



South Georgia and the South Sandwich Islands

Creating a whale sanctuary in the South Atlantic

Foreword

“SGSSI provides a clear opportunity to enhance protection of one of the planet’s greatest biological assets. Chances like this should be grabbed with both hands”

Daniel Pauly

University of British Columbia



The very names of South Georgia and the South Sandwich Islands ring with history and the era of Antarctic exploration. Ernest Shackleton and other intrepid explorers capture our imagination with their daring journeys to these icy and remote islands.

But even the briefest glance at history also points to another, less glorious past: the tragic and destructive over-exploitation of the local wildlife at an industrial scale. Over centuries, Antarctic fur seals, elephant seals, baleen whales, and fish were harvested with devastating results. Populations of these animals were decimated, and some species were even driven to the brink of extinction.

Happily, in recent decades, there has been a concerted effort to protect these waters. As a result, many species are beginning to recover. Today, the incredible abundance of wildlife is truly astounding. Tens of millions of seabirds breed on the islands, penguins are busy everywhere along the shores, millions of seals bask on the beaches, while whales are now again swimming in the ocean.

Sadly, however, not everything is quite so positive. Even in the farthest reaches of the frigid south Atlantic Ocean, climate change is having major impacts on the ecosystem, leaving the future of these waters – and the vast array of marine life which teems within them – uncertain. Recognizing the region's biological

significance, the local government established a marine protected area (MPA) around South Georgia and the South Sandwich Islands just over a decade ago. Two reviews of the MPA, in 2013 and 2018, assessed continuing threats to the region, resulting in enhanced and extended protection. This year, another science-based evaluation is currently underway.

At the moment, even with the existing safeguards and high levels of protection in place, most of these waters remain open to commercial fishing. This includes fishing for Antarctic krill, a small crustacean that underpins almost the entire marine ecosystem in the Southern Ocean.

To meet the threats from climate change and krill fishing, the UK government now has an opportunity to again enhance marine protection – by creating additional fully protected ocean sanctuaries within these waters. This would help to ensure that the whales, seals, penguins, and other wildlife that use these waters would have the best chance possible to recover and thrive.

Future generations will then be able to look back with pride, not only at Shackleton and the heroic era, but also on how the UK made good on the uncontrolled destruction of the past.

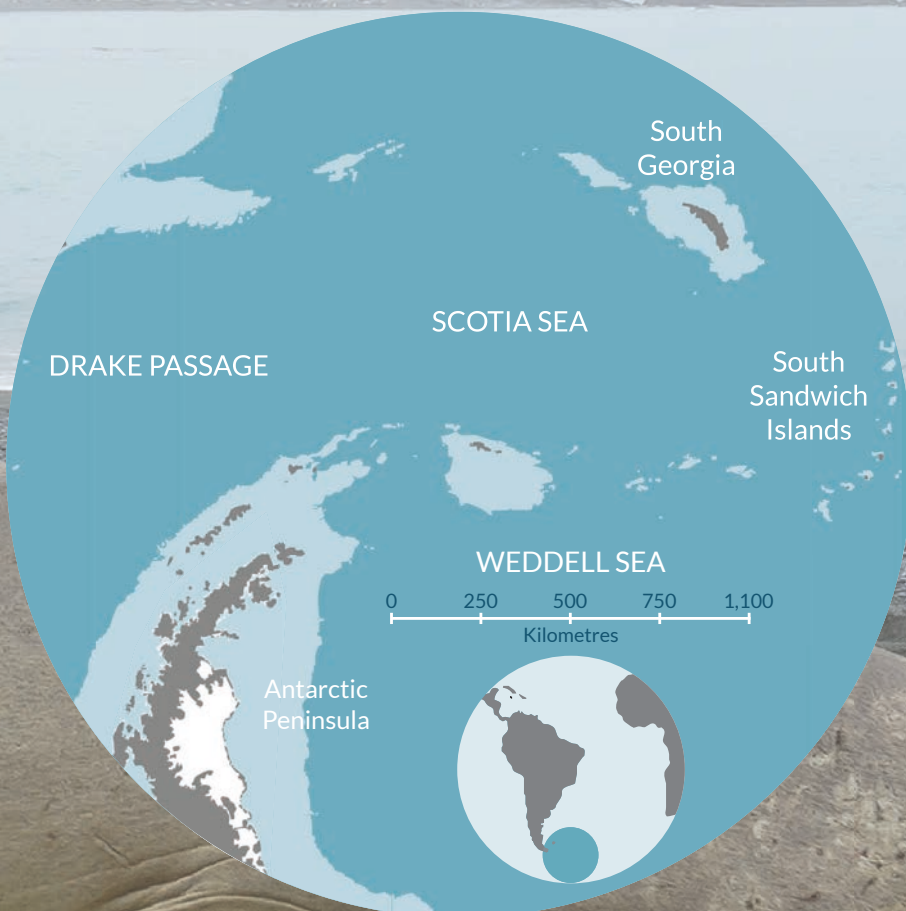
The Rt Hon Lord (William) Hague
United Kingdom Foreign Secretary 2010-2014

