South Georgia & the South Sandwich Islands
Mackerel Icefish Fishery (48.3) Management Plan
2018 - 2019

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**Preamble**

The South Georgia & the South Sandwich Islands Maritime Zone (SGSSI MZ), was declared in 1993. It extends 200 nautical miles from the baselines (the coast of South Georgia and each of the South Sandwich Islands) and occupies approximately 1.3 million km$^2$. The South Georgia & the South Sandwich Islands MPA (SGSSI MPA), which occupies the 1.07 million km$^2$ of the SGSSI MZ that lies north of 60° S was declared in 2012, with additional protection measures established in 2013. The SGSSI MPA is a sustainable use MPA and includes no-take zones in all coastal areas, areas closed to all seabed fishing on the shelf, and temporally closed areas.

**Conservation and management objectives**

The *South Georgia & the South Sandwich Islands Strategy 2016-2020* sets out the key conservation and management objectives for the fisheries within the SGSSI MPA. These are:

- Manage SGSSI fisheries in a precautionary manner, to the highest international standards and consistent with all CCAMLR$^1$ requirements, to ensure long-term sustainability.

- Collaborate with stakeholders to develop fishery management plans to guide management and research, with clear and transparent policy and updated fisheries legislation.

- Establish arrangements for monitoring and assessing the performance of the MPA.

- Continue raising standards in the fisheries and ensure best practice is adopted, including by developing a plan to phase out heavy fuel and restricting bunkering activity.

- 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.

- 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.

- 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.

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$^1$ CCAMLR is the Commission for the Conservation of Antarctic Marine Living Resources.

The South Georgia & South Sandwich Islands Marine Protected Area

The SGSSI MPA incorporates a number of management tools designed to protect targeted stocks as well as ecological links to fisheries and the wider ecosystem. The tools relevant to this fishery are:

- Total ban on all commercial bottom trawling throughout the SGSSI MZ; and
- 12 nautical mile no-take zone around South Georgia, Shag Rocks, Black Rock and Clerke Rocks;

Other restrictions set out by the MPA include a 3 nautical mile complete no-take zone and a 12 nautical mile pelagic no-take zone around the South Sandwich Islands.

Figure 1: The SGSSI Maritime Zone (including the SGSSI MPA) and the CCAMLR catch management areas.
History of the South Georgia Mackerel Icefish Fishery

The fishery for mackerel icefish (Champsocephalus gunnari) in the SSGSSI MZ is a pelagic or semi-pelagic trawl fishery and operates under CCAMLR regulations. Fishing for mackerel icefish began in South Georgia waters in the late 1970s, with large catches taken by eastern European (ex Soviet bloc) vessels. Catches peaked in 1981/82 with a reported 178,000 tonnes, although there is some doubt about the accuracy of the data. Following the establishment of CCAMLR in 1982 concerns were expressed about depletion of stocks, which led to CCAMLR closing the fishery in 1989. The fishery was later re-opened with additional controls to ensure long-term sustainability including those imposed by the Government of South Georgia & the South Sandwich Islands. Very small allowable catches were permitted and the fishery was limited to pelagic trawling only to avoid adverse impacts on non-target species. In recent years the allowable catch has been between 1,500 and 5,000 tonnes, although the full quota has not always been taken up. The fishery is Marine Stewardship Council certified.

The SSGSI MZ is within the area covered by the Convention on the Conservation of Antarctic Marine Living Resources, to which the United Kingdom is a contracting party. Accordingly, fisheries in the SGMZ are managed under the auspices of CCAMLR. It is a condition of every licence that all applicable CCAMLR Conservation Measures (CMs) must be adhered to. GSGSSI sets additional compliance conditions which are often more precautionary than those agreed under CCAMLR.

