of a strategy to reduce the potential impact of this fishery on marine habitats. These include the creation of Benthic Closed Areas covering over 6,000km<sup>2</sup> of seabed to protect marine corals (VMEs that require protection within the CCAMLR area); depth restrictions on the longline fishery; no take zones around all of the islands in SGSSI; and the declaration of a Marine Protected Area (MPA) covering over 1 million km<sup>2</sup>. Further actions include a ban on the use of mesh bags to contain longline weight to minimise entanglement of corals with fishing gear.</p> <p>The declaration of the MPA area was implemented through an Order (the Marine Protected Areas Orders 2012 and 2013) that was made under the Wildlife and Protected Areas Ordinance 2011. These Orders and Ordinance provide an enforceable, statutory strategy for protecting marine habitats. The MPA management plan sets out the objectives for habitat protection and restrictions on fishing activities and managing impacts on habitats within the MPA area.</p> <p>These management actions represent a strategy which uses the best available information to manage the impacts of the fishery on marine habitats, meeting the SG60, 80 and 100 requirements.</p> <p>The assessment team note that the management strategy for the MPA area is presently under review and is taking account of both new information about the distribution of marine habitats and the emergence of new expectations about the habitat management tools in place (such as the MSC CRv2.0 requirements for a “move on” rule for VMEs). The team has generated a recommendation that the MPA management review being carried out in 2017-18 should take account of the new information and expectations.</p>		
b	<b>Guidepost</b>	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>There is a well-founded strategy in place for managing habitats impacts on the basis of the best available information. This has resulted in the creation of Reduced Impact Areas (RIAs); depth constraints on the fishery; and spatial closures of areas which are either known to support or thought to support potentially vulnerable benthic habitats.</p> <p>The remoteness of the area, coupled with the depth of the fishery prevents testing of the effectiveness of the management strategy. The SG60 and SG80</p>		

<b>PI 2.4.2</b>		<b>There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types</b>	
		requirements are fully met by the strategy that is in place, but in the absence of testing the SG100 requirements are not met.	
<b>c</b>	<b>Guidepost</b>		There is some evidence that the partial strategy is being implemented successfully.
	<b>Met?</b>		Y
	<b>Justification</b>	Clear evidence that the strategy for managing the spatial extent of fishing activity is being implemented successfully is provided by VMS and observer records of the pattern of fishing activity which confirms that no fishing is taking place in closed areas, and that the only fishing taking place in RIAs is in compliance with the requirements for fish tagging in those areas (see Figure 3). The SG80 and SG100 requirements are therefore fully met.	
<b>d</b>	<b>Guidepost</b>		There is some evidence that the strategy is achieving its objective.
	<b>Met?</b>		N
	<b>Justification</b>	<p>The objective of the MPA management plan is to “<i>Conserve marine biodiversity, habitats and critical ecosystem function</i>”. The management strategy sets out measures and actions designed to achieve this objective.</p> <p>Although it is clear that the measures and actions set out in the MPA management plan are being implemented successfully, the remoteness of South Georgia coupled with the depth at which the fishery takes place means that there is very limited evidence about the habitats that may be impacted and thus whether the management objective is being achieved. Because of this, SG100 is not considered to be met.</p>	
<b>References</b>		GSGSSI, 2012a, b, 2013c; Agnew et al, 2007; Martin et al, 2012; section 5.5.5.	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>			<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>			<b>NA</b>

**10.4.12 Evaluation Table for PI 2.4.3**

<b>PI 2.4.3</b>		<b>Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types</b>		
<b>Scoring Issue</b>		<b>SG 60</b>	<b>SG 80</b>	<b>SG 100</b>
<b>a</b>	<b>Guidepost</b>	There is basic understanding of the types and distribution of main habitats in the area of the fishery.	The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>The nature and distribution of the main habitat types in the area has been determined in part from information gathered from the fishery by fishery observers (see Figure 17). This has provided information is at a scale relevant to the fishery, and has identified the habitat types that are most vulnerable to the impacts of the fishery.</p> <p>The distribution of habitat types over their range is not known however. This is the subject of ongoing research by the GSGSSI, who have commissioned scientists to carry out survey work and to use the latest biogeographical methods to determine the distribution of habitat types.</p> <p>The information available meets the SG60 and SG80 requirements, but does not meet the SG100 requirements.</p> <p>It is anticipated that the SG100 requirements will be wholly or entirely met with the completion of scientific work currently being carried out to improve understanding of the distribution and sensitivities of benthic habitats in the GSGSSI MZ.</p>		
<b>b</b>	<b>Guidepost</b>	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.	The physical impacts of the gear on the habitat types have been quantified fully.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>Data from fishery observers allows the nature, spatial extent, location and timing of impacts of the fishery on habitats to be determined. Generic information on the impacts of longlines on marine habitats is also available (Jennings &amp; Kaiser, 1998). The physical impacts of the gear on habitats have not been quantified however. The SG60 and 80 requirements are therefore met, but not the SG100 requirement.</p>		

<b>PI 2.4.3</b>		<b>Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types</b>		
<b>c</b>	<b>Guidepost</b>		Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Changes in habitat distributions over time are measured.
	<b>Met?</b>		Y	N
	<b>Justification</b>	Ongoing monitoring of fishing operations and gear used, together with continuing collection of information on habitats is considered sufficient to determine any increase in risk to habitat (see for instance Martin et al, 2012). Changes in habitat distributions over time are not measured. The SG80 requirement is therefore met, but not the SG100 standard.		
<b>References</b>		Benedet, 2016; Hogg et al, 2016; Hogg & Collins 201X; GSGSSI, 2012a, b; GSGSSI 2013c; Jennings & Kaiser, 1998; Agnew et al, 2007; Martin et al, 2012;section 5.5.5.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>				



### 10.4.13 Evaluation Table for PI 2.5.1

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The information presented on the Principle 2 components (retained and discarded non-target species; ETP species and habitats) all indicate that the fishery is highly unlikely to disrupt any of the key elements in ecosystem structure and function.</p> <p>The marine ecosystem around South Georgia is based on krill. Toothfish are known to be opportunistic predators that occupy a high trophic level (see Figure 5). Elephant seals and sperm whales are known to feed on toothfish. Ecosystem modelling (using Ecopath and Ecosim) suggests that the fishery is sustainable and is not likely to affect non-target species.</p> <p>The SG60, 80 and 100 requirements are met because there is evidence available (in the form of an ecosystem model based on observations of the fishery) that concludes that the fishery is highly unlikely to disrupt the key elements of the ecosystem.</p>		
<b>References</b>		Brown et al, 1999; Collins et al, 2007; Constable, et al, 2000; Phang, 2008; Pinkerton et al, 2007; Pilling et al, 2001; section 5.5.1 of this report.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

### 10.4.14 Evaluation Table for PI 2.5.2

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	There are measures in place, if necessary.	There is a partial strategy in place, if necessary.	There is a strategy that consists of a plan, in place.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The overall strategy for the protection of the environment of South Georgia is set out formally in the Environment Charter that was adopted by the GSGSSI in 2001. This set out sets out clear commitments for both the UK Government and GSGSSI to, inter alia, implement obligations under international agreements affecting the area; establish effective monitoring and enforcement mechanisms; and abide by the principles set out in the Rio Declaration on the Environment and Development.</p> <p>The strategy for the protection of the marine environment is currently delivered through a management plan for the South Georgia and South Sandwich Islands Marine Protected Area (MPA) that was introduced in 2012. The purpose of the MPA management plan is to protect the key elements of the ecosystem in the area. The measures set out in the plan have been implemented. The plan is based upon the best available information, and is subject to quinquennial review.</p> <p>The SG60, 80 and 100 requirements are met because there is a strategy in place for managing ecosystem impacts is designed to ensure that the fishery does not pose a risk of serious or irreversible harm to ecosystems, and consists of a plan that has been implemented.</p>		
b	<b>Guidepost</b>	The measures take into account potential impacts of the fishery on key elements of the ecosystem.	The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	<p>The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem.</p> <p>This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.</p>
	<b>Met?</b>	Y	Y	Y

<b>PI 2.5.2</b>	<b>There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function</b>			
<b>Justification</b>	<p>Information from the fishery about the catch of non-target species, ETP species, habitat impacts, and ecosystem effects has shaped the management strategy and management plan that is in place.</p> <p>The components of the strategy are regulations governing the catch that may be retained on fishing vessels (to protect target and non-target species); the gear that may be used (to protect ETP species and marine habitats); and spatial &amp; temporal controls on fishing activity (introduced to protect the target species, non-target species, ETP species, marine habitats, and ecosystems).</p> <p>All of the measures in place are based upon an understanding of the impact of the fishery on the relevant ecosystem components (for instance the use of tori lines and other mitigation measures to eliminate impacts on birds; and the creation of no take zones to protect Vulnerable Marine Ecosystems). The management measures have been refined over time to ensure that they have the desired outcome (such as the elimination of the bird bycatch problem in the fishery).</p> <p>The plan in place has been developed over several years, and represents a full strategy to restrain impacts. The MPA plan is subject to quinquennial review, to take account of any new information about ecosystem impacts. The licensing system for the fishery is designed to constantly reduce ecosystem impacts, by favouring operators with a track record of low environmental impacts (in terms of catch of non-target and ETP species).</p> <p>The strategy and plan in place therefore meets all of the SG60, 80 and 100 requirements.</p>			
<b>c</b>	<b>Guidepost</b>	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.
	<b>Met?</b>	Y	Y	Y
<b>Justification</b>	<p>The measures in place for managing catch of non-target species and ETP species are demonstrably effective: bycatch rates are consistently low, and the fishery is considered unlikely to adversely affect non-target species. Ecosystem modelling also indicates that under the present management regime the fishery is unlikely to adversely affect marine ecosystems.</p> <p>The measures in place for protecting marine habitats are more difficult to test than those for other ecosystem components because the area is remote and the fishery is conducted in deep water, so habitat impact are difficult to observe. The GSGSSI has responded to these challenges by using the best available source of information to identify areas with vulnerable marine ecosystems and then prohibit or severely limit fishing activity in these areas (through their designation as no take zones, reduced impact areas and benthic closed areas).</p> <p>Information directly from the fishery therefore provides direct evidence that the measures in place for managing fishery impacts on the ecosystem components are likely to work. The SG60, 80 and 100 requirements are met.</p>			