Opportunity to safeguard a global biodiversity treasure



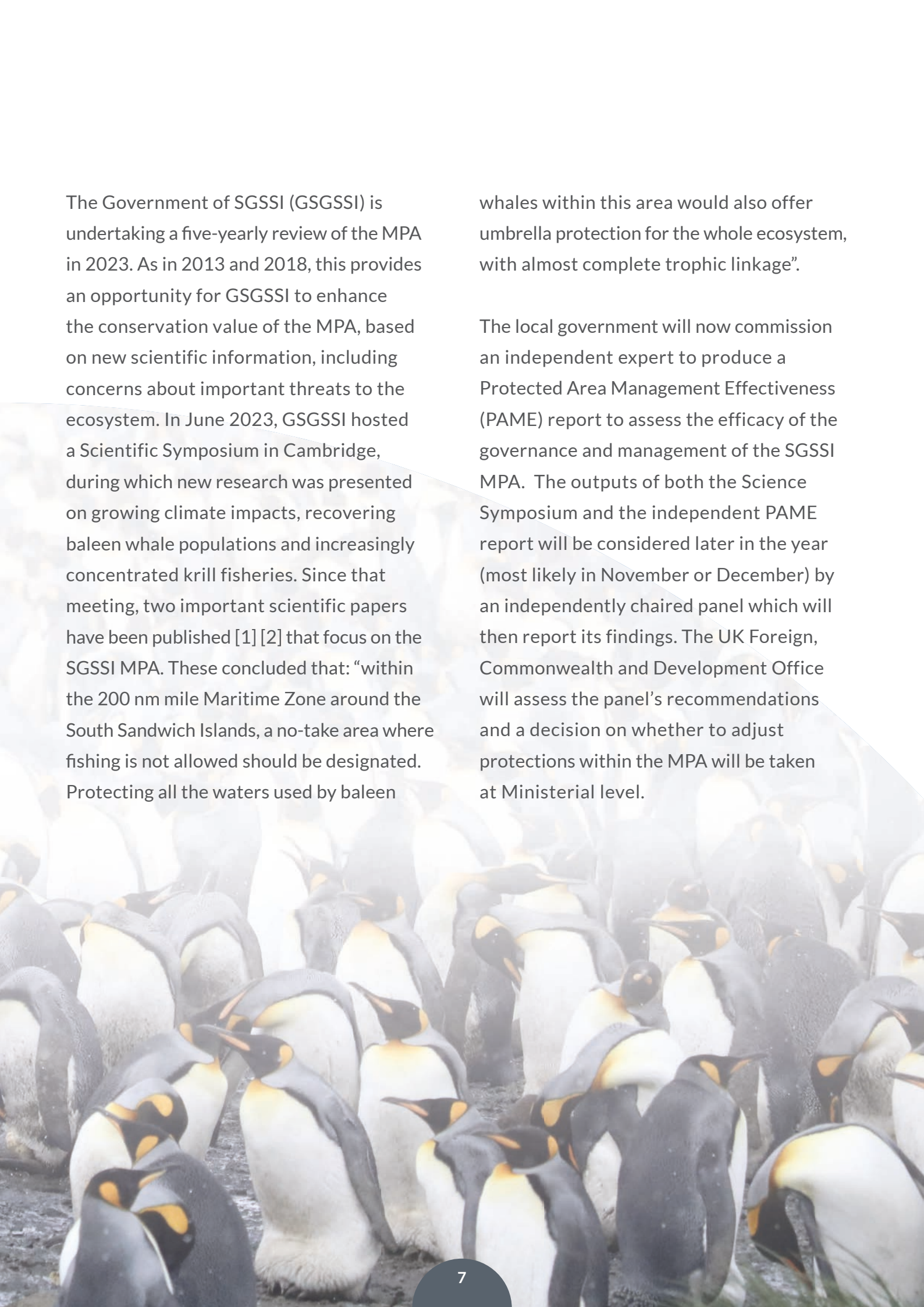
South Georgia and the South Sandwich Islands (SGSSI) lie more than 1,700 kilometres (1,050 miles) east from the southern tip of South America in the remote expanse of the south Atlantic Ocean. Mostly uninhabited by humans (approximately 20 scientists and government officials operate from South Georgia), the area hosts one of the largest concentrations of spectacular marine wildlife anywhere in the world. The islands and surrounding waters provide habitat for over three million Antarctic fur seals, more than 97% of the world's population – and more than half of the world's southern elephant

seals. South Georgia has as many as 100 million seabirds, including vast numbers of penguins, albatross, prions, and petrels. The Antarctic's only songbird, the South Georgia pipit, is found only on that island. Zavodovski Island in the South Sandwich Islands has more than one million chinstrap penguins, the largest colony in the world. The South Sandwich Trench, is the deepest part of the Southern Ocean (over 8,000 m - 5 miles), whilst the East Scotia Ridge includes hydrothermal vents which provide habitat for unique species assemblages which remain little known and little studied.



The SGSSI MPA review a science led opportunity





The Government of SGSSI (GSGSSI) is undertaking a five-yearly review of the MPA in 2023. As in 2013 and 2018, this provides an opportunity for GSGSSI to enhance the conservation value of the MPA, based on new scientific information, including concerns about important threats to the ecosystem. In June 2023, GSGSSI hosted a Scientific Symposium in Cambridge, during which new research was presented on growing climate impacts, recovering baleen whale populations and increasingly concentrated krill fisheries. Since that meeting, two important scientific papers have been published [1] [2] that focus on the SGSSI MPA. These concluded that: “within the 200 nm mile Maritime Zone around the South Sandwich Islands, a no-take area where fishing is not allowed should be designated. Protecting all the waters used by baleen

whales within this area would also offer umbrella protection for the whole ecosystem, with almost complete trophic linkage”.

The local government will now commission an independent expert to produce a Protected Area Management Effectiveness (PAME) report to assess the efficacy of the governance and management of the SGSSI MPA. The outputs of both the Science Symposium and the independent PAME report will be considered later in the year (most likely in November or December) by an independently chaired panel which will then report its findings. The UK Foreign, Commonwealth and Development Office will assess the panel’s recommendations and a decision on whether to adjust protections within the MPA will be taken at Ministerial level.

Key recommendations

Within the SGSSI MPA, scientists [3] [4] [5] have shown that recovering populations of baleen whales feed across large areas including in both coastal and offshore habitats. Protecting the areas used by baleen whales therefore requires appropriately sized marine reserves which can be achieved by:

- 1.** Fully protecting both coastal and offshore waters around the South Sandwich Islands to the edge of the Maritime Zone (200nm - adding over 400,000 km² in full protections) to provide a sanctuary for baleen whales, with complete food-web connections, whilst at the same time, providing umbrella protection for all other species.
- 2.** Prohibiting krill fishing in offshore waters of South Georgia identified as key whale feeding grounds, whilst also allowing existing fisheries for toothfish and mackerel icefish to continue operation.
- 3.** Improving fisheries management around South Georgia, by setting a more precautionary catch limit for krill.

