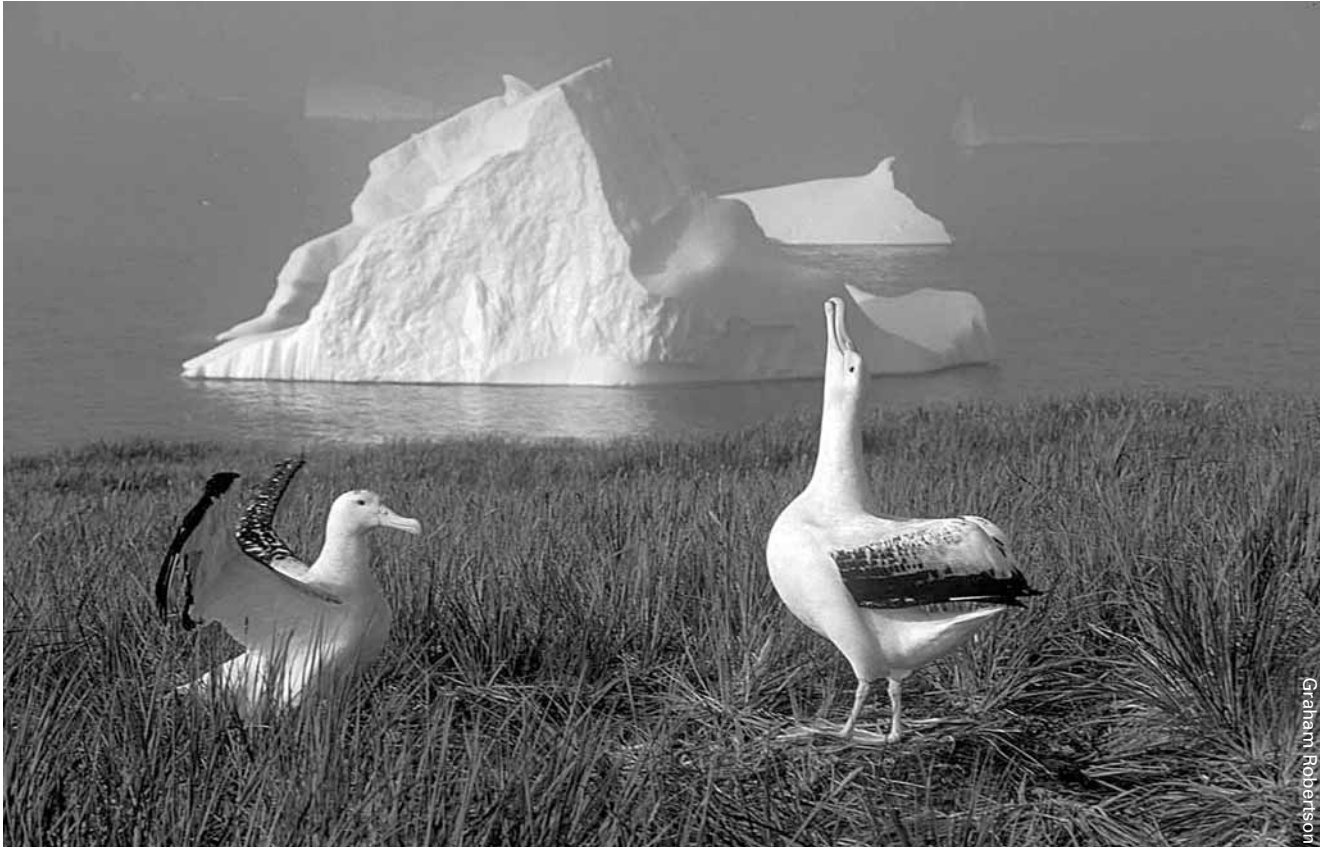


South Georgia and the South Sandwich Islands



Sally Poncet



A pair of Wandering Albatrosses on Annenkov Island

General introduction

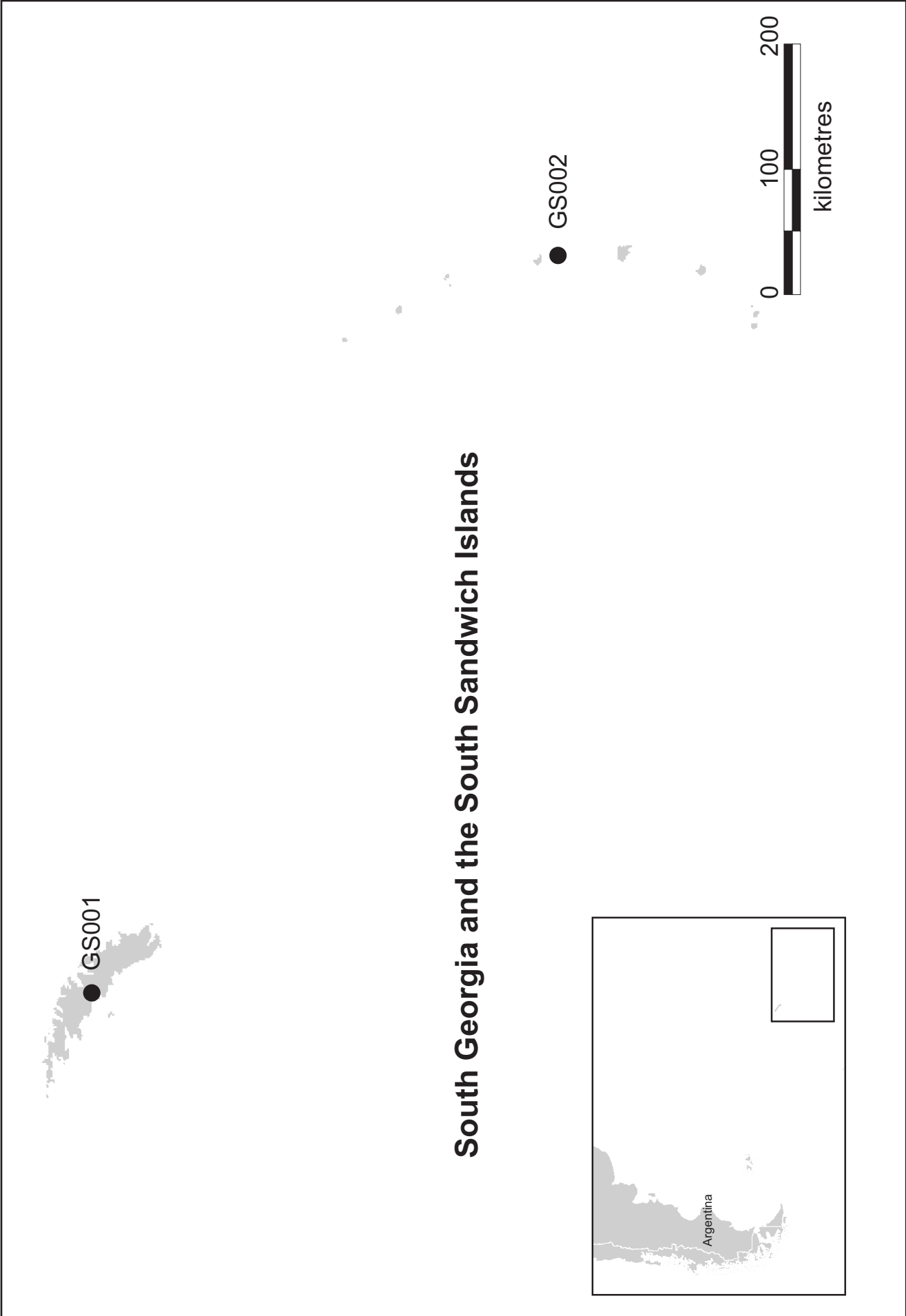
South Georgia and the South Sandwich Islands are two geographically distinct groups of islands in the Atlantic Ocean sector of the Southern Ocean, situated between 26 and 43 degrees west longitude and 53 and 60 degrees south latitude, and at least 1,243 miles (2,000 km) from the closest continental shores of South America. They are a United Kingdom Overseas Territory, administered by the Government of South Georgia and the South Sandwich Islands through the Office of the Commissioner in Stanley, Falkland Islands. Sovereignty of the islands is also claimed by Argentina. Neither island group has a permanent resident human population, although South Georgia's administrative centre and two British research stations are inhabited year-round by government representatives and scientists. There is no air link to either island group. Both are accessible only by sea and are visited by British naval vessels, research vessels, cruise ships, fisheries protection vessels under charter to the South Georgia government and yachts en route to and from the Antarctic and other destinations. The local economy is

dependent primarily on fishing licences sold to foreign fleets, and secondarily on tourism and philately.