<b>PI 2.5.2</b>		<b>There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function</b>		
<b>d</b>	<b>Guidepost</b>		There is some evidence that the measures comprising the partial strategy are being implemented successfully.	There is evidence that the measures are being implemented successfully.
	<b>Met?</b>		Y	Y
	<b>Justification</b>	<p>The GSGSSI has systems in place for monitoring compliance of the fleet with all management measures, including those in place for ecosystem. Monitoring is carried out by independent ship-board observers (100% fleet coverage); inspections of vessels by fishery officers at sea; and monitoring of vessel activity using VMS.</p> <p>The GSGSSI reports that there have been no transgressions of the gear restrictions, spatial and temporal controls that are in place to protect marine ecosystems. The SG60 and 80 requirements are therefore fully met.</p>		
<b>References</b>		CCAMLR, 2016a; GSGSSI, 2001; GSGSSI, 2012a, b. GSGSSI, 2014a; Martin et al, 2012; Phang, 2008;		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

### 10.4.15 Evaluation Table for PI 2.5.3

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).	Information is adequate to broadly understand the key elements of the ecosystem.	
	<b>Met?</b>	Y	Y	
	<b>Justification</b>	<p>The key elements of the ecosystem are understood. The function of the ecosystem has been modelled. The impact of the fishery on other ecosystem elements (target species, non-target species, ETP species, and habitats) is monitored to inform understanding of impacts.</p> <p>The information available meets the SG60 and SG80 requirements.</p>		
b	<b>Guidepost</b>	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail.	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail.	Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The main interactions between the fishery and ecosystem elements are monitored and have been investigated. Interactions that have been examined in detail include the effect of the fishery on non-target species (principally macrourids and rajids); impacts on ETP species (bird mortality and cetacean depredation); and habitat impacts (through monitoring of bycatch over many years). These appear to be the main interactions between the fishery and the ecosystem.</p> <p>The available information is sufficient to meet the SG60, 80 and 100 requirements.</p>		
c	<b>Guidepost</b>		The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.	The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood.
	<b>Met?</b>		Y	Y

<b>PI 2.5.3</b>		<b>There is adequate knowledge of the impacts of the fishery on the ecosystem</b>	
	<b>Justification</b>	The impacts of the fishery on target, non-target and ETP species are subject to ongoing and continuous monitoring. The main functions of all of these components in the ecosystem as predators or prey are understood, and have been modelled. The SG80a and 100 requirements are therefore fully met.	
<b>d</b>	<b>Guidepost</b>		Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.
	<b>Met?</b>		Y
	<b>Justification</b>	There is sufficient information available on all of the components and elements of the ecosystem to allow the consequences for each component to be inferred and the effect of the fishery on overall ecosystem function to be modelled. All of the available information indicates that under the current management regime the fishery has very little impact on ecosystem components, elements and function.  The information available is sufficient to meet the SG80 and SG100 requirements.	
<b>e</b>	<b>Guidepost</b>		Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).
	<b>Met?</b>		Y
	<b>Justification</b>	Information about the fishery and its effects on ecosystem components and elements is gathered continually through the on-board observer programme. This information is capable of detecting any change in risk level, and has also been used to develop strategies to manage ecosystem impacts (for instance, through the development of bird mitigation measures in the fishery and also the identification of vulnerable marine ecosystems that have subsequently been protected under the GSGSSI MPA management plan).	
<b>References</b>		Agnew & Mitchell, 2007; Agnew et al, 2007; CCAMLR, 2016a; Collins et al, 2007; Constable et al, 2000; Croxall & Wood, 2002; GSGSSI, 2012a, b; Laptikhovsky et al, 2014; Martin et al, 2012; Mitchell & Agnew, 2007; Mitchell et al, 2007; Moir Clark & Agnew, 2010; Morley et al, 2004; Phang, 2008; Pilling et al, 2001; Roberts, 2006; Varty et al, 2008; Wolfaardt & Christie, 2010.	

<b>PI 2.5.3</b>	<b>There is adequate knowledge of the impacts of the fishery on the ecosystem</b>
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>	<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>NA</b>

## 10.5 Principle 3 Evaluation Tables

### 10.5.1 Evaluation Table for PI 3.1.1

<b>PI 3.1.1</b>		<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> <li>• Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and</li> <li>• Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</li> <li>• Incorporates an appropriate dispute resolution framework.</li> </ul>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	There is an effective national legal system and a framework for <u>cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and <u>organised and effective cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and binding procedures <u>governing cooperation with other parties</u> which delivers management outcomes consistent with MSC Principles 1 and 2.
	<b>Met?</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>
	<b>Justification</b>	<p>The UoC stock is neither a straddling or shared stock. The Government of South Georgia and the South Sandwich Islands (GSGSSI) has sole competence for the management of the stock. Because this stock is located within the Antarctic, the GSGSSI is under an international legal obligation to comply with the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). The CCAMLR Commission resolved in 1986 that the South Georgia fisheries should be managed in accordance with binding “<i>limitations on catch, or equivalent measures</i>” set by the Commission (CCAMLR, 1986).</p> <p>GSGSSI has established a management regime for the fishery that is compatible with CCAMLR and gives effect to the Convention. There is clear evidence that GSGSSI participates fully with CCAMLR requirements to monitor and report both fishing activity, stock status and environmental impacts associated with the fishery (CCAMLR, 2016a). The GSGSSI also implement a TAC for the stock that is more precautionary with advice from CCAMLR as a matter of policy. The CCAMLR advice on TAC, fishing seasons, and the distribution of fishing effort between management areas, as well as requirements to minimise environmental impacts (such as bird bycatch mitigation measures) are given effect through enforceable licence conditions.</p> <p>The management system for the fishery is set out in the <i>Fisheries (Conservation and Management Ordinance) 2000</i>, which includes formal provisions, procedures, and duties for managers that are designed to deliver outcomes required by CCAMLR both with respect to the conservation of fish stocks (MSC Principle 1) and also the protection of the marine environment (MSC Principle 2).</p> <p>In addition to this, the 2001 GSGSSI Environment Charter sets out a binding commitment for the GSGSSI to implement international agreements for the protection of wildlife, such as the UN Rio Declaration (and hence the Convention on Biological Diversity).</p>		



PI 3.1.1	<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>• <b>Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and</b></li> <li>• <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>• <b>Incorporates an appropriate dispute resolution framework.</b></li> </ul>			
	<p>The national legal system meets all of the SG60, 80 and 100 requirements and delivers outcomes consistent with SG60, 80 and 100 for this aspect of the SI. Although this is not a shared or straddling fish stock, the commitment made by GSGSSI to implement CCAMLR requirements demonstrates compliance with binding procedures for international cooperation, meeting the SG60, 80 and 100 requirements in this regard. The legal system also delivers management outcomes consistent with MSC Principles 1 and 2.</p>			
b	Guidepost	<p>The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.</p>	<p>The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.</p>	<p>The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.</p>
	Met?	Y	Y	Y
	Justification	<p>The management system includes mechanisms to resolve disputes that involve the transgression of fisheries regulations and also to allow participants in the fishery to challenge management decisions taken by the GSGSSI.</p> <p>The mechanisms for resolving disputes arising from transgressions of the regulations that govern the vessels operating in the fishery are set out in the <i>Fisheries (Conservation and Management Ordinance) 2000</i>. This ordinance sets out the powers of enforcement offices and the mechanism for resolving disputes, either through administrative penalties (for minor transgressions) or through the Courts for more major offences. This system has been tested through the occasional prosecution of transgressors for minor administrative offences.</p> <p>The mechanism for challenging management decisions is provided either through the Courts, either through the opportunity to offer a defence for transgressions; or through the opportunity for Judicial Review of management decisions. The management system was challenged through a Judicial Review in 2011-12, which found in favour of the GSGSSI, ruling that the mechanisms in place for restricting access to the fishery are lawful.</p> <p>In summary, all of the SG60, 80 and 100 requirements are met by the management system.</p>		

<b>PI 3.1.1</b>		<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>• <b>Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and</b></li> <li>• <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>• <b>Incorporates an appropriate dispute resolution framework.</b></li> </ul>		
<b>d</b>	<b>Guidepost</b>	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>No one is dependent on this fishery for food. All fishing is commercial.</p> <p>The management system for the fishery is based on the allocation of licences on the basis of stock status, and the track record of applications (with respect to their compliance with fisheries regulation in force to protect both the target stock and the marine environment). The procedure for licence allocations has been tested with approval in the Courts through Judicial Review proceedings,</p> <p>The management system represents an explicit and formal commitment to respect the legal and customary rights of individuals dependent on the fishery for their livelihood.</p> <p>The fishery meets the SG60, 80 and 100 requirements.</p>		
<b>References</b>		CCAMLR, 1986, 2013c, d; GSGSSI, 2001, 2011, 2014a,		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

### 10.5.2 Evaluation Table for PI 3.1.2

<b>PI 3.1.2</b>		<b>The management system has effective consultation processes that are open to interested and affected parties.</b>		
		<b>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>At the international level, CCAMLR is responsible for developing consistent standards for the management of fisheries and their environmental impacts throughout the area covered by the convention. The functions, roles and responsibilities of the Commission are explicitly defined and are understood by all CCAMLR members, including GSGSSI (see section 5.6.2 of this report).</p> <p>Management processes for SGSSI are straightforward and explicitly defined in UK legislation and also in the Fisheries (Conservation and Management) Ordinance 2000.</p> <p>The Commissioner of SGSSI has full responsibility for administration of the Island, and the Director of Fisheries has full responsibility for the conservation and management of fish stocks, fishing activities and their regulation. Fishery Protection Officers are empowered to enforce these regulations (such officers include, inter alia, police officers, customs officers, harbour masters, UK military personnel and Fishery Protection Officers appointed by the Commissioner). The roles and responsibilities of all individuals and organisations are explicitly defined in this legislation and well understood by participants in the fishery.</p> <p>The SG60, 80 and 100 requirements are fully met by the management processes in place.</p>		
<b>b</b>	<b>Guidepost</b>	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.
	<b>Met?</b>	Y	Y	Y