As the Southern Ocean continues to recover from a legacy of over-exploitation, ecosystems will change. However, it remains uncertain how they will alter. Probably the most important ecological engineers that will reshape these biodiverse waters, will be the recovering populations of baleen whales [1]. In addition, climate change will produce profound differences that are not yet fully understood [6]. Safeguarding species and the habitats that they need from adverse impacts of human activities will help these biodiverse ecosystems continue to function [7]. Scientists and governments now widely recognize the need for greater levels of protection for marine life, including coastal and deeper offshore waters – to meet the global goal of protecting and conserving at least 30% of the ocean by 2030 [8] [9].

Fisheries for krill focus upon areas where krill are more predictable and more abundant. These are often the same areas that krill-eating predators rely upon. In such areas, competition between fishermen and natural predators is inevitable. Reserving adequate food for recovering species of whale is therefore vital, especially as climate change

Opportunity for New Protections Around South Georgia and the South Sandwich Islands



ATLANTIC OCEAN

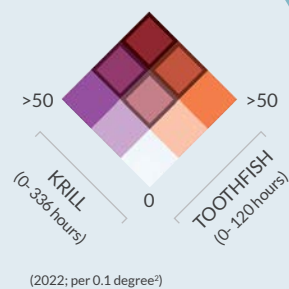
SCOTIA SEA



0 150 km
0 100 nm

- EEZ
- No-Take Zone
- Potential Enhanced Protections of South Georgia
- Proposed Additional South Sandwich Islands Full Protections
- Depth <700m
- Depth <2250m

Fishing Vessel Footprint*



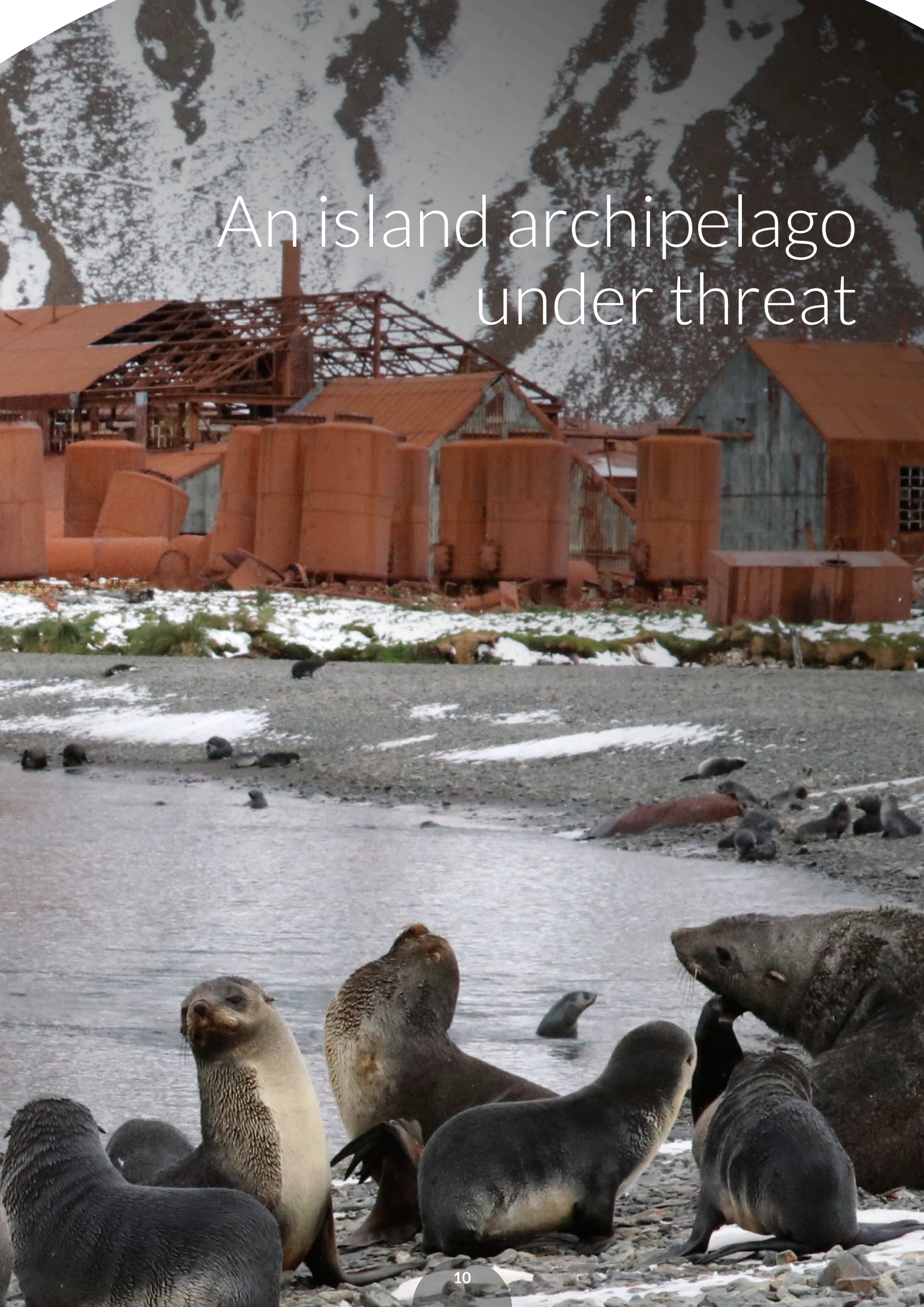
Source: Natural Earth; GEBCO; Marine Regions; Greeninfo Network; Government of South Georgia and South Sandwich Islands; Global Fishing Watch

*Based on GFW model of apparent fishing effort

may already be having impacts upon stocks of krill [10]. Moreover, whales can be caught in trawls or injured and killed through 'ship strike', so carefully regulated fisheries measures are needed to avoid these impacts.