South Georgia

South Georgia and its associated smaller offshore islands, islets and stacks lie between the parallels of 53°00'S and 55°00'S, and between the meridians of 34°30'W and 42°00'W. These islands are very isolated, lying about 870 miles (1,400 km) east-south-east of the Falkland Islands, 963 miles (1,550 km) north-east of Cape Dubouzet (the nearest point on the Antarctic continent), 1,336 miles (2,150 km) east of Cabo Virgenes (South America's nearest mainland point) and 2,983 miles (4,800 km) from Cape Town, South Africa. The nearest land is Zavodovski Island, the northernmost island in the South Sandwich Islands group, 342 miles (550 km) to the east-south-east.

The island group covers 1,450 square miles (3,755 square km) and ranks as the third-largest sub-Antarctic archipelago after the Falkland Islands and Iles Kerguelen. South Georgia itself is 106 miles (170 km) long and 1.2 to 25 miles (2 to 40 km) wide,



South Georgia and the South Sandwich Islands

and its long axis is orientated in a north-west to south-east direction. It is surrounded by over 70 islands, islets, stacks and rocks, including the outliers Shag Rocks, 155 miles (250 km) west of the north-west end of the island, and Clerke Rocks, 47 miles (75 km) east of the south-east end. The larger offshore islands support vascular plants and breeding seabirds, and include Willis Islands and Bird Island off the north-west extremity, Cooper Island off the south-east extremity, and Annenkov Island, 9 miles (15 km) off the central south-west coast. With a backbone of steeply uplifted mountain ranges (the Allardyce and Salvesen Ranges) that separate two contrasting coasts, and a landscape dominated by spectacular alpine topography, South Georgia is the highest of all sub-Antarctic islands. There are at least 20 peaks over 2,000 m altitude, culminating at 2,934 m on the island's summit, Mt Paget. Much of the land is over 1,000 m altitude and at least half is covered in permanent ice and snow, with over 160 glaciers, many of which are currently undergoing rapid recession and ablation. The south-west coast is fully exposed to the prevailing westerly weather systems. It is colder and more heavily glaciated than the north-east with numerous glaciers debouching into the sea and permanent snow and ice starting at 300 m altitude. The coastline is predominantly rock and ice, and extensive Tussac-covered lowland areas are uncommon. In contrast, the north-east coast is more sheltered, with a permanent snow line starting at 400–600 m altitude, and extensive ice-free vegetated peninsulas bounded by glaciers, many of which terminate on land.

South Georgia lies close to the north-east edge of the tectonically active Scotia Plate and is the emergent part of a small block of continental crust, the Scotia Arc. This steep submarine ridge runs as a continuous submarine feature from the Patagonian Shelf off the South American continent to the Antarctic Peninsula. Although itself volcanically inactive, South Georgia is connected by a line of subsurface Scotia Arc seamounts to the volcanically active South Sandwich Islands. Most of the island consists of sedimentary rocks of various types, of which the volcanoclastic sandstones and shales of the Cumberland Bay Formation form well over half the island and most of its high peaks. Remnants of the volcanic island arc from which these rocks originated occur on islands off the south-west coast. Older still are the igneous rocks from the original continental rocks of Gondwana found in the south-west corner of the island.

The coastline, which totals over 600 miles (1,000 km) in length, is deeply indented and embayed. Steep-sided fjords up to 9 miles (15 km) long, and often over 300 m in depth, intersect impressive sea cliffs; the headlands are surrounded by extensive wave-cut platforms, and beaches of sand or shingle form at the head of sheltered bays. Offshore, the coast is fringed with beds of Giant Kelp *Macrocystis pyrifera*, which grows to about 30 m depth, while inshore, the Bull Kelp *Duroidia antarctica* is found from sea level to 5 m depth. The tidal range is about 1 m. The south-west coast of the island is exposed to heavy wave action under the influence of the prevailing westerly wind and ocean swell. The north-east coast is more sheltered, but occasionally subject to the effect of long-distance ocean swell generated by northerly and, more rarely, easterly winds.