<b>PI 3.1.2</b>	<p><b>The management system has effective consultation processes that are open to interested and affected parties.</b></p> <p><b>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</b></p>		
<b>Justification</b>	<p>At the international level, regular meetings of the CCAMLR Group on Fish Stock Assessment take into account all relevant information about the fishery. The reports of meetings provide evidence of how information has been used.</p> <p>There is evidence of consultation with stakeholders over all aspects of management of this fishery. Consultation documents have recently been issued for proposed changes to the duration of fishing licences, and extensive consultations were carried out before implementation of the new MPA arrangements in 2012-3.</p> <p>The consultations that were carried out during the process of creating the new MPA arrangements demonstrated that the management system is capable of seeking and considering information from stakeholder and the explaining how it has been used.</p> <p>During the course of this re-assessment, the GSGSSI has started the process of revising the management plan for the GSGSSI Marine Protected Area (MPA). The consultation process for this review demonstrates a proactive approach that provides opportunities for, and encourages, stakeholder engagement: in August 2017 the GSGSSI wrote to stakeholders and posted a notice on its website inviting written submissions to inform the review process, and to invite participation in an “Advisory Group” of stakeholders to assist with the review. Written submissions were subsequently published in October 2017, and a meeting of the Advisory Group was held in November 2017. This Advisory Group is due to produce a report containing advice and recommendations for the MPA review during 2018. This MPA review process provides further evidence of the management system accepting information from stakeholders and explaining how it is used.</p> <p>The consultation systems in place at CCAMLR and the GSGSSI level meet all of the SG60, 80 and 100 requirements.</p>		
<b>c</b>	<b>Guidepost</b>	The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	<b>Met?</b>	<b>Y</b>	<b>Y</b>
<b>Justification</b>	<p>At the international level, meetings of the CCAMLR Group on Fish Stock Assessment provide an opportunity for all interested and affected parties to be involved in management of the fishery.</p> <p>At the national level, although South Georgia has no resident population, but nevertheless there are a significant number of parties interested in the management of the Island and the seas around it.</p> <p>To facilitate stakeholder engagement in the management process, the GSGSSI makes use of electronic media in its consultations with stakeholders, and publishes an annual report summarising its activities which is published on the internet.</p> <p>The administrative officers of GSGSSI are based in Stanley on the Falkland Islands, which is the base of operations for many of the vessels prosecuting the fishery.</p>		

<p><b>PI 3.1.2</b></p>	<p><b>The management system has effective consultation processes that are open to interested and affected parties.</b></p> <p><b>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</b></p>	
	<p>To further facilitate engagement, the GSGSSI holds an annual meeting with stakeholders in London, at which presentations are given about current management issues and proposals. The Commissioner and Director of Fisheries directly engage with interested parties at this meeting. During the assessment of the fishery the Assessment Team attended the annual stakeholder meeting held in September 2017 to observe the consultation process in operation. The meeting was attended by a wide range of stakeholders from many sectors including the fishing industry and environmental NGOs.</p> <p>As noted in SIb above, the process for review of the MPA management plan demonstrates consultation process are in place that provide opportunity, encouragement and facilitation of stakeholder engagement in management processes.</p> <p>There is evidence of consultation processes that provide opportunities for all interested parties to be involved, and the actions of the GSGSSI facilitate the engagement of any interested parties, both in the routine management of the fishery and in the quinquennial review of the MPA management plan that is presently underway. The fishery meets the SG80 and 100 requirements.</p>	
<p><b>References</b></p>	<p>GSGSSI, 2012a, 2013a, b, 2017jd.</p>	
<p><b>OVERALL PERFORMANCE INDICATOR SCORE:</b></p>		<p><b>100</b></p>
<p><b>CONDITION NUMBER (if relevant):</b></p>		<p><b>NA</b></p>

### 10.5.3 Evaluation Table for PI 3.1.3

<b>PI 3.1.3</b>		<b>The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.
	<b>Met?</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>
	<b>Justification</b>	<p>Clear long term objectives for the fishery are set out in the CAMLR Convention (Article II) and also in the GSGSSI 5 year strategy for 2016-20.</p> <p>Management policy for the fishery (set out in the Fisheries Ordinance (2000)) requires the Director of Fisheries and all Fishery Officers to have regard to the provisions of the CAMLR Convention (at §4(5)). Objectives that are specific to the management of the fishery are in place to guide the harvest strategy in response to stock assessment information (see section 5.4.4 of this report)</p> <p>The clarity of the objectives coupled with the legal requirements set out by the GSGSSI meet the SG60, 80 and 100 requirements.</p>		
<b>References</b>		CAMLR, 1980; GSGSSI, 2016; Fisheries (Conservation and Management) Ordinance 2000. Sections 5.4.3 & 5.4.4 of this report.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

**Evaluation Table for PI 3.1.4**

<b>PI 3.1.4</b>		<b>The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices.
	<b>Met?</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>
	<b>Justification</b>	<p>Incentives for sustainable fishing are set out in the Fisheries (Conservation and Management) Ordinance 2000 and in the administrative procedures associated with the licensing and management of the fishery.</p> <p>The legislation provides a disincentive to fish unsustainably, by identifying offences and associated penalties.</p> <p>The administration of the fishery provides a proactive mechanism for both encouraging good practice and discouraging bad practice. Licences are awarded to vessels on the basis of their past performance in the fishery with respect to compliance with regulations in place to conserve both toothfish and non-target species (including ETP species) and marine habitat protection measures. This provides a system for explicitly considering and reviewing both the compliance of the fleet and the effectiveness of the management system.</p> <p>The management system for the fishery is also subject to regular review from CCAMLR, which considers catch and stock assessment data as well as information on environmental impacts in its assessment of the status of the fishery.</p> <p>Taken together the legal and administrative arrangements established by GSGSSI and CCAMLR meet all of the SG60, 80 and 100 requirements for both the target species and Principle 2 Components for this fishery.</p>		
<b>References</b>		CAML, 1980; CCAMLR, 2013d; GSGSSI, 2010; Fisheries Ordinance, 2000.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

### 10.5.4 Evaluation Table for PI 3.2.1

PI 3.2.1		The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system	Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.	Well defined and measurable short and long-term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.
	<b>Met?</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>
	<b>Justification</b>	<p>Short and long term objectives are set for this fishery by both CCAMLR and the GSGSSI. These objectives are implemented through the management system that is administered by the GSGSSI. The overall objective for the management of the fishery is set by Article II of the CAMLR Convention which is demonstrably consistent with the outcomes expressed by MSC Principle 1 and 2.</p> <p>The short and long term objectives for the SG toothfish fishery are set out in the CCAMLR harvest strategy for the stock, which aims to apply an exploitation rate such that the SSB for the stock approaches a precautionary target of 50% B<sub>0</sub>. This is a measurable long term fishery-specific objective which is transposed into a shorter term objective through TAC advice from CCAMLR.</p> <p>At the GSGSSI level the CCAMLR TAC advice is implemented through the process of issuing fishing licences with their associated conditions. These licences govern the quantity of fish that can be caught and other restrictions on fishing activity (such as the spatial and temporal restrictions in place to protect non-target species and marine habitats). The GSGSSI management system is in turn guided by long term objectives which require, <i>inter alia</i>, that the TAC is set at a lower level than advised by CCAMLR (a precautionary target of 55%B<sub>0</sub> rather than 50%).</p> <p>The objectives for the fishery are measurable in that performance against the objective can be quantified (in the case of the target species and more abundant non-target species there are annual TACs; for ETP species there are targets for reducing by bycatch). The performance of the fishery against these objectives is monitored, measured and reported.</p> <p>Overall, there are explicit objectives in place within the management system at the CCAMLR and GSGSSI level, and these are consistent with MSC Principles 1 and 2, meeting the SG60, 80 and 100 requirements.</p>		
<b>References</b>	CAMLR, 1980; CCAMLR, 2013d; GSGSSI, 2010; Fisheries Ordinance, 2000.			
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>



### 10.5.5 Evaluation Table for PI 3.2.2

<b>PI 3.2.2</b>		<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	<b>Met?</b>	<b>Y</b>	<b>Y</b>	
	<b>Justification</b>	<p>At the international level, meetings of the CCAMLR Group on Fish Stock Assessment provides the principal decision-making process for the fishery, which results in long-term strategies (harvest control rules for fish stocks and strategies to protect the marine environment from fishing impacts) which are subsequently adopted by the GSGSSI.</p> <p>At the national level, the decision making processes for the fishery are set out in the Fisheries Ordinance 2000, which established the administrative mechanisms for managing and regulating the fishery. These processes result in the setting of an annual TAC, technical restrictions for the fishery, and spatial and temporal constraints on fishing activity that form the strategy for controlling the exploitation rate of the stock in order to achieve the fishery specific objectives (specifically a SSB of no less than 55% B<sub>0</sub>). Clear decision making processes were also established for determining the management of the GSGSSI Marine Protected Area, and resulted in the production (and subsequent revision) of a Management Plan for the MPA that delivered the GSGSSI strategic objectives for management of the marine environment.</p> <p>These established decision making processes at the international and national level meet the SG60 and SG80 requirements.</p>		
<b>b</b>	<b>Guidepost</b>	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	<b>Met?</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>
	<b>Justification</b>	<p>At the international level, CCAMLR has established decision making processes that respond to all issues identified in relevant research (for instance in connection with both stock status and impacts of the fishery on the marine environment) in an adaptive and timely manner. Evidence of this adaptive and timely response is provided by, inter alia, CCAMLR Conservation Measure 25-02 which sets out the measures that vessels must adopt in order to mitigate impacts on birds.</p>		