Our report summarises the latest science and makes clear recommendations about the path that the forthcoming MPA review should take to safeguard one of the UK's greatest biodiversity hotspots.

An island archipelago under threat





South Georgia was probably first discovered in 1675 by Anthony de la Roché, a London merchant. A century later in 1775, James Cook was the first to land, survey and map the island. Cook also discovered the southern islands of the South Sandwich group, whilst the northern islands were discovered in 1819 by Bellingshausen. Britain claimed sovereignty over South Georgia in 1775 and the South Sandwich Islands in 1908. The UK Overseas Territory of South Georgia and the South Sandwich Islands was formed in 1985, previously the islands had been governed as part of the Falkland Islands Dependencies.

Since early times, South Georgia's marine life has been subject to serial periods of over-exploitation. On returning from his circumnavigation, Cook reported large numbers of Antarctic fur seals. Sealers then over-exploited the species so that the fur trade rapidly became uneconomic; well over 1.2 million animals were killed, leaving just a few individuals, probably between 30 and 1500 animals [11]. By the end of the nineteenth century, southern elephant seals, southern right whales, and some sub-Antarctic penguins had been harvested for oil. As some

of these stocks declined, economic focus shifted again, so that by the beginning of the twentieth century, harvesting for other baleen whale species and sperm whales was well established. After landing the first whale at Grytviken in 1904, until the last in 1965, South Georgia whaling stations processed around 175,250 whales. Whalers reduced humpback whale populations from about 27,000 to fewer than 450 [12]; enormous numbers of fin, and blue whales were also processed. Then, with the demise of the great whales and weakening profits, other less-valuable species were sought, so that by the latter half of the twentieth century, fishing for finfish and Antarctic krill had begun. Early catches of marbled rockcod and mackerel icefish by fleets of the former Soviet Union, took these demersal fish populations to such low levels, that population recovery is only now just becoming evident [13].

Much of this history is well documented [14] [15] [16] [17] [18] [19] [20] [21] [22], clearly demonstrating how human greed has, for the past 250 years, progressively depleted marine resources, fishing down the marine food chain [23] across the Scotia Sea, including at SGSSI.

Management after historical destruction

In 1982, management of marine species in the Southern Ocean and south Atlantic finally started to come under strict control; first through the multilateral Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR); then in 1985, the commercial whaling moratorium came into force, agreed through the International Whaling Commission (IWC).

In 1993, GSGSSI declared a 200 nm Maritime Zone, and a Fisheries (Conservation and Management) Ordinance. In 2012, GSGSSI declared a large scale MPA, imposing even more stringent management conditions than those agreed by CCAMLR [24] [25]; further revisions to the SGSSI MPA came into force in 2013 and 2019.

Currently, fisheries management remains under CCAMLR (comprising 27 Member States, advised by a Scientific Committee), with more stringent unilateral enhancements made by GSGSSI.

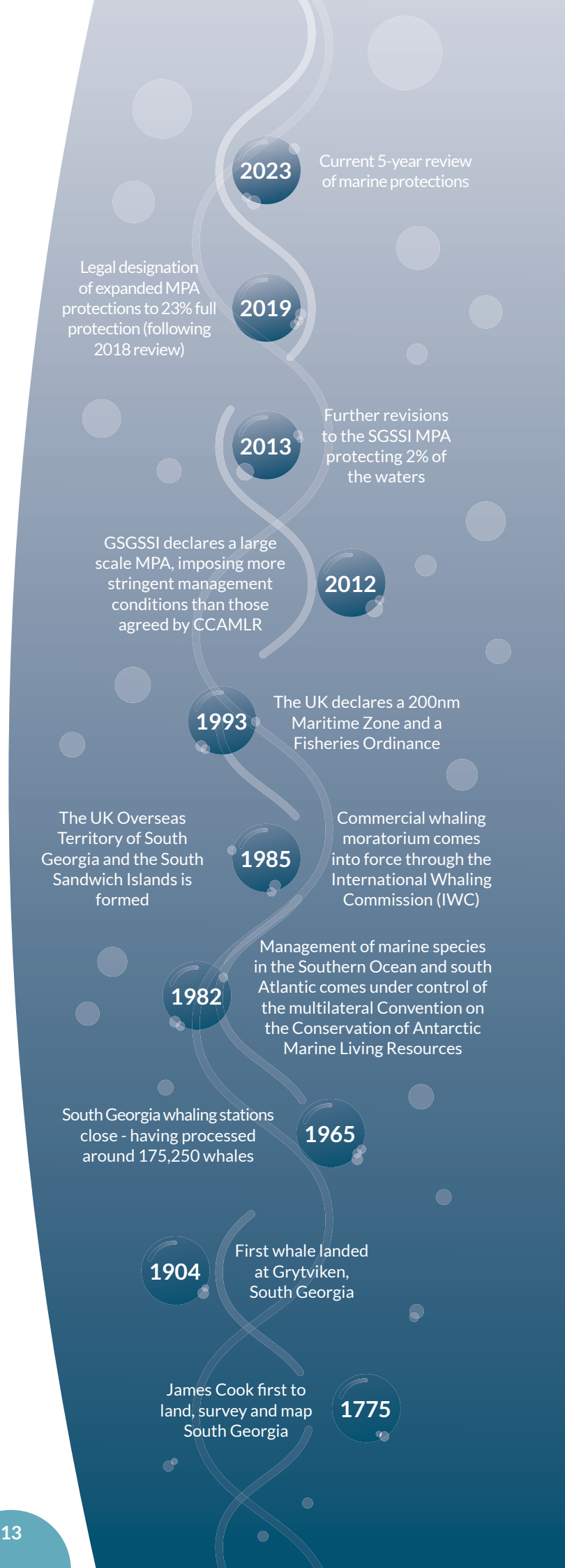
Today, three marine species are commercially exploited at South Georgia [26]; krill, mackerel icefish and Patagonian toothfish. In contrast, the marine living resources of the South Sandwich Islands have been left in relative peace, apart from a brief interlude during

the whaling era when whaling and sealing expeditions were licenced by the Falkland Island Government [22]. Today, the only harvesting at the South Sandwich Islands, is a nominal catch of Patagonian toothfish and of Antarctic toothfish.