Fishery Management

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<tbody>
<tr>
<td></td>
<td>Wildlife and Protected Areas Ordinance 2011 (as amended).</td>
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<td>Marine Protected Areas Order 2013.</td>
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<td>Fisheries (Transhipment and Export) Regulations 1990 (as amended).</td>
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<td>CCAMLR Schedule of Conservation Measures in Force 2017/18 (as updated from time to time).</td>
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<p>| Fishing Season | 1 December until 30 November |</p>
<table>
<thead>
<tr>
<th>Valid Fishing Areas</th>
<th>Beyond 12 nautical miles around South Georgia, Shag/Black Rocks and Clerke Rocks</th>
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<tr>
<td>Fishing Methods Permitted</td>
<td>Pelagic trawling</td>
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<tr>
<td>Licencing</td>
<td>2 year licencing, with quota allocation confirmed bi-annually on the basis of scientific advice.</td>
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**Fishery Management Timetable**

- **December 1 - November 30** – South Georgia (Subarea 48.3) mackerel icefish fishing season.
- **September** - Preliminary stock assessment presented at annual Fishing Industry Meeting.
- **October** - Stock assessment presented at CCAMLR at which two-year catch limits are agreed (2019).
- **November** - Annual licence advice presented to the Government of South Georgia & the South Sandwich Islands.
- **December** - Updates to mackerel icefish Information for Applicants and licence conditions published.

**2018-2019 South Georgia (48.3) Mackerel Icefish Fishery Licence Advice**

**Stock assessment**

Two developments of the stock assessment methodology were considered by CCAMLR in 2017, updating the biomass estimation bootstrap (WG-SAM-17/36) in the light of Fallon *et al.*, (2016) and an alternative method of aggregating length frequencies from the survey hauls (WG-FSA-17/51). The alternative biomass bootstraps were shown to make no significant difference, and so for consistency with other assessment areas, CCAMLR agreed retaining the approach used previously (e.g. 2015).

The updated, survey-based, demersal biomass assessment of the stock status, presented at CCAMLR FSA-2017, was adopted as the basis for the CCAMLR catch limit advice for 2017/18 and 2018/19. The survey-swept area estimates of demersal icefish biomass show a broadly increasing biomass since 2009, and the 2017 estimate is the second-highest biomass observed since 2000 (Figure 1). The median biomass estimate at the time of the 2017 demersal fish survey, was 91,500 tonnes with the lower 5th percentile at 47,400 tonnes.

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In deriving catch limits, CCAMLR makes the precautionary assumption that the survey-swept area population biomass estimate represents the total icefish biomass at South Georgia, despite fish in the water column being passing above the bottom trawl. The safeguard is then reinforced by taking lower 5th percentile of the survey biomass as the starting point for catch projections and also assuming no recruitment to the population occurs during future years. The resulting population is projected forward and only catches at or below the level that would permit 75% survival of the stock biomass are agreed. The CCAMLR icefish decision rule approach to setting catch levels has been shown to be highly precautionary and not to impact the dynamics of the icefish stock.

The lower 5th percentile of the survey biomass at the start of the 2017/18 season was estimated to be 45,350 tonnes, of which 23,999 tonnes will remain at the end of the 2018/19 season without fishing. Upper catch limits of 4,733 tonnes in 2017/18 and 3,269 tonnes in 2018/19 were agreed by CCAMLR as consistent with its decision rule to retain 75% of the stock.

Figure 2: Mackerel Icefish in Subarea 48.3: UK trawl survey demersal biomass estimates (median and 5th - 95th percentile).

**Catch limits**

**CCAMLR**

CCAMLR advice for the conduct of the fishery and the Subarea 48.3 catch limit is based on the CCAMLR (2017) assessment of stock status as presented in CM 42-01 (2017), which covers fishing activity directed at mackerel icefish in the 2018 and 2019 seasons. The catch limit
provided by CM 42-01 is 4,733 tonnes for 2018, and 3,269 tonnes for 2019, based on the projections from the assessment. The assessment is based on the survey conducted in January 2017. As no survey is planned for 2018, the next assessment will be conducted after the 2019 survey.