<b>PI 3.2.2</b>		<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.</b>		
		<p>At the national level, the decision making processes for the fishery respond to advice from CCAMLR about the appropriate exploitation rate for the target stock and also advice on how to manage impacts on non-target species and habitats provided by CCAMLR and resulting from ongoing research (including monitoring of the target and non-target species that would detect changes that might arise from climate change). Changes to the management regime have been made in a timely and adaptive manner in response to this advice and research (for instance through the reduction in TACs for non-target species and the creation of an MPA around South Georgia).</p> <p>Decisions are informed by stakeholder consultation (for instance over the creation of new MPAs and changes to the licensing regime for the fishery) and take account of the wider implications of decisions (evidenced by the decision not to permit the use of “cachalotera” umbrella net gear because of concern about post-capture mortality of tagged fish and possible impacts on marine habitats).</p> <p>The SG60, 80 and 100 requirements are fully met.</p>		
<b>c</b>	<b>Guidepost</b>		Decision-making processes use the precautionary approach and are based on best available information.	
	<b>Met?</b>		<b>Y</b>	
	<b>Justification</b>	Decisions concerning the management of the fishery are taken in response to scientific advice from CCAMLR and research work carried out or commissioned by the GSGSSI. There is evidence that decisions are precautionary (CCAMLR TAC advice is precautionary, and the GSGSSI sets a lower TAC than advised by CCAMLR, which is more precautionary still; NTZs and BCAs have been established as precautionary management measures to protect non-target species and marine habitats). The requirements of this SI are fully met.		
<b>d</b>	<b>Guidepost</b>	Some information on fishery performance and management action is generally available on request to stakeholders.	Information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	<b>Met?</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>

<b>PI 3.2.2</b>		<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.</b>		
	<b>Justification</b>	<p>Information about fishery performance and management actions is provided directly to stakeholders throughout the year (through correspondence, reports, publications, and through meetings with stakeholders based in Stanley). Information about the fishery is available to all stakeholders on the GSGSSI website and in an annual report (GSGSSI, 2013a), and also in reports submitted to CCAMLR (CCAMLR 2016).</p> <p>The GSGSSI website provides information about current consultations and the decisions taken after the consultation period (the most recent example being the November 2013 announcement about the change to long-term licensing for the fishery (GSGSSI, 2013b).</p> <p>The GSGSSI also holds an annual meeting in London with stakeholders at which information about fishery performance and management actions and also the findings of recent research, monitoring and evaluation are presented for scrutiny and discussion.</p> <p>The SG60, 80 and 100 requirements are fully met by the systems in place for reporting fishery performance and management actions.</p>		
<b>e</b>	<b>Guidepost</b>	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>There is no evidence that the fishery or management system has shown any disrespect or defiance of the law, nor repeatedly violated any laws or regulations necessary for the sustainability of the fishery.</p> <p>There have been some legal disputes between the GSGSSI and operators of fishing vessels. These have arisen when the restrictive licensing scheme in place for the fishery has resulted in vessels either not being allocated a licence or having their licence withdrawn. In some instances this has resulted in the operator taking Judicial Review proceedings against the GSGSSI. In each case (most recently in November 2012) the GSGSSI has been found to have acted in accordance with the law.</p> <p>The SG60, 80 and 100 requirements are met for this SI.</p>		
<b>References</b>		GSGSSI, 2011, 2012a, 2013a, b, 2017jd; CCAMLR, 2016		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>



### 10.5.6 Evaluation Table for PI 3.2.3

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The fishery is closely monitored and controlled by the GSGSSI which operates a statutory surveillance system. Additional monitoring and control measures are applied by the client and Government to ensure compliance with the CCAMLR toothfish management measures (the DCD and DED documentation system).</p> <p>The statutory system in force requires, <i>inter alia</i>, that the fishing vessel reports daily fishing activity (location and catch weight) to the GSGSSI; monitoring of landings that are reconciled with daily catch reports; surveillance of the fishing vessel using two VMS systems (one for GSGSSI and another for CCAMLR); direct observation of fishing trips, monitoring of fishing practices and sampling of catches by on-board observers; inspection of vessels by GSGSSI staff at King Edward Point; aerial reconnaissance through "Operation Coldstare" military flights; and surveillance of fishing activity at sea by the patrol vessel <i>Pharos SG</i>, which routinely patrols for more than 200 days per year in CCAMLR sub-area 48.3.</p> <p>This comprehensive system is capable of detecting breaches of management measures, strategies and rules. The level of compliance is excellent demonstrating the ability of the system to enforce these measures, strategies and rules.</p>		
b	<b>Guidepost</b>	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>A clear set of statutory sanctions are in place. These are set out in the Fisheries Ordinance 2000. Fisheries Protection Officers are empowered to stop, board, inspect and seize fishing vessels. Offences can result in withdrawal of fishing licences and a fine of up to UK£250,000. Minor offences can be dealt with by the Director of Fisheries; more major offences are heard in the Magistrates' Court.</p> <p>The only legal actions taken against any of the operators was the issue of an administrative penalty in 2010, and more recently two incidents in 2014: a fine of £30,000 for the capture of white chinned petrels resulting from setting lines</p>		

<b>PI 3.2.3</b>		<b>Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with</b>		
		<p>during daylight; and a fine of £20,000 for discarding fishing hooks in offal from a vessel.</p> <p>The high level of compliance under this well monitored regime demonstrates that the system is both enforced and complied with, supporting a conclusion that the sanctions provide effective deterrence.</p>		
<b>c</b>	<b>Guidepost</b>	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The high level of observer coverage in the fishery, close monitoring of fishing activity using surveillance equipment, inspections of vessels at sea, and inspection of landings provides a high degree of confidence that the fishery is compliant with all relevant management measures.</p> <p>The fishery also assists management through the provision of daily catch data which supports effective stock management, and by working with GSGSSI observers to implement the tagging programme for toothfish and rajids throughout the fishery area and also in the BCAs where a higher level of tagging is conducted to assist research. Some vessels have also trialled the use of Electronic Monitoring (EM) equipment in recent years to assist the development of new methods for monitoring the fishery.</p> <p>The level of compliance with the management system and cooperation between the fishers and GSGSSI meets the SG60. 80 and 100 requirements.</p>		
<b>d</b>	<b>Guidepost</b>		There is no evidence of systematic non-compliance.	
	<b>Met?</b>		Y	
	<b>Justification</b>	Evidence of inspections of vessels has been provided. There is no evidence of systematic non-compliance with the management system; in fact all evidence indicates a very high level of compliance. The SG80 requirements are met.		
<b>References</b>		GSGSSI, 2014c; Fisheries (Conservation and Management) Ordinance 2000; section 5.6.3.4 of this report.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

### 10.5.7 Evaluation Table for PI 3.2.4

PI 3.2.4		The fishery has a research plan that addresses the information needs of management		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
	<b>Met?</b>	<b>Y</b>	<b>Y</b>	<b>N</b>
	<b>Justification</b>	<p>The GSGSSI publication "South Georgia &amp; the South Sandwich Islands: Toothfish Fishery (48.3 &amp; 48.4) Management Plan 2018" identifies the key strategic priorities for fisheries research for the next four years, and provides an overview of the work that is being carried out to address these priorities.</p> <p>Current research work includes trials of CCTV equipment to monitor bird by-catch; setting both shallow and deep lines to study the movement of toothfish; testing the utility of Benthic Closed Areas; investigating cetacean depredation; testing new tagging methods for skate; and (through an industry-sponsored PhD studentship) studying toothfish recruitment.</p> <p>The GSGSSI commission research by the British Antarctic Survey based at King Edward Point and stock assessment by the Centre for Environment, Fisheries &amp; Aquaculture Science (CEFAS) in order to deliver these priorities. Stock assessment information is submitted in a timely fashion to the annual CCAMLR Scientific Committee meetings in Hobart, Australia. A summary of annual progress with research work is provided in the South Georgia Project Liaison Committee Science Report.</p> <p>The GSGSSI provides financial support to the South Atlantic Environmental Research Institute, which is working to encourage research and build research capacity within and between UK South Atlantic Overseas Territories.</p> <p>The research plan and research underway meets the SG60 and 80 requirements fully. The SG100 requirements are not fully met because this standard of performance would require a more comprehensive research plan that is also relevant to MSC Principle 3. Although a review of management processes was carried out in 2014, the current research plan is limited to MSC Principles 1 &amp; 2, so the SG100 requirements are not fully met.</p>		
b	<b>Guidepost</b>	Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.
	<b>Met?</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>
	<b>Justification</b>	The research plan is available from the GSGSSI website. Results of research are circulated to all interested parties and a summary is published in the GSGSSI Annual Report. Reports on research findings and plans for the coming year are made at the annual GSGSSI Science-Industry meeting in London, which		

<b>PI 3.2.4</b>	<b>The fishery has a research plan that addresses the information needs of management</b>
	<p>stakeholders are invited to attend. The results of the stock assessment are discussed at the annual CCAMLR Scientific Committee and published on the CCAMLR website.</p> <p>Where appropriate, research results from the fishery are also published in the peer-reviewed scientific literature. Many of these publications are cited in the relevant sections of this report with respect to both the stock status and life history of both the target and non-target species.</p> <p>The dissemination of research information meets the SG60, 80 and 100 requirements.</p>
<b>References</b>	<p>GSGSSI, 2017jc;; Faulkner et al. 2010, Soeffker and Tixier 2015, Söffker et al. 2015, CCAMLR 2016, Gasco et al. 2016, Hogg et al. 2016, Belchier 2017; section 5.6.3.6 of this report.</p>
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>	
	<b>90</b>
<b>CONDITION NUMBER (if relevant):</b>	
	<b>NA</b>