Over the past four decades, strict management has allowed the waters of the SGSSI MPA to begin the long process of recovery. This has been slow, with some species still only now showing early signs of recovery; nevertheless improved management has increasingly led to positive conservation gains. Responsible management relies upon both robust objective evidence, and where necessary, precautionary management. Thus, as scientific evidence accumulated, GSGSSI acted and increased levels of protection for krill and its predators (e.g. coastal no-take areas and a no-take summer season to protected krill-eating predators). GSGSSI has also imposed stringent management controls for important finfish fisheries (e.g. conservative fishery catch limits and rigorous control of seabird by catch). In some instances, GSGSSI has even acted ahead of the scientific evidence, closing areas in a precautionary manner whilst scientific evidence accumulates (e.g. designating full protect for the South Sandwich Trench).

This precautionary principle, acting ahead of the science, is important, particularly given the high levels of uncertainty now facing managers. Various factors are contributing to increased levels of uncertainty, including ecosystem recovery after historical exploitation, climate change and political uncertainty [1] [2]. The precautionary principle is now likely to become increasingly important.

At present, CCAMLR has agreed krill catch limits for all SGSSI waters. Generally, these industrial fisheries operate in just a few areas where catches are highly concentrated [27] extracting tens of thousands of tonnes. However, in spite of some closed areas within the MPA, over three quarters of SGSSI waters remain legally open to krill fishing. Today, the demand for krill is increasing, with China signalling its intentions to dramatically increase its krill fishery activities [2]. GSGSSI has previously imposed more strict limits than CCAMLR, but these need to be reviewed in the context of future uncertainty [1]. Projections of how the world will look after another few decades are very unclear, suggesting that SGSSI managers must understand that fisheries should not be managed as though it were business as usual.



Management into the future

“The incredible marine life of the SGSSI is starting to recover, yet remains under threat from climate change and overfishing. This year, the UK can fully protect huge areas of this global biodiversity hotspot, and to further demonstrate ocean leadership”

Dona Bertarelli

Ocean advocate and cofounder of the
Pew Bertarelli Ocean Legacy Project



SGSSI waters sit fully within the area managed by CCAMLR, which has a mandate to conserve biodiversity and manage fisheries in accordance with strict ecological principles. However, at the sub-Antarctic islands, sovereign states maintain the option to apply unilateral management decisions to areas under their national jurisdiction. As such, GSGSSI has historically allowed CCAMLR to provide the broad framework for fisheries management - whilst upholding its right to designate and manage its waters through domestic legislation.

Consequently, management of SGSSI waters remains complex, given the different contributions from CCAMLR, IWC and GSGSSI. Nevertheless, GSGSSI implements all internationally agreed management measures, with supplementary regulations implemented under domestic legal instruments and management processes that provide more robust management and protection.

However, difficulties have recently arisen within CCAMLR that have the potential to delay important work [28]. Such work includes: ensuring management resilience to climate change [29], facilitating the designation of MPAs [30], and building a revised management framework for the krill fishery [2].

Problems have arisen following increased polarization about how to interpret and implement the primary Objective of CCAMLR, that is, the conservation of Antarctic marine living resources, where conservation also includes rational use. Historically, rational use has meant fisheries management must follow a broad ecosystem approach [31]. This means that under CCAMLR, only fisheries where sufficient data exist are generally allowed to operate.

However, in recent years the imperative to fish by some Members has become increasingly apparent, and is now risking much, not only in terms of biodiversity and ecosystem support, but also political stability [2].

Currently, issues within CCAMLR mean that there is little chance of progressing modern management methods within a multilateral framework, leaving sovereign states with an imperative to protect the more northerly parts of the CCAMLR management area [2]. With CCAMLR stalled, domestic legislation is now needed to ensure biodiverse areas are not subject to industrial fishing, and that they are protected to allow previously depleted baleen whale populations to recover, and to build resilience to the impacts of climate change [1].

What are the Threats?

“Since the last review in 2018, the global climate crisis has permeated all major habitats - but none more than the Southern Ocean. By fully protecting the South Sandwich Islands - the UK can provide the ecosystem the greatest chance to flourish under changing climatic conditions”

Professor Alex Rogers
Science Director,
Ocean Census



South Georgia and the South Sandwich Islands are remote, and as such, most likely experience fewer direct threats than many other more populous parts of the world (e.g. [32]). Indeed, many threats are now well managed within the SGSSI MPA, including, amongst other things, a prohibition on the carriage and use of heavy fuel oils, a prohibition on marine hydrocarbon and mineral resource extraction, a prohibition on destructive bottom trawling, and a closed season for the krill fishery to reduce competition with krill-dependent predators during critical breeding and feeding periods. The MPA also includes closed no-take zones where fishing is completely prohibited [24] [25]. Despite these restrictions, some factors, such as plastic pollution originating from outside the SGSSI MPA, continue to impact wildlife (e.g. [33]) and are beyond the control of local management. However, two factors will be key to the future management of the SGSSI MPA [1], warranting particular consideration and which are not adequately managed under current MPA restrictions:

Industrial fishing for krill

Antarctic krill is found in the polar waters of the Southern Ocean. It is a key species in the Antarctic marine ecosystem, and one of the most abundant multicellular animal species on the planet with an estimated biomass of approximately 500 million tonnes [34]. Harvesting began in the 1960s, with the first catches in the Scotia Sea made in the

1970s by vessels from Japan and the former Soviet Union. Within CCAMLR, five Members currently fish for krill: Chile, China, Norway, South Korea and Ukraine.