South Georgia lies in the Scotia Sea within the Antarctic Zone of the Antarctic Circumpolar Current, and about 217 miles (350 km) south of the Polar Front. It is surrounded by eastward-flowing Antarctic surface waters, with temperatures between 0°C and 4°C. Of major biological significance to the South Georgia marine ecosystem is the area to the north-east of the island where Antarctic Zone water meets colder waters that originate in the polar regions to the south and south-east of the island. Biological productivity is further enriched by favourable oceanic conditions created at the edge of the continental shelf, where depths increase rapidly to over 3,000 m. The continental shelf itself is relatively wide, extending for 31–93 miles (50–150 km) from the island. It is mostly less than 200 m deep, except for the deep submarine canyons which are the offshore extensions of many of the glaciated fjords on the island.

Horses, sheep, pigs, cats, dogs and other domestic animals were kept at the whaling stations in the past but are no longer present and none is known to have caused any significant environmental impact. However, the biodiversity of large areas of South Georgia has been modified by the introduction of three non-native species of mammals, the Norway Rat *Rattus norvegicus*, Reindeer *Rangifer tarandus* and the House Mouse *Mus musculus* and by the recent expansion of Antarctic Fur Seals *Arctocephalus gazella*, which have significantly modified the plant species composition of large areas of Tussac grassland in north-west South Georgia and reduced the area of suitable breeding habitat for certain Tussac-nesting bird species. The greatest threats to the terrestrial environment come from predation of birds and insects by Norway Rats and from damage to vegetation by Reindeer and Fur Seals. Rats are thought to have been introduced by sealing vessels in the late 1700s, and now occupy virtually the entire north-east coastline and the northern quarter of the south-west coast. In rat-infested coastal areas, South Georgia Pipits and smaller burrowing petrel species have been eliminated, and populations of White-chinned Petrels and Yellow-billed (South Georgia) Pintails significantly reduced. Reindeer are present on the central north coast region and have overgrazed significant areas of Tussac Grass *Parodiochloa flabellata*, Greater Burnet *Acaena magellanica* and various species of lichen; their selective grazing habits have encouraged the spread of the introduced Annual Meadow-grass *Poa annua*. Other common alien plant species include chickweed *Cerastium fontanum* and dandelions *Taraxacum officinale*, but none is considered to present a threat to the native flora.

South Georgia's high-altitude glaciated interior, together with its position south of the Antarctic Polar Frontal Zone and surrounded by cold Antarctic waters, results in a cooler oceanic climate than that of most other sub-Antarctic islands, and a harsher climate than expected from its latitude.

The orographic effects of the island's central mountain ranges greatly influence regional precipitation and weather. The south-west side and the extremities of the island, being exposed to the prevailing westerly weather systems, are typically cold, wet and cloudy with strong winds. The north-east coastal areas are more temperate, being sheltered by the mountain ranges and local topography. Here, the average annual precipitation is 1,600 mm, annual wind speed is 4.4 m

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per second, and annual temperature is +2°C with an absolute range of -19°C to +24°C. Winter and summer seasons are clearly defined, with temperatures averaging +4.8°C in the summer and -1.2°C in winter. Föhn winds produce localised rapid increases in temperature; katabatic winds associated with passing frontal systems may result in gusts of over 100 knots.