### 10.5.8 Evaluation Table for PI 3.2.5

<b>PI 3.2.5</b>		<b>There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives</b> <b>There is effective and timely review of the fishery-specific management system</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	The fishery has in place mechanisms to evaluate some parts of the management system.	The fishery has in place mechanisms to evaluate key parts of the management system	The fishery has in place mechanisms to evaluate all parts of the management system.
	<b>Met?</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>
	<b>Justification</b>	<p>Key parts of the management system are reviewed on an annual basis by the CCAMLR scientific committee. The scope of this review is, however, limited to the effectiveness of stock management and the implementation of measures to manage environmental impacts.</p> <p>The GSGSSI commissioned a review of all parts of the management system in 2014, which was conducted by two independent experts. The conclusions of this review were that the overall management of the fishery is effectively managed. The authors set out several recommendations for improving management; these were mostly concerned with improving the robustness of the management system to changes in personnel (see section 5.6.3.7 of this report).</p> <p>The evidence presented at this audit shows that key parts of the management system are subject to regular review, and that all parts of the management system are subject to occasional review. The SG60, 80 and 100 requirements are therefore fully met.</p>		
<b>b</b>	<b>Guidepost</b>	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	<b>Met?</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>
	<b>Justification</b>	<p>The management of the fishery by GSGSSI is subject to internal review by the Government's scientific advisors, Cefas. Management is also subject to regular external review at the annual CCAMLR Scientific Committee meetings that are held in Hobart, Australia. Reports of fishing activity and stock assessment are scrutinised by the Scientific Committee, and reports of the status of the fishery are published by CCAMLR along with advice on TAC and any other management measures.</p> <p>As noted above, the GSGSSI appointed external reviewers to carry out a comprehensive review of all parts of the management system in 2014.</p> <p>The regular internal and external review of the management system meets the SG60, 80 and 100 requirements.</p>		
<b>References</b>		Hanchet and Welsford 2014, CCAMLR 2016a; section 5.6.3.7 of this report.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>NA</b>

## **11 Appendix 1.2 Risk Based Framework (RBF) Outputs**

The RBF has not been used for this assessment.

## **12 Appendix 1.3 Conditions**

There are no conditions of certification for this assessment.

## 13 Appendix 2 Peer Review Reports

### 13.1 Peer Reviewer A

#### Summary of Peer Reviewer Opinion

<b><i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i></b>	<b>Yes</b>	<b>CAB Response</b>
<b><i>Justification:</i></b> This is the third assessment for this fishery and the level of management applied has increased throughout the periods of certification. The assessment team have comprehensively described and evaluated the fishery. There are some points where the precise scoring can be queried – but these are all relevant to whether the score should be 80 or 100 on specific scoring indicators – there is no SI where a score below 80 would appear warranted.		Comments noted, no response necessary.

<b><i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCR 7.11.1 and sub-clauses]</i></b>	<b>NA</b>	<b>CAB Response</b>
<b><i>Justification:</i></b> No conditions are raised, a decision which appears fully supported by the evidence. The recommendations raised are supported; the client may also wish to consider the need to formalise a review of unwanted catch reduction measures.		Comments noted.  This is a good point: reduction of unwanted catch is a new CRv2.0 requirement. The team has made a recommendation in response to this comment.

If included:

<b><i>Do you think the client action plan is sufficient to close the conditions raised? [Reference FCR 7.11.2-7.11.3 and sub-clauses]</i></b>	<b>NA</b>	<b>CAB Response</b>
<b><i>Justification:</i></b> As there are no conditions, there is no requirement for a CAP.		Comment noted, no response necessary.

#### Performance Indicator Review

Please complete the appropriate table(s) in relation to the CAB's Peer Review Draft Report:

- For reports using one of the default assessment trees (general, salmon or enhanced bivalves), please enter the details on the assessment outcome using **Error! Reference source not found.**
- For reports using the Risk-Based Framework please enter the details on the assessment outcome at .

- For reports assessing enhanced fisheries please enter the further details required at **Error! Reference source not found..**

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification	CAB Response
1.1.1	Yes	Yes	NA	<p><b>Justification</b></p> <p>Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	Comment noted, no response required.
1.1.2	Yes	Yes, on balance	NA	<p>Sic SG100 - this requires that the TRP is consistent with Bmsy or a higher level (which it clearly does) and takes into account relevant precautionary issues such as the ecological role of the stock – it is not entirely clear that this latter requirement is met, although, as noted, there is "no known special low trophic or other role requiring additional precaution".</p>	As pointed out, the TRP is set likely higher than Bmsy and additional precaution has been applied in setting the TAC. Although no specific reason has been given for this greater precaution, it would address issues such as the ecological role of the stock or other unknown factors, which is the point of precaution. There is no requirement that the precaution address any particular issue. Text has been added to clarify this.
1.2.1	Yes	No	NA	<p>Sid SG100– the harvest strategy was implemented in 2000, but evidence is not provided that it has 'periodically' been reviewed and improved (e.g. is there a review at CCAMLR scientific committee meetings akin to that covering the stock assessment)?</p>	The evidence is in the references provided. This has been clarified in the text with more examples. An important task of all CCAMLR meetings is ultimately to review the harvest strategy and its different components, changing the strategy as necessary. The primary control, the TAC, obviously has been reviewed and adjusted regularly, but in addition many issues have been reviewed and some interventions implemented.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.2	Yes	Yes	NA		Comment noted, no response required.
1.2.3	Yes	Yes	NA		Comment noted, no response required.
1.2.4	Yes	Yes	NA		Comment noted, no response required.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.1.1	Yes	Yes	NA	<p>The assessment team have to deal with the complex issue of the Humboldt squid as a main bait species. This is addressed appropriately here, although it may be useful to specifically address the two 'main' species encountered – Humboldt squid and sardine at each point. It is noted that Humboldt squid is caught in Central and South America. Given the evidence of the stock assessments referenced in the assessment, and the recent expansion of the range of this species, and catches, it seems safe to qualitatively assume a greater than 70% probability that the stock is at levels above 20% of its pre-fishing level (i.e. highly likely to be above MSC default biologically based limits).</p>	<p>Comment noted. We have made some changes to the scoring rationale in response to these observations. We have also reviewed the recommendation that we have raised with respect to bait species in the light of these comments.</p>
2.1.2	No	No	NA	<p>MSC CR v1.3 was fairly silent on the details of assessing 'main' bait species. CR v2.0 is more explicit, and states that</p>	<p>We note the comment. We had already taken account of the quantity of bait used in our consideration of whether the requirements of this PI are met. In the light</p>



Performance Indicator	Has all available relevant information been used to score this indicator? (Yes/No)	Does the information and/or rationale used to score this indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				<p>CR v2.0 also states that the volumes of total weight from the fishery that the bait is purchased from could be used as part of the rationale as to whether or not the amount of bait purchased by the UoA is hindering/not hindering recovery of the bait-stock. This would clearly be the case for the squid.</p> <p>This should be made explicit for PI 2.1.2 – with Humboldt squid and sardine specifically addressed. The existing</p>	<p>of these comments we have made some minor revisions to make this more explicit.</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification	CAB Response
2.1.3	No	No	NA	scoring should not be affected, however, except for SI c where it is not clear that a management strategy is being successfully implemented for the squid.	We have revised Sia in response to this comment. We have amended the rationale for SId to better justify the basis for the score of 100 that has been awarded and that we still consider to be appropriate.
2.2.1	Yes	Yes	NA		Comment noted, no response necessary.
2.2.2	Yes	Yes	NA		Comment noted, no response necessary.
2.2.3	Yes	Yes	NA		Comment noted, no response necessary.
2.3.1	Yes	Yes	NA		Comment noted, no response necessary.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification	CAB Response
2.3.2	Yes	Yes	NA		Comment noted, no response necessary.
2.3.3	Yes	Yes	NA		Comment noted, no response necessary.
2.4.1	Yes	Yes	NA	Given the CR v1.3 definition of serious or irreversible harm, this is a secure evaluation.	Comment noted, no response necessary.
2.4.2	Yes	Yes	NA		Comment noted, no response necessary.
2.4.3	Yes	Yes	NA		Comment noted, no response necessary.
2.5.1	Yes	Yes	NA		Comment noted, no response necessary.
2.5.2	Yes	Yes	NA	It is noted that measures to protect marine habitats are specifically addressed in PI 2.4.2 – the score of 100 for SI c is therefore considered appropriate.	Comment noted, no response necessary.
2.5.3	Yes	Yes	NA		Comment noted, no response necessary.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.1.1	No	Yes	NA	Whilst unlikely to affect the scoring, the treatment of CCAMLR as a relevant management entity is treated inconsistently. It appears in SI a and then not again until PI 3.1.3. Some reference at relevant SIs would appear appropriate.	We have reviewed our scoring comments and feel that we have considered CCAMLR appropriately.  CCAMLR is very important because it forms the framework for international cooperation, and sets consistent standards throughout the CCAMLR region.  However, the management system for the fishery is set out in GSGSSI legislation. The CCAMLR convention is not legally enforceable within the UoA, except as a consequence of GSGSSI legislation (such as, for instance, the requirement set out in GSGSSI fishing licences to observe specified CCAMLR management measures).
3.1.2	No	Yes	NA	As above, reference to CCAMLR in SI a and probably b seem appropriate.	Our scoring comments in SIa make this relationship very clear, and the remaining comments are a logical consequence of this rationale and the respective role of CCAMLR and GSGSSI legislation..  We have added some text to the SIs here in response to this comment and to explain the role of CCAMLR.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.1.3	Yes	No	NA	At SG100 it is not made clear how long term objectives are required by management policy.	We have stated that <i>"Management policy for the fishery (set out in the Fisheries Ordinance (2000)) requires the Director of Fisheries and all Fishery Officers to have regard to the provisions of the CAMLR Convention (at §4(5))."</i> The CAMLR Convention sets out long term objectives; SG100 is therefore justified.
3.1.4	Yes	Yes	NA		Comment noted, no response necessary.
3.2.1	Yes	Yes	NA		Comment noted, no response necessary.
3.2.2	No	Yes	NA	Again, for completeness, reference to CCAMLR in SI a and d would seem appropriate.	We have revised this PI in response to these comments.
3.2.3	Yes	Yes	NA		Comment noted, no response necessary.
3.2.4	Yes	Yes	NA		Comment noted, no response necessary.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.5	No	No	NA	<p>Again the relationship between CCAMLR and GSSSSI in scoring is not clear. For SI a it seems that both CCAMLR and GSSSSI have mechanisms to evaluate their respective management systems. CCAMLR has also been subject to occasional external review. SI b may meet SG100 but a more realistic interpretation may be that GSSSSI systems have regular internal and external review, CCAMLR is only occasionally externally reviewed?</p>	<p>This is a valid point, but does not alter the basis for the scoring. CCAMLR's role is limited (as we have described in our rationale for SIa).  The "fishery-specific management system" is the GSSSSI management system, and that forms the basis for the score we have awarded at SIb. We consider that this score and rationale remain appropriate.</p>

**Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary) can be added below and on additional pages**

1. Shark species are considered in both section 5.5.3 (non-target species) and Section 5.5.4 (ETP); the latter is probably not appropriate unless these are recognized in relevant ETP legislation.
2. Section 7.3. The procedures for traceability appear extremely secure. The point of change of ownership, however, is not clear – this is stated as being Port Stanley, but from here it is understood that product is dispatched in sealed containers. It may be worth clarifying that the change of ownership occurs when product is containerized and dispatched from Stanley.