Under CCAMLR, krill fishing is managed in a precautionary manner with catches allocated to different areas, including for waters around South Georgia and around the South Sandwich Islands. However, catches are increasing and becoming more concentrated in both space and time. As such, CCAMLR has been working to develop a new management framework to prevent ecosystem impacts from the fishery [35].

However, the revised management framework does not provide adequate safeguards to test for and prevent ecosystem impacts. The current work plan does not allow for adequate ecosystem monitoring, spatial protection through the designation of MPAs, or incorporation of climate resilience [2]. All of these safeguards are critical to ecosystem protection. The revised framework, if agreed, would allow krill catches to increase more than four-fold at the Antarctic Peninsula, and if eventually implemented within SGSSI waters, by similar large amounts. Currently, adequate safeguards are not in place [1] [2], and without such constraints, the krill fishery should not expand.

It will be challenging to develop the appropriate safeguards in some areas, due to their geographic isolation; indeed,

in some areas it may never be possible to develop adequate monitoring. As such, krill fisheries should not expand into these regions. These areas should now be set aside as no-take closed areas [1] [2], facilitating baleen whale recovery, and providing umbrella protection for all species. The South Sandwich Islands are a model example of where krill fisheries should never be allowed to operate. Similarly, baleen whales use offshore habitats to the north and east of South Georgia [5], which should also be closed to krill fishing.

Climate change

Climate change impacts are projected to affect habitats and species, including species of commercial interest, across many parts of the Southern Ocean [6]. No issue, therefore, has greater importance for the future sustainable management of the Southern Ocean than does climate change [36]. Yet our ability to understand how species and ecosystems might change is still rudimentary [37]. Most biological datasets are of short duration, with many shorter than 30 years.

Last year, 2022, was globally the fifth warmest on record, indeed the last eight years have been the eight warmest on record; the annual average temperature was 0.3°C above the recent reference period of 1991 to 2020, equating to approximately 1.2°C higher than the historical reference period of 1850 to 1900;

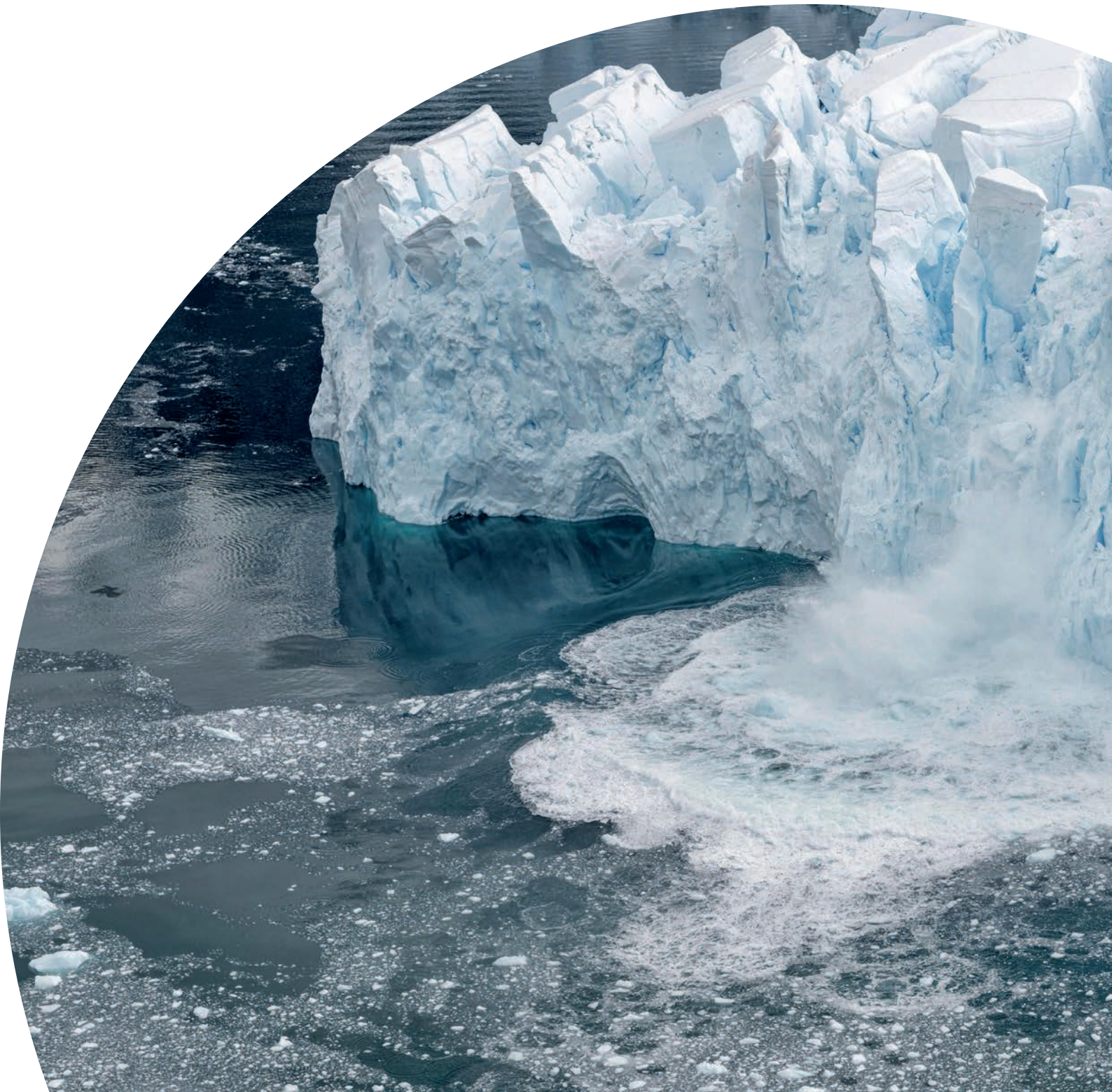
atmospheric carbon dioxide concentrations increased by approximately 2.1 ppm, while atmospheric methane concentrations increased by approximately 12 ppb; in February, Antarctic sea ice reached its lowest ever minimum extent based on the 44-year satellite record, whilst five other calendar months saw the Antarctic sea ice extent reach record or near-record low values [38].