There are 25 species of vascular plants native to South Georgia, over 50 naturalised introduced vascular species, which mostly occur around the old whaling stations, and about 125 species of mosses, 80 of liverworts and 150 of lichens. There are no known endemic vascular plant species, although there are a few endemic bryophytes and lichens. There are no trees or shrubs, and only mosses and lichens survive in the inland rock and ice environment. Of the vascular plants, only seven develop extensive stands and dominate distinct communities. They are Tussac Grass *Parodioclhoa flabellata*, Greater Burnet *Acaena magellanica*, Tufted Fescue Grass *Festuca contracta*, Greater Rush *Juncus scheuchzerioides*, Brown Rush *Rostkovia magellanica*, Antarctic Hairgrass *Deschampsia antarctica* and the introduced Annual Meadow-grass *Poa annua*, which dominates areas grazed by Reindeer and trampled by seals and penguins. The vegetation changes with altitudinal and regional climatic differences, and seven main vegetation types are described. However, due to topographic and environmental gradients, much of the vegetation comprises a series of intermediate zones sharing floristic features of adjacent communities. Extensive areas of vascular vegetation are principally confined to low-altitude coastal areas and offshore islands, islets and stacks where the landscape is dominated by Tussac grassland, with *Parodioclhoa flabellata* dominant. This species extends from sea level to a maximum altitude of 200 m on the south coast and 400 m on the north coast. Short grassland, dominated by *Festuca contracta*, is widespread up to 200 m altitude on coastal areas of the central north coast; pure stands of *Acaena magellanica* herbfield occur most frequently in sheltered damp Tussac grassland but are absent in areas grazed by Reindeer. Mire and bog communities dominated by *Juncus scheuchzerioides* and *Rostkovia magellanica* occur wherever there are seepage slopes, streams and springs. Moss banks are dominated by *Polytrichastrum alpinum* and *Chorisodontium aciphyllum*. In wetter areas of the island in non-Reindeer areas, *Chorisodontium aciphyllum* is usually the dominant moss species, whereas *Polytrichastrum alpinum* is dominant in Reindeer areas where selective grazing has resulted in replacement of the original Tussac grassland by mosses. Fellfield communities consisting of scattered mosses, lichens and various vascular plants occur on dry stony ground in exposed windswept sites on the coast and on inland plateaux, screes, rock faces and mountain ridges.

There are no indigenous terrestrial mammals, reptiles, amphibians or freshwater fish. The terrestrial and freshwater invertebrate fauna is limited in terms of numbers and species diversity. It includes flies, mites, ticks, springtails, diving beetles, spiders, annelid worms and molluscs.

South Georgia has had the longest period of continuous human habitation and economic history of all sub-Antarctic

islands. Important commercial fisheries have been based at the island since the late 1700s, initially exploiting seals and whales, and currently taking Antarctic Krill *Euphausia superba*, Patagonian Toothfish *Dissostichus eleginoides* and Mackerel Icefish *Champscephalus gunnari*. Permanent habitations were established in 1904 with the construction of the first whaling station at Grytviken, followed by civil administration buildings at King Edward Point in 1912, and further whaling stations at Leith Harbour, Stromness, Husvik, Prince Olav Harbour and Ocean Harbour. The last whaling station closed in 1964 and, with the exception of Grytviken and King Edward Point, these sites are now uninhabited. The island was occupied continuously by military garrisons from 1982 to 2001, and military exercises and visits of inspection are carried out on a regular basis.

There are three centres of human population on the island, at Bird Island, Grytviken and King Edward Point. Government Officers appointed by the Commissioner are resident at the island's administrative centre at King Edward Point. Although there is no permanent human population, four long-term residents in the employ of the government live at King Edward Point and nearby Grytviken. With the exception of the Post Office at King Edward Point, there are no public service facilities, nor are there any land-based manufacturing industries. User organisations include the British Antarctic Survey, the South Georgia Museum, an international fishing fleet and the Armed Forces of the United Kingdom. Non-resident British Antarctic Survey research and support personnel are present year-round at the applied fisheries research station at King Edward Point, which houses about eight people in the winter and up to 18 in the summer, and at the Bird Island research stations with four people in the winter and up to 10 in the summer. Cargo to the island is shipped from the UK by British Antarctic Survey vessels and from the Falkland Islands by government-chartered fisheries protection vessels. Sources of government revenue are principally fishing and transshipping licences, augmented by passenger landing fees, vessel harbour dues and philatelic sales. Annually, about 6,000 people visit South Georgia. The majority are recreational visitors arriving on cruise ships that regularly include the island as part of their Antarctic Peninsula itineraries during the summer months. Other visitors include yacht crews and contract workers, researchers, military personnel and passengers on a variety of vessels associated with resupply, research, fishing and military activities. Ship-based tourist activities include shore landings and Zodiac cruising, with occasional sub-aqua diving, camping, mountaineering and kayaking excursions. The only land-based tourism facility on the island is the South Georgia Museum at Grytviken. There are no accommodation facilities for tourists on the island, although climbing and scientific expeditions are permitted to camp, and both day and longer-term visitors occasionally occupy the six field huts on the central north coast.