## 13.2 Peer Reviewer B

### Summary of Peer Reviewer Opinion

<i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i>	Yes	CAB Response
<i>Justification:</i> Yes the report is clear and concise and all the scoring is appropriate and well justified both in the report and the scoring comments. Four recommendations are appropriate and if followed should greatly assist the client at any subsequent reassessment when some aspects of Principle 2 are subtly changed in the updated version of the certification requirements..		Comment noted, no response required.

<i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCR 7.11.1 and sub-clauses]</i>	Yes/No N/A	CAB Response
<i>Justification:</i>		Comment noted, no response required.

If included:

<i>Do you think the client action plan is sufficient to close the conditions raised? [Reference FCR 7.11.2-7.11.3 and sub-clauses]</i>	Yes/No N/A	CAB Response
<i>Justification:</i>		Comment noted, no response required.

### Performance Indicator Review

Please complete the appropriate table(s) in relation to the CAB's Peer Review Draft Report:

- For reports using one of the default assessment trees (general, salmon or enhanced bivalves), please enter the details on the assessment outcome using **Error! Reference source not found..**
- For reports using the Risk-Based Framework please enter the details on the assessment outcome at .
- For reports assessing enhanced fisheries please enter the further details required at **Error! Reference source not found..**



**For reports using one of the default assessment trees:**

<b>Performance Indicator</b>	<b>Has all available relevant information been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	<b>CAB Response</b>
1.1.1	Yes	Yes	N/A	The probability estimates provide the support for the high degree of certainty at both scoring issues	Comment noted, no response required.
1.1.2	Yes	Yes	N/A	Reference points related to Bo are well explained in the text of the report. At scoring issue b the consideration of precautionary issues does not meet SG 100	Comment noted, no response required.
1.2.1	Yes	Yes	N/A	All four scoring issues are well supported with comprehensive information, on the success of the harvest strategy, well presented in the text of the report and in the scoring comments	Comment noted, no response required.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to support this Indicator score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.2	Yes	Yes	N/A	The well defined harvest rules are clearly effective and the stability of the stock status provides ample evidence in support of a sustainable fishery.	Comment noted, no response required.
1.2.3	Yes	Yes	N/A	The information provided about this fishery is comprehensive and well explained. The team have chosen to highlight an issue related to the supporting survey data to reduce the score to 90.	Comment noted, no response required.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to support this Indicator score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification	CAB Response
1.2.4	Yes	Yes	N/A	<p>Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	<p>We note the comment. It is difficult to assess when Sld SG100 would be met – that is when enough different approaches have been tried to merit the extra 5 points. There is always more research and modelling that can be done. Approaches that have been tried have not been exhaustive.</p>
2.1.1	Yes	Yes	N/A	<p>Absence of target reference points for some bait species which have to be assessed as 'Retained species' reduces score to 80</p>	<p>Comment noted, no response required.</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to support this Indicator score the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification	CAB Response
2.1.2	Yes	Yes	N/A	<p>This is a potentially complex issue which is very well explained by the team and has appropriately generated a Recommendation. This highlights for the client that one of the current bait species, Sardine from ICES 8c and 9a would fail to meet SG 80 in CR version 2.0.</p>	Comment noted, no response required.
2.1.3	Yes	Yes	N/A	<p>Issue again with some of the bait species where there is no formal assessment.</p>	Comment noted, no response required.
2.2.1	Yes	Yes	N/A	<p>None of the 'discarded' species reach the 5% threshold but stock status is not known. Measures in place to minimise discarding.</p>	Comment noted, no response required.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to support this Indicator score the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification	CAB Response
2.2.2	Yes	Yes	N/A	<p>Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p> <p>Very clear evidence presented here and in the report to support the reduced score in relation to a strategy. Well supported by observer coverage.</p>	Comment noted, no response required.
2.2.3	Yes	Yes	N/A	<p>This fishery, in terms of MSC accreditation, benefits enormously from the 100% observer coverage with checks. This is very evident here in support of the 90 score.</p>	Comment noted, no response required.
2.3.1	Yes	Yes	N/A	<p>Information on ETP contact and impact is comprehensive and strongly supported by the observer programme. Problem areas from the past have been identified and addressed (eg hooks in the offal)</p>	Comment noted, no response required.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification	CAB Response
2.3.2	Yes	Yes	N/A	Score again well supported by evidence from the observer programme.	Comment noted, no response required.
2.3.3	Yes	Yes	N/A	As 2.3.2	Comment noted, no response required.
2.4.1	Yes	Yes	N/A	The team have provided a comprehensive raft of information on potential benthic impact which is unusual for a longline fishery. Score of 80 well supported	Comment noted, no response required.
2.4.2	Yes	Yes	N/A	A clear strategy is in place and the evidence for it is well presented with reference to for example the BPA and technical measures related to the bottom weights.	Comment noted, no response required.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification	CAB Response
2.4.3	Yes	Yes	N/A	<p>Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	Comment noted, no response required.
2.5.1	Yes	Yes	N/A	<p>Ample evidence in support of this score with plans which minimise ecosystem impact. This is backed by the management plan for the Marine protected areas which is reviewed every five years.</p>	Comment noted, no response required.
2.5.2	Yes	Yes	N/A	<p>The team have provided ample evidence here in terms of identifying the main potential interactions and impacts, together with the strategies to minimise them.</p>	Comment noted, no response required.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to support this Indicator score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification	CAB Response
2.5.3	Yes	Yes	N/A	As 2.5.2 above	Comment noted, no response required.
3.1.1	Yes	Yes	N/A	The management system for this fishery is comprehensive and well explained by the team in the four scoring issues. The fishery is firmly governed by Convention requirements related to this high profile and potentially vulnerable marine ecosystem.	Comment noted, no response required.
3.1.2	Yes	Yes	N/A	A complex Management hierarchy, involving the UK, but there are very well documented consultation processes here and in the text of the report	Comment noted, no response required.
3.1.3	Yes	Yes	N/A	Management policies and objectives are clearly explained	Comment noted, no response required.



Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification	CAB Response
3.1.4	Yes	Yes	N/A	<p>Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.</p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	Comment noted, no response required. Sorry about the template.
3.2.1	Yes	Yes	N/A	<p>The short and long term objectives for the fishery are formally set out by both GSSSI and CCAMLR and satisfy the requirements at SG 100</p>	Comment noted, no response required.
3.2.2	Yes	Yes	N/A	<p>The decision making processes and the evidence in support of each of the five scoring issues is well presented by the team</p>	Comment noted, no response required.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to support this Indicator score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.3	Yes	Yes	N/A	<p>The fishery is exceptionally well monitored on shore and at sea and strongly supported by the 100% observer programme. Evidence has been presented of sanctions for non compliance with regulations.</p> <p>The team has presented evidence of the 'ultimate' sanction for non compliance, i.e the fate of the longliner MV Elqui!</p>	Comment noted, no response required.
3.2.4	Yes	Yes	N/A	<p>I accept the reduced score at scoring issue a based on the current reseach plan not addressing issues related to all P3 management systems even though I think that it is a harsh conclusion..</p>	Comment noted, no response required.

**Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary) can be added below and on additional pages**

Acoura have assembled a very experienced assessment team of two experts with a wide range of relevant knowledge, not only of the MSC process but also of toothfish fisheries generally. It is therefore not surprising that this report, and related scoring, is of a high quality with no contentious issues at all for me to address. The team also identified no weaknesses in the fishery. In that context this is the third reassessment of this fishery (first certified in 2004) and over that thirteen year period most problem areas have been identified and addressed by the client. For this re-assessment I was particularly impressed by the team's foresight in highlighting, via recommendations, four areas which need to be addressed before any future re-assessment against MSC CR version 2.0 or its successor. This provides the client with ample warning and sufficient time during which to address these issues.

Acoura Response: Thank you for this feedback.

The report is full of very useful and really interesting background information on this unique fishery in an ecologically highly sensitive area. For an example there is an excellent section 5.1.2 detailing the complex administration of the fishery inextricably linked with the multinational Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) but with the management and licensing via the Government of South Georgia and the South Sandwich Islands (GSSGSSI). The team also describes the impressive and very important Biodiversity Action Plan supported by the Species Action plan. This addresses most of the important ecosystem issues in an area containing numerous species of marine mammals and one of the world's most abundant and diverse seabird communities. There is no doubt in my mind that the ongoing success of this fishery in achieving MSC accreditation is strongly supported by the 100% Observer coverage of the fishery. This helps to provide both management and scientists with the necessary tools to sustainably manage this fishery.

On a lighter note I was amused by the picture of the longliner MV Elqui being scuppered for fishing illegally in 2006. I feel it should have had the legend "*Let that be a lesson to you all!*" Well done team for including it!