This year, 2023, Antarctic sea ice saw even lower record values of extent [39]. Moreover, extreme events are occurring which potentially place unprecedented stress on ecosystems [40].

Climate change impacts are increasingly apparent. At South Georgia there has been a mean temperature increase of ~0.9°C in January and ~2.3°C in August over the top 100 m of the water column over the past century, with warming diminished at deeper depths [41]; also, 97% of glaciers have retreated [42]. More widely across the Scotia Sea krill abundance and distribution are changing [43] [10]. As a consequence, more comprehensive research and monitoring is needed to ensure that fisheries, particularly krill fisheries are sustainable. Many ecological interactions are not well understood, and many are not even studied. For example, recovery from historical over-exploitation and climate change can act in concert to alter ecosystem dynamics

[20] [44]. Disentangling these confounding drivers may be difficult and complex, and will require significant research and monitoring, which in remote regions is unlikely ever to be available. Areas with little or no ecological monitoring should therefore

be set aside as no-take closed areas. Again, the South Sandwich Islands and offshore areas to the north and east of South Georgia are areas without comprehensive monitoring and which should therefore be closed to krill fishing.



Why South Georgia and the South Sandwich Islands are so important

“SGSSI is a rich seasonal feeding area for critically endangered Antarctic blue whales, endangered sei whales and vulnerable fin and sperm whales and is an important foraging area for migrating southern right whales and humpback whales. Protecting their prey, krill, from exploitation in this area is essential if we are to restore their populations to pre-whaling levels and restore ecosystem function”

Chris Butler-Stroud
Chief Executive at
Whale and Dolphin
Conservation



South Georgia and the South Sandwich Islands are biodiverse, with unique ecological communities [45] [25] [46]. South Georgia is renowned for its abundant marine mammal and seabird populations, with 29 seabird species known to breed regularly [45]. Less well known are the South Sandwich Islands, but these too support numerous species of seabird, including globally important populations of penguins (see below). They also support ~4% of the global population of southern giant petrels and between ~13 and ~31% of the global population of Antarctic fulmars [47]. The waters around SGSSI also provide important feeding grounds for baleen whales [3] [4] (see below), including during the winter, albeit in lesser numbers [5], when krill fishing is allowed under GSGSSI regulations. Marine biodiversity is also important at the sea floor, with unique hydrothermal vent communities [48], and deep hadal communities [49] present nowhere else in the Southern Ocean (see below).

The South Sandwich Islands remain one of the least-disturbed parts of the Southern Ocean. Marine food-web connections are largely intact or are increasingly recovering after historical perturbations. Though pelagic whaling devastated populations of baleen whales, these are now recovering. Recovery will challenge current ecological understanding about how marine ecosystems change. The South Sandwich Islands therefore

offer an opportunity to understand such processes without further human perturbation.

Recovering whale populations

A long period of exploitation drove western south Atlantic humpback whales to the brink of extinction; they declined to only 450 whales by the mid-1950s [12]. Subsequent protection has allowed a strong recovery such that the current population is now estimated to be at 93% of its pre-exploitation size [12]. Similarly extensive over-exploitation of other baleen whale species also led to dramatic population declines, with individuals only now beginning to be seen within SGSSI waters [50].

With the renaissance of the baleen whales, the ecosystem in the Scotia Sea is set to change, possibly dramatically; however, it is still uncertain how these changes will be manifest.

One plausible future may be that as baleen whales recover, Southern Ocean productivity will increase overall [51]. This future is based on the hypothesis that pre-exploitation populations of baleen whales and krill stored larger amounts of available iron than is the case at present, and that they would have recycled substantial amounts throughout surface waters, enhancing overall ocean productivity. This hypothesis identifies iron as the limiting micronutrient in the Southern Ocean, and defecation by baleen whales as a

major mechanism for recycling iron, making it available to phytoplankton (diatoms) and then krill, leading to increased productivity.

A different, but equally plausible future identifies that as baleen whales recover, there may be major shifts in the abundance of certain species [52]. This hypothesis recognises that the removal of the great whales would have resulted in an enormous annual release of prey [53], allowing some species to expand their populations (e.g. chinstrap penguins [54]). Now, with the return of the great whales, populations of these species might change fundamentally, with some species declining as the baleen whales recover.

Determining whether either of these competing hypotheses is correct, is challenging. Nonetheless, fisheries managers must appreciate and understand that a major ecosystem change is likely. They must, therefore, manage harvested species, particularly krill, in a way that is sufficiently precautionary, regardless of whether either of these hypotheses is right.

This means that krill harvests at South Georgia must be precautionary and sustainable in the light of future change; harvesting is currently highly concentrated in both space and time [27]. In contrast, the South Sandwich Islands

remain little disturbed; they are little visited by tourist vessels, and if they were closed to krill fishing, they would offer a unique opportunity to understand what will happen as baleen whale populations recover.

Penguin populations

There are 18 species of penguin. These breed almost exclusively in the Southern Hemisphere, with some species breeding within five UK Overseas Territories (British Antarctic Territory, South Georgia and the South Sandwich Islands, Falklands Islands, Tristan da Cunha and St Helena). If the populations of all penguin species were combined, then approximately 37% of all individuals would be found within areas governed by the UK. This makes the UK responsible for more penguins than any other government.


At the last census, just over 1.5 million pairs of penguins (4 different species) were found on the South Sandwich Islands [47]; equivalent to 7.5% of all penguins worldwide. At South Georgia another 7.3% also breed [55] [56] [57]. At the South Sandwich Islands, chinstrap, (1.3 million breeding pairs, almost half of the world population), Adélie, (~125,000 pairs), gentoo, (~2,000 pairs), and macaroni (~95,000 pairs) penguins, all breed [47]; these species are all known to feed upon krill. Moreover, and adding to their importance, it has also

been reported that chinstrap penguins from other island archipelagos may congregate near to the South Sandwich Islands after breeding [1].