South Sandwich Islands

The South Sandwich Islands are a remote chain of 11 uninhabited volcanic islands and associated islets, rocks and stacks lying between approximately 56°S and 60°S and 26°W and 28°W in the South Atlantic sector of the Southern Ocean.

South Georgia and the South Sandwich Islands

From north to south, the major islands are Zavodovski, Leskov, Visokoi, Candlemas, Vindication, Saunders, Montagu, Bristol, Bellingshausen, Cook and Thule. They lie in a north-south direction over a distance of 239 miles (385 km) and on average are spaced about 25 miles (40 km) apart. The southern coast of Thule Island is less than 37 miles (60 km) north of the 60th parallel, which defines the northern limit of Antarctica Treaty area. The nearest land masses to the group are South Georgia, some 342 miles (550 km) west-north-west, and the South Orkney Islands, about 497 miles (800 km) west-south-west.

The majority of islands are heavily glaciated volcanic cones. The total land area of the archipelago is 27,760 hectares, of which about 85% is covered in permanent snow and ice, which starts at about 300 m altitude. Thule, Visokoi, Montagu, Bristol and Cook Islands are almost entirely ice covered. Volcanic heat has created large ice-free areas on Zavodovski and Candlemas Islands, and Saunders, Leskov, Vindication and Bellingshausen Islands are virtually ice free. Freshwater bodies are limited to a few small ponds on one or two islands.

The archipelago's highest point is Mount Belinda at 1,375 m on Montagu Island. The summits of Cook, Saunders and Visokoi Islands are approximately 1,000 m; that of Thule is 725 m; Zavodovski and Candlemas Islands are both 550 m; and the remainder are between 250 m and 450 m altitude. Geologically, the islands are of recent volcanic origin, composed mostly of basalts and basaltic andesites from the Scotia Arc continental crust. Eight of the 11 islands have been known to be volcanically active within the past 100 years, and subsequently the seabed, coastline and inland areas may be subject to rapid topographical changes. Volcanic and fumarolic activity was recorded in the 1960s on Visokoi, Leskov and Thule Islands. In 1997, active summit craters were observed on Zavodovski, Candlemas, Saunders and Bellingshausen Islands, and in 2004 Mount Belinda on Montagu Island erupted. There have been no signs of recent volcanic activity on Vindication and Cook.

The archipelago lies south of the Polar Frontal Zone and on the eastern rim of the Scotia Plate, about 80 miles (128 km) west of the 7,000 m deep-sea South Sandwich Islands trench with a maximum depth of 8,265 m. Depths between the islands are mostly over 2,000m. Biologically, they are included in the maritime Antarctic biogeographical zone. There are no indigenous terrestrial mammals, reptiles, amphibians or freshwater animals. The invertebrate fauna is typical of the maritime Antarctic zone and includes mites, springtails, nematodes, rotifers and tardigrades.

Virtually the entire 124 miles (200 km) total of coastline is sheer vertical rock or ice, with very few beaches or low-lying,

level ice-free terrain. Offshore, the local bathymetry is occasionally modified by submarine eruptions, with uplifting and subsidence of the ocean floor and shorelines. There are very few sheltered coastal areas and all shorelines are exposed to heavy wave action under the influence of the prevailing westerly wind and ocean swell. Neither *Macrocystis pyrifera* nor *Durvillea antarctica* have been recorded, and most littoral zones are steep and lack any shelving reefs below the reach of tides and ice scour, with the result that shallow-water fauna and marine algae are thought to be relatively impoverished, and similar to that of the South Orkney Islands. There is no information available for tidal ranges.

The islands are exposed to weather from the prevailing westerly and south-westerly air flows. Mountain summits are almost always hidden by low cloud, with frequent fog and snow. Cloudless days are rare. During most winters, the islands are completely surrounded by pack ice, which usually disperses in November.