Acoura Response: we are glad you liked the picture; it tells a story very effectively.

## 14 Appendix 3 Stakeholder submissions

### 14.1 Verbal submissions

#### 14.1.1 Fisheries Science – Industry Meeting Agenda September 13<sup>th</sup> 2017



#### South Georgia Fisheries Science and Industry Meeting 2017

Foreign & Commonwealth Office

September 13<sup>th</sup> at 2pm

#### Agenda

- 1) Welcome and introductions (FCO/GSGSSI)
- 2) 2017 season overview (GSGSSI), incorporating
  - 48.2/48.4 toothfish research fishing (CEFAS)
  - use of CCTV on fishing vessels (Argos Froyanes)
  - groundfish survey and research update (BAS)
- 3) Stock assessment forward look (CEFAS)
- 4) CCAMLR update (FCO)
- 5) Toothfish MSC re-assessment (Acoura Marine)
- 6) Forward look (GSGSSI), incorporating:
  - consultation on licensing and management of the toothfish fishery
  - MPA 5-year review
- 7) Q&A

Close – 17:00

*NB: tea and coffee will be available from 1345*

### 14.1.2 Meeting with client and Cefas, 15<sup>th</sup> September 2017

#### Meeting Record – South Georgia Toothfish Longline Fishery

**Attendees:** **Government of South Georgia & the South Sandwich Islands (GSGSSI)**

Sue Gregory, Fisheries Manager

**Centre for Environment, Fisheries & Aquaculture Science (Cefas)**

Chris Darby, Scientist

Marta Soffker, Scientist

Timothy Earl, Scientist

**Acoura Marine**

Jim Andrews

Paul Medley

Louise Allan

**Date:** **15<sup>th</sup> September 2017**

**Time / Location:** **1015-1430, Foreign & Commonwealth Office, London**

**Subjects discussed:** **Re-assessment of South Georgia Toothfish Longline Fishery:-**

- Principle 1
- Principle 2
- Principle 3

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#### Status

**Government for South Georgia and the South Sandwich Islands (GSGSSI)** are the client for the fishery and are responsible for management of the South Georgia Toothfish fishery.

**Centre for Environment, Fisheries & Aquaculture Science (Cefas)** are responsible for stock assessment and provision of fishery management advice, working under contract to GSGSSI.

#### Principle 1 (Stock Status)

1. Fishing activity
  - a. The 2017 fishing season had just ended (on 31<sup>st</sup> August). 6 vessels had been licensed to fish during the 2017 season.
  - b. The GSGSSI TAC for 2013 was 2200t; this is lower than the CCAMLR recommendation of 2600t (Cefas considered that the CCAMLR TAC may be skewed by occasional high recruitment events that have not been seen in recent years). TAC Uptake in 2017 was 2192t.
2. Stock Status
  - a. CPUE is monitored over the course of the fishing year and compared between years. CPUEs in recent years have been good. CPUE falls during the middle part of the fishing season and recovers during August, probably linked to spawning/feeding behaviour.
  - b. Recruitment to the stock is thought to be generally low, with occasional good year classes (such as 1990-91 and more recently in 2010). The reasons for occasional good recruitment are not known, and research is due to begin on this issue shortly.
  - c. Some movement of tagged fish between sub-area 48.4 (outside the UoA) into sub-area 48.4 (the UoA) had been detected. 16 tagged fish from 48.3 had been caught, compared to 873 tagged fish from 48.4.
3. Assessment

- a. The 2017 stock assessment is due to be submitted to CCAMLR during September ahead of TAC discussions during October.
  - b. CCAMLR will set a TAC for the next two years.
4. Reference points
- a. An appropriate biological target reference point for the fishery is to maintain the SSB at more than 50% of the unfished level. In order to manage uncertainties and ensure that this 50% reference point is not breached, the GSGSSI has now adopted a higher management target reference point (55%) and has reduced the TAC to ensure that the stock remains in the 50-55% zone.
  - b. The TAC is set annually on the basis of stock assessments, and TAC uptake is monitored to ensure that the management objectives are achieved.
5. Other fishery removals –
- a. IUU fishing – there is no evidence of IUU fishing in this fishery; if it was detected the IUU catch would be deducted from the annual TAC.
  - b. Whale depredation – this is regarded as a fishery removal (because the whales are only able to predate upon fish that have been caught on longlines and brought into shallower waters). This depredation is deducted from the CCAMLR TAC before GSGSSI determine the national TAC annually; the depredation losses are added to the fishery catch when catches are reported to CCAMLR. Depredation losses are estimated using a range of data from the fishery, including observations of foraging around the vessel and also changes in the ratio of species in the catch (whales preferentially feed on toothfish, and evidence of “cryptic depredation” is provided when catch composition changes as a result).
6. Surveillance / monitoring
- a. All vessels are required to submit daily catch returns and weekly catch data (for both target & non-target species).
  - b. Observers are present on all vessels throughout the fishing season. There is now also a “roaming” observer who moves between vessels to provide additional coverage and to ensure a harmonised approach between observers & vessels.
  - c. All vessels are required to meet CCAMLR requirements for VMS (satellite) monitoring of fishing activity.
  - d. The fishery is policed by GSGSSI fishery officers.
7. Gear loss
- a. Vessels report any gear loss; rates are low.
  - b. The number of hooks deployed and recovered by the vessel are recorded.
  - c. Vessels are required to use hooks that are marked with the identity of the vessel (to enable detection of any hooks originating from this fishery in bird nesting areas).
8. Gear type
- a. The fleet all use Spanish longlines or autoline systems.
  - b. The “umbrella” gear used previously to address cetacean depredation problems is no longer used as this gear is thought to adversely affect the post-capture survival of the fish, and could thus compromise the stock assessment which is dependent on the tagging and subsequent recapture of fish.

## **Principle 2 (Marine Environment)**

1. Non target species
  - a. Information on the quantity of non-target species caught in the fishery was provided to the team. The most abundant non-target species are:

- i. grenadiers (3 species – *Macrourus holotrachys*, *M. carinatus*, and occasionally *M. “caml”*). CCMLR set an annual TAC of 131t; most of the grenadiers caught are discarded.
        - ii. Skates – no skates are currently retained although CCMLR set a TAC of 131t. Most skates are cut free from the longline before being hauled aboard. Some are recovered to the vessel for measurement and tagging by observers before being returned to the sea.
      - b. Other species caught include *Antimora rostrata* and very occasional Greenland shark.
      - c. Any crabs caught in the fishing gear now have to be returned to the sea.
      - d. Cefas have provided a report on the skate tagging work.
      - e. Weekly catch data from each vessel is compared to a database of catch composition for different areas and seasons to see how catches in the current year compare to expected catch profiles and to identify any anomalies (high levels of non-target species or unexpected species) as they occur.
      - f. The benthic closed areas in the SGSSI MPA network provide a refuge for toothfish, grenadier and other non-target species. The 700m minimum depth limit was also introduced to reduce grenadier catches.
      - g. An ID guide has been prepared to assist on board observers with the identification of non-target species, including fish species and benthic invertebrates. Cefas have also carried out assessments of the accuracy of species identification by different observers.
2. ETP species
  - a. Interactions with birds have been reduced from high levels in the 1990s by mitigation measures that include:-
    - i. Night time setting of gear
    - ii. Weighting of lines to encourage rapid sinking
    - iii. Thawing of bait
    - iv. Use of streamer lines & Brickle curtain when setting and recovering gear
    - v. No offal discharge when setting gear
    - vi. Discharge of offal from opposite side of vessel during recovery of gear
  - b. There have been some fatalities of white chinned petrels in the longline fishery over the past 2 years, at the start of the fishing season. 21 birds were reported to have been killed in the 2017 season. Records of bird interactions were presented at the annual stakeholder meeting in September. It is not presently clear why these fatalities have started to occur – possible explanations include an increase in the abundance of petrels following rat eradication or a change in the behaviour of either the birds or the fishing fleet.
  - c. No marked hooks from the longline fishery have been recorded in bird nests at Bird Island in the past 3 years.
  - d. Cetaceans (mainly orcas and sperm whales) interact with the fishery, stealing fish from the longlines as they are recovered. Depredation levels increased significantly in the 2017 fishery, with losses of around 9.5% of the total catch. The increase appears to be associated with a greater spatial coincidence of fishing activity and orca distribution in the past season. The depredation losses are taken account of in TAC allocations and reporting of fishing mortality to CCMLR. Cefas, GSGSSI and the fishing industry continue to investigate these interactions and how depredation losses could be managed.
  - e. No adverse interactions with the sperm whales have been observed since the entanglement of one individual in 2012.
3. Habitats
  - a. It was noted that only 8% of the GSGSSI EEZ is available for fishing by longlines (this being water between 700 and 2250m deep, further than 12nmi

- from the coast and also outside the benthic closed areas). Only part of this available area is fished by the longline fleet.
- b. GSGSSI, Cefas and the British Antarctic Survey are presently carrying out research work to identify the character and extent of different seabed habitats, and particularly potential VMEs within the EEZ. Work that has been carried out and planned includes:-
    - i. Camera monitoring of the seabed habitats within and outside benthic closed areas;
    - ii. Camera monitoring of some shallower areas using the headrope camera on scientific trawls conducted by BAS;
    - iii. Plans for more detailed studies including:-
      1. Deployment of a drop-down high resolution camera from Pharos and subsequently NERC research vessel Discovery, starting in 2018 and over the 2018-19 summer. The objective of this work is to compare seabed habitats within and outside BCAs, and to compare areas that have been unfished with areas where fishing ceased on designation of the BCA with areas that are currently being fished, in order to see if any differences can be detected that would indicate impacts and recovery from them. This work is part of the UK Foreign Office "Blue Belt" project.
      2. Deployment of lower resolution underwater cameras attached to fishing gear. 4 cameras are due to be tested initially, with a view to wider deployment in the fleet in subsequent years. These cameras would provide information about seabed character in fished areas.
      3. Testing of movement sensors attached to longlines to provide information about how they may move on the seabed during their deployment. This will provide a better understanding of the nature of the interaction of the fishing gear with the seabed.
  - c. GSGSSI are due to carry out another review of their MPA network and protection measures; this is likely to propose new management measures relating to VMEs, such as move-on rules.
4. Ecosystem interactions
- a. Some Ecopath modelling has been carried out, although this has focused on the pelagic ecosystem and role of krill.
  - b. Diet work has been carried out on juvenile toothfish, but less information is available for adults, which are known to be scavengers.
  - c. Toothfish are known to be prey for sperm whales, and possibly also for elephant seals.
  - d. Temperature loggers are being deployed in the SG EEZ to monitor changes to the marine ecosystem resulting from climate change, and which could affect stock productivity.
5. Bait
- a. Humboldt squid, sardines and mackerel are used as bait in the fishery. GSGSSI have provided data on the quantity of each species used in the fishery.
- 6.