The CM (CM42-01) for this fishery is for two years. It excludes vessels that catch more than 19 birds from the fishery for the rest of the season. This is a slight change from the previous Conservation Measure which would have excluded a vessel exceeding that limit in the first year for the entire period of both seasons. The change returns the rule to that which existed prior to 2015, when the Conservation Measure was revised annually.

GSGSSI

Given the nature of the stock the catch limits set by CCAMLR for this two-year period are within the Government’s biomass survey index reference limit. To avoid exceeding CCAMLR catch limits the Government expects to set a quota of 4,700 tonnes for the 2018 season and 3,200 tonnes for the 2019 season.

Management of By-Catch

In addition to the by-catch limits in CCAMLR CM 33-01 (1995) and 42-01 (2017) the by-catch of *Patagonotothen guntheri* will be limited to 100 tonnes for the area west of 40°W (Shag Rocks). Once this by-catch limit is reached in any season, the area west of 40°W will be closed to the icefish fishery.
King Edward Point science programme (British Antarctic Survey - BAS)
The Government of South Georgia & the South Sandwich Islands has contracted BAS to manage the research base at King Edward Point since 2001. The station houses office and laboratory facilities where scientists conduct higher predator monitoring and fisheries science work all year round. The research directly supports the management of the mackerel icefish fishery including the stock assessment work. KEP Science is guided by the KEP Science 5 year Plan. Current projects include:

1. Long term studies of mackerel icefish diet based on stomach samples collected on commercial vessels;
2. Analysis of bird by-catch specimens; and
3. Scientific support for observers and on-board vessel data collection.

Stock assessment and population science (Centre for Environment, Fisheries and Aquaculture Science - Cefas)
Cefas has been contracted since 2012 to carry out annual icefish stock assessments, provide licensing advice, and conduct other population-level science. The contract is jointly operated by the Government of South Georgia & the South Sandwich Islands and the UK Foreign and Commonwealth Office.

The assessment and associated management approach for the icefish stock in Subarea 48.3 are well suited to the limited data currently available for the estimation of sustainable long-term exploitation rates and the provision of responsive, precautionary management advice. There is limited room for improvement in the stock assessment method until factors such as the amount of icefish in the water column can be determined using reliable acoustic methods.

Suggested research priorities include collaboration with the industry to help them identify concentrations of icefish could help to optimise fishing efficiency and effect a greater uptake of the quota.

Observer Programme (MRAG / CapFish)
The consortium of MRAG and CapFish manage the South Georgia scientific observer programme. MRAG/CapFish are tasked with providing highly experienced and capable observers whose role is to both meet the reporting requirements for CCAMLR as well as the additional standards and tasks set by GSGSSI. The GSGSSI Scientific Observer programme currently includes:

1. 100% observer coverage on icefish vessels;
2. Diet sampling through the collection of stomach samples for analysis by BAS scientists;
3. Improved whale photographic ID gathering; and
4. Additional monitoring of seabird presence.

Fishery research priorities
The Government has identified the following priorities for the 2018 – 2019 licensing period based on existing research, and collaboration with fishery operators and non-governmental organisations, and current policy development:

1. **Target species research**: work to identify concentrations of mackerel icefish so helping to optimise fishing efficiency, including through collection of acoustic data;
2. **Gear trials**: trials of different net designs, including shape and mesh size, to investigate impacts on catch efficiency and minimising bird by-catch;
3. **Warp strikes**: implementation of CCTV monitoring of warps to investigate frequency of bird strikes and survival outcomes;
4. **Diurnal migration**: standardised trials of day and night setting in the same locations to investigate the impact of fish movement in the water column on catch rates; and
5. **Intra-annual variation**: investigate the distribution of mackerel icefish around the MZ throughout the season, requires better spatial variation in hauls rather than focus on preferred fishing grounds.