Unlike other areas, the South Sandwich Island penguin populations are relatively stable, and have not experienced the same declines in abundance and distribution as have been reported for the rest of the Scotia Arc, or parts of the western Antarctic Peninsula [47]. This suggests that the islands have been subject to lower levels of ecological change, and in time, they may offer a penguin refuge compared with other areas that are changing more rapidly.

Refugia are habitats where species retreat to, persist in, and can potentially expand from, under changing environmental conditions [58]. Consequently, identifying and protecting refugia for species is a priority for conservation under projected anthropogenic climate change. For species of sub-Antarctic penguin, the South Sandwich Islands appear to be an important refugia, and as such should be protected.





“I have undertaken many endurance swims
in the Southern Ocean and never fail to be
astounded by the diversity of ocean life”

Lewis Pugh

Endurance swimmer and
UN Patron of the Oceans



Hydrothermal vents and hadal ecosystems

The Southern Ocean is a region of high diversity for deep-sea species [48]. Close to the South Sandwich Islands, unique species exist at the seabed, occurring nowhere else in the Southern Ocean. Particularly important are the species found near hydrothermal vents (geothermally heated water discharges found near volcanically active places) along the East Scotia Ridge (ESR) [48] and the hadal communities (deeper than 6,000 m) in the South Sandwich Trench [49].

The chemosynthetic ecosystems found around the vents along the ESR are dominated by a distinct species of yeti crab and by stalked barnacles, limpets, peltospiroid gastropods, anemones, and a predatory sea star. Taxa abundant in other vent ecosystems in other oceans, are absent from the ESR, suggesting that the ESR ecosystems represent a distinct vent biogeographic province [48].

The South Sandwich Trench is isolated from other hadal systems [49] and represents the coldest known hadal ecosystem,

reflecting a largely unique high pressure-low temperature environment. Important species include three hadal fish, with very low population densities; four species of scavenging amphipods; large densities of brittle stars; dense aggregations of holothurians; with gastropods, sponges, and stalked crinoids also present [49]. Nowhere else in the Southern Ocean are these ecological communities found, making them important to protect.

Closer to the South Sandwich Islands, clear gradients in the distribution of many fish and invertebrate species are evident. Seawater temperature appears to be a key factor in driving the distributions of species, suggesting that these species may also be vulnerable to climate change, plausibly with the potential for poleward shifts in the ranges of some species [59]. Protection to limit the level of disturbance to species would offer opportunities for research on changes in distribution in the context of a warming ocean.

Ocean sanctuaries to protect whole ecosystems

“The UK must act now to fully protect these incredibly biodiverse waters, creating large no-take sanctuaries that support recovering populations of whales, their food, krill, and all other marine species”

Prof Philip Trathan

Antarctic marine ecologist
with over 30 years experience



When designated, the SGSSI MPA was at the cutting edge of marine spatial management, but now, a decade on, governments are under greater scrutiny. Since 2012, scientists and governments have recognized that much more is needed, indeed many governments are now advocating for 30 × 30; that is, to designate at least 30% of Earth's land and ocean area as protected and conserved areas by 2030. As such, the 30 × 30 initiative was endorsed in 2022 by the Convention on Biological Diversity. The UK is a leading proponent of 30 × 30, advocating for a minimum of 30% coverage to meet inter-governmental objectives [8] [9]. Scientific evidence indicates that full protection of at least 30% of the global ocean will help to reverse adverse ecological impacts; preserve fish populations; increase resilience to climate change and sustain long-term ocean health [60]. With strong support for 30 × 30 from the UK, it is self-evident that the SGSSI MPA should now come under intense scrutiny at the time when the current five-yearly review is taking place. Further, we recognise that other sites within the UK's Blue Belt of MPAs have achieved over 90% full protection with very little direct impact

on localized fishing activities (e.g. Tristan da Cunha, Pitcairn Islands and Ascension), yet 77% of SGSSI remains open to industrial fisheries. Given the immense damage done to the South Georgia marine ecosystem over the past 250 years, major efforts are still needed to help maintain existing marine species and populations, whilst also facilitating the recovery of those species still depleted from historical over-exploitation.

As baleen whale populations continue to recover, ecosystem change is highly likely to occur, albeit with uncertain outcomes. To facilitate recovery, protection should be implemented at scales that reflect baleen whale habitat use, including within both nearshore and offshore areas. Protection would remove competition for their main prey, krill, as well as limit incidental mortality and whale strike. Protecting baleen whale populations should also provide umbrella protection for all biodiversity within the areas protected. This can be achieved this year by creating a large no-take zone around the South Sandwich Islands and closing offshore areas to the north and east of South Georgia to krill fishing.

A photograph of four King penguins swimming in the ocean. The penguins are dark grey with a distinctive yellow patch on their necks and long, orange beaks. They are moving through the water, creating white foam and splashes. The background is a deep blue sea with some whitecaps. A large white curved shape is overlaid on the right side of the image, containing the title and quote.

2023: The year for action

“Opportunities to fully protect huge areas of ocean rich in biodiversity at zero cost are few and far between and closing rapidly. The UK must act whilst it has the chance”

Professor Callum Roberts
University of Exeter

With CCAMLR failing to deliver on a network of MPAs within the Southern Ocean, failing to deliver on climate resilient management, and failing to deliver adequate ecosystem monitoring to detect the impacts of fishing [2], the UK should act to fully protect large areas vital to the recovery and operation of this exceptional polar ecosystem. This year, 2023, provides a unique opportunity for the UK to enhance full protection around one of its greatest biological assets.

Full protection of areas critical to baleen whales would afford them a sanctuary, whilst also providing a haven for millions

of penguins. As climate change rages across our planet, all species require help to ensure their future resilience.

This year's review of the SGSSI MPA provides the UK with an opportunity to establish its position as a global ocean champion, by granting full protection to the waters around the South Sandwich Islands (400,000 km²) and additional safeguards and improved management around South Georgia.



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