### Principle 3 (Governance & Management)

1. Spatial / temporal restrictions



- a. Longline fishing is prohibited in waters shallower than 700m and deeper than 2250m around South Georgia. The shallow water restriction exceeds the CCAMLR minimum depth restriction of 550m.
  - b. Fishing is prohibited in eight Benthic Closed Areas (BCAs) covering 12,000 km<sup>2</sup> (though some scientific fishing is allowed in some of these areas to ensure adequate tagging of the population takes place in order to inform the stock assessment).
  - c.
2. Observer coverage
- a. Independent fishery observers are carried aboard all vessels on all fishing trips.
  - b. Observers record the capture of toothfish and non-target species, interactions with birds and cetaceans, and also the fishing practices aboard the vessel.
3. Review of the management system
- a. GSGSSI are presently consulting stakeholders over changes to the licensing of the fishery, and also possible changes to the fisheries ordinance and the fishery management plan. The proposed changes to licensing arrangements include:-
    - i. A change from a 2-year to a 4-year licence period (with a mid-term review).
    - ii. Changes to the criteria used for determining licence applications.
    - iii. Introduction of a points system for any fisheries infringements detected.
  - b. The stock assessment and the management system for the fishery conform to CCAMLR requirements and are scrutinised by CCAMLR, providing some independent external review.
  - c. An independent review of the management system was conducted in 2014 and is due to be repeated in 2019. The 2014 review reported very favourably (a copy has been provided to the assessment team).
4. Research plan
- a. There is a structured research programme in place and this has been provided to the assessment team.
5. Disputes
- a. There have been no recent disputes concerning the fishery.
6. Legal & customary framework
- a. The key legislation applying to the fishery is the Fisheries Ordinance 2000 and the Wildlife & Protected Areas Ordinance 2013.
  - b. Stakeholders are consulted before new legislation is introduced.
  - c. A full list of all legislation in force relevant to the fishery has been provided to the assessment team.
7. Compliance & Enforcement
- a. Inspections of fishing vessels are carried out on their arrival at KEP and at sea.
  - b. No infringements have been detected aboard licensed vessels.
  - c. There is no evidence of any IUU fishing in the area. IUU fishing is monitored by Pharos, by aerial overflights of the EEZ, and also using satellite & AIS data. The only unlicensed longlines found in the area are reported to have been very old.
8. Stakeholder engagement
- a. GSGSSI holds regular meetings with licence holders, both en masse, and also through end of season debriefs with each fishing operator.
  - b. GSGSSI also convenes annual stakeholder meetings in London (the assessment team attended the 2017 meetings).

- c. All consultations on changes to the management or operation of the fishery are posted on the internet.

**Actions called for:**

1. Cefas

- a. Provide information on the number of tagged fish from sub-areas 48.3 and 48.4 that are caught in sub-area 48.4.
- b. Provide a list of the biological parameters that are monitored by fishery observers.

## 14.2 Written submissions

### 14.2.1 During assessment

No comments were submitted during the assessment.

### 14.2.2 Responses to PCDR – WWF

Assessment Stage	Fishery	Date	Name of Individual/Organisation Providing Comments
<input checked="" type="checkbox"/> Public review of the draft assessment report <sup>3</sup> <b>Opportunity to review and comment on the draft report, including the draft scoring of the fishery.</b>	South Georgia Patagonian Toothfish Longline	6/6/2018	Sarah Davie WWF-UK

Comment	Nature of Comment	Justification
		Please attach additional pages if necessary.

<sup>3</sup> [MSC Fisheries Certification Requirements, v2.0 section 7.15](#)

<p><input checked="" type="checkbox"/> I wish to provide general comments about the assessment of this fishery against the MSC Fisheries Standard.</p>		<p>WWF has a long history of involvement with the MSC certification of fisheries around the globe promoting the sustainability of fisheries and to recognise advancements that fisheries have been making. We recognise that the South Georgia toothfish longline fishery is among the most highly scoring certified fisheries in the world and WWF welcomes the desire of this fishery to enter the reassessment in the MSC program.</p> <p>In this instance WWF is concerned by the representation of the relevant management system across all Principals. The management system for the South Georgia toothfish longline fishery is set out within GSGSSI legislation. Throughout the draft CCAMLR management, rules, and limits are referred to, however these are not a legal requirement within the maritime zone of South Georgia. GSGSSI use CCAMLR conservation measures as a basis of their legislation, adding additional layers of protection and precaution which we welcome. It is upon these measures and legislation that the assessment should be based. In particular the assessment should focus on scoring the fishery against GSGSSI's stock target of 55% of virgin biomass, and not the CCAMLR requirement of 50%.</p> <p>In relation to the two 'main' bait species, WWF have concerns on their use in the fishery and their scoring within the assessment. Bait species were specifically highlighted within the assessment recommendations as needing to be from sustainable sources. The Humbolt squid is identified as the primary bait species, which as stated within the draft report, is a short lived species strongly affected by its surrounding environmental conditions, which can lead to large and sudden changes in stock health. Even with the low level of catches removed for bait within this fishery given the overall level of recent catches, the lack of management,</p>
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Comment (cont.)	Nature of Comment	Justification <small>Please attach additional pages if necessary.</small>
		<p>identified target levels, biological reference levels, or acceptance of a peer reviewed stock assessment should make the use of this species as bait a risk. The second 'main' bait species, sardine, originates from two stocks, one of which is considered as being below sustainable levels and lacking a management plan (27.8.c and 27.9.a). Again, the volumes of catch associated with the toothfish fishery are low compared to the overall catches from the stock. This appears to be being used as a justification for not marking down the score, a low associated catch from an unevaluated or unsustainable stock should not be used as a replacement for sustainability.</p> <p>Assessment methodology highlights, through four recommendations, that should the fishery be assessed using FCRv2.0 criteria the overall scoring and status of the fishery would be less favourable, possibly affecting its current unconditional certification status. We understand that FCRv2.0, which increases accountability for the wider ecosystem and environmental impacts of a targeted fishery, will be launched in the latter half of 2018. As such, WWF recommend and request that this fishery is re-assessed against the more holistic FCRv2.0 (or its successor) no longer than 2 years after its launch.</p>

Please feel free to contact the undersigned should you have any question. WWF looks forward to your prompt reply and will continue to provide inputs to the MSC certification of the wild capture fisheries.

Yours faithfully,

Sarah Davie  
 Polar Program Specialist  
 WWF-UK

### 14.2.3 Responses to PCDR - MSC Technical Oversight

SubID	PageReference	Grade	RequirementVersion	OversightDescription	Pi	CABComment
28798	89	Guidance	FCR - 7.4.11.b v2.0	<p>The Report states within the traceability section (Table 17, Row 2) “.At catch verification (mid season and/or end of season) any fish from 48.2 and/or 48.4 is weighed separately and checked against the catch logs for each of those fisheries. The risk of any of the UOC vessels fishing outside the UOC in different geographical areas, either on the same trip or different trips is therefore considered to be very low”.</p> <p>It seems that some fishing by said vessels does happen outside the UOC (e.g. 48.2 and 48.4) on occasion or as part of fishery research purposes however its stated that the risk “of any of the UOC vessels fishing outside the UOC in different geographical areas, either on the same trip or different trips is therefore considered to be very low”.</p> <p>It would help if this section was more explicit about which UoA vessels fish outside the UoA. Additionally some clarity would aid in terms of how fish caught from non-certified area (s) was separated on board, in particular, after harvest and before package if in the same trip.</p>		

## 15 Appendix 4 Surveillance Frequency

The MSC Certification Requirements specify that after each certification, surveillance and re-certification the Certified Accreditation Body (CAB) shall, with input from the client, determine the level at which subsequent surveillance of the fishery shall be undertaken.

In the most recent re-assessments of each UoC, a “Remote” surveillance programme was proposed (under CRv1.3), requiring alternating annual on-site and off-site surveillance audits.

The assessment team considers that it would be appropriate to assign the equivalent “Level 4” surveillance score to this fishery under the CR v2.0 requirements. The surveillance programme that complies with this surveillance score is set out below.

**Table 15.1: Surveillance level rationale**

Year	Surveillance activity	Number of auditors	Rationale
1	Off-site	2 auditors, off-site	This fishery presently has no conditions of certification, has returned a high score against all 3 MSC Principles, and has demonstrated an excellent track record of compliance with the MSC Scheme requirements as well as conditions of certification generated during earlier periods of certification. The fishery is well documented, and the GSGSSI has consistently provided comprehensive and verifiable information about the fishery that enables remote surveillance to be carried out

**Table 15.2: Timing of surveillance audit**

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
1	September 2018	September 2019	Coincides with certificate anniversary

**Table 15.3: Fishery Surveillance Program**

Surveillance Level	Year 1	Year 2	Year 3	Year 4
Level 4	Off-site surveillance audit.	On-site surveillance audit.	Off-site surveillance audit	On-site surveillance audit. Reassessment

## **16 Appendix 5 Objections Process**

(REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED  
AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR)

The report shall include all written decisions arising from an objection.  
(Reference: FCR 7.19.1)