The archipelago's flora is considered to belong to the maritime Antarctic zone, although it is relatively poor in species composition compared to the South Orkneys and South Shetland Islands. This is thought to be due to the islands' extreme geographical isolation and the volcanic activity that is continually modifying terrestrial habitats. There is only one species of vascular plant, Antarctic Hairgrass *Deschampsia antarctica*, recorded from Candlemas Island only. A variety of bryophytes, lichens and hepatics grow on rocky crests, boulder scree, coastal cliffs and areas permeated by summer meltwater. Algae, notably *Prasiola crispa*, occur extensively in areas adjacent to penguin colonies. Of significance are the unique vegetation complexes of hepatics and mosses that form around warm, damp fumaroles.

With the exception of a brief period of human occupation of Thule Island from 1976 to 1982, the South Sandwich Islands have never been inhabited. An Argentine refuge hut was constructed on Thule in 1954, and in 1976 at the same site an Argentine naval and meteorological station was established and permanently occupied until 1982. The station was destroyed in 1983 by British military forces. Commercial fisheries included exploitation of the islands' Fur Seal population in the 1800s, hunting of whales during the 20th century, and currently Patagonian Toothfish may be taken under licence within the South Georgia and South Sandwich Islands Maritime Zone. The islands are visited infrequently by military vessels, cruise ships, yachts and research vessels during the summer months, with occasional brief landings and some camping by scientific and film expeditions. Adverse weather and sea conditions usually limit tourist activities to ship-based inshore viewing of the penguin colonies.

Ornithological importance

South Georgia

South Georgia holds one of the world's most abundant and diverse seabird communities, whose total breeding population probably exceeds 30 million pairs. In the late 1970s, it was thought that Macaroni Penguins, Antarctic Prions, Common

Diving-petrels, South Georgia Diving-petrels and White-chinned Petrels numbered at least 2 million breeding pairs each. These were only rough estimates and there is evidence of subsequent declines of Macaroni Penguins and White-chinned Petrels. Blue Petrels are also abundant. There are six species of

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penguin, four species of albatross and 13 species of smaller petrel and related species, including nine burrow-nesting petrels. There is one landbird, an endemic passerine, the South Georgia Pipit, and there are five waterbird species including two species of waterfowl – the Yellow-billed (South Georgia) Pintail and the Speckled Teal – the latter believed to be a relatively recent arrival from South America or the Falkland Islands. Three endemic sub-species/taxa have been recognised. They are the Yellow-billed (South Georgia) Pintail and the Imperial (South Georgia) Cormorant, which are confined to the island group, and the Antarctic (South Georgia) Tern. A total of 45 species of vagrants have been recorded from the island and its inshore waters.

Ten species of global conservation concern breed at South Georgia. These are the Endangered Black-browed Albatross, Vulnerable Wandering Albatross, Grey-headed Albatross, Macaroni Penguin, Southern Giant-petrel and White-chinned Petrel, as well as the Near-threatened Gentoo Penguin, Light-mantled Albatross, Northern Giant-petrel and South Georgia Pipit.

Under BirdLife's Endemic Bird Area categorisation system, the island qualifies as a Secondary Area (s037) because of the restricted-range South Georgia Pipit, which is confined to South Georgia and its offshore Tussac islands.

Seven of the island's *Procellariidae* taxa are protected under the Agreement for the Conservation of Albatrosses and Petrels (ACAP). These are the Wandering Albatross, Black-browed Albatross, Grey-headed Albatross, Light-mantled Albatross, Southern Giant-petrel, Northern Giant-petrel and the White-chinned Petrel.

In global terms, South Georgia is the most important breeding site for Grey-headed Albatrosses and White-chinned Petrels, the third most important site for

Wandering Albatrosses (after the Prince Edward Islands and the Crozet Islands) and the second most important site for King Penguins (after the Crozet Islands), and the third most important site for Black-browed Albatrosses (after the Falkland Islands and Islas Diego Ramirez, Chile). Well over half the world population of White-chinned Petrels, Grey-headed Albatrosses, Antarctic Prions and Common Diving-petrels breed here, as do nearly half of King Penguins and Gentoo Penguins and possibly Blue Petrels, and around one-quarter of Macaroni Penguins (subject to revision as the population has declined significantly in recent years). Wandering Albatrosses, Northern Giant-petrels, Brown Skuas *Catharacta lonnbergi* and Snowy Sheathbills *Chionis albus* account for 20% or more of the world populations, and Black-browed Albatrosses and Southern Giant-petrels for approximately 15%.

South Sandwich Islands

In total 16 bird species – 13 seabirds and three waterbirds – breed at the South Sandwich Islands, including an endemic sub-species of the Imperial (South Georgia) Shag, which is thought to be confined to the island group, and three species of global conservation concern. These are the Near-threatened Gentoo Penguin, the Vulnerable Macaroni Penguin and Southern Giant-petrel. The last is protected under the Agreement for the Conservation of Albatrosses and Petrels.

The archipelago contains important breeding sites for a number of colonial seabirds, the most abundant being the Chinstrap Penguin, Adelie Penguin, Macaroni Penguin and the Southern (Antarctic) Fulmar, with at least 10,000 pairs estimated for each. It is the second most important global breeding site for Chinstrap Penguins (after the South Shetland Islands), with over one-third of the world's population, and its populations of Snow Petrels, Cape Petrels and Southern (Antarctic) Fulmars are believed to be of global significance.

The occurrence and presence of globally threatened species at Important Bird Areas in South Georgia and the South Sandwich Islands

	GS001	GS002
Black-browed Albatross (EN)	X	
Wandering Albatross (VU)	X	
Grey-headed Albatross (VU)	X	
Southern Giant-petrel (VU)	X	X
White-chinned Petrel (VU)	X	
Macaroni Penguin (VU)	X	X
Gentoo Penguin (NT)	X	X
Light-mantled Albatross (NT)	X	
Northern Giant-petrel (NT)	X	
South Georgia Pipit (NT) (A2)	X	

Conservation infrastructure and Protected Area system

Management of all aspects of South Georgia and the South Sandwich Islands' environment and of all human activities occurring there is the responsibility of the Commissioner for the Government of South Georgia and the South Sandwich Islands (SGSSI). Decisions relating to international treaties and the obligation to ensure that relevant international law is implemented are the responsibility of the Commissioner in conjunction with the Foreign & Commonwealth Office in the UK. Protection for the environment is provided for by SGSSI national legislation, which was undergoing review at the time of writing.

The primary instrument for environmental protection is the Falkland Islands Dependencies Conservation Ordinance of 1975. Other subsidiary legislation includes the Wild Mammals and Birds (Export) Regulations. These provide for the designation of Protected Areas and visitor areas in the territory, for regulations to protect fauna and flora, including the prohibition of the introduction of non-indigenous species, and for the export under licence of wild animals and birds. Under the current provisions of the Ordinance, all native plants, birds and mammals (except whales and dolphins) are protected, as are the introduced Reindeer. Fur seals are also afforded maximum protection as a Specially Protected Species under the Protocol on Environmental Protection to the Antarctic Treaty. The Fisheries (Conservation and Management) Ordinance of 1993 provides for the regulation of conservation and management of the fishing waters around the islands, and includes internal waters, the territorial sea (defined as inshore waters up to 12 nautical miles seaward of specified sites on the islands) and the Maritime Zone, which extends south to 60°S latitude and up to 200 nautical miles (370 km) from the outer boundary of the territorial sea. Regular surveillance of the zone is maintained by fisheries protection vessels, and a rigorous framework of licensing ensures that the government's conservation and management obligations under the the Convention on the Conservation of Antarctic Marine Living Resources are respected. These ordinances and regulations are expected to be amended in accordance with a revision of those environmental policies presented in 2000 in the *Environmental Management Plan for South Georgia* (McIntosh and Walton 2000), which emphasised protection of indigenous wildlife and ecosystems, and suggested a more comprehensive system of site protection in the form of proposed Protected Areas, Environmentally Sensitive Areas and Open Areas for the entire island and its offshore islands, stacks and territorial waters, but not including the South Sandwich Islands.

Under the 1975 Ordinance, three categories of managed area were created at South Georgia: Specially Protected Areas (SPAs), Sites of Special Scientific Interest (SSSIs) and Areas of Special Tourist Interest (ASTIs). These designations limit access and activities at certain areas. SPAs were designated to preserve natural ecological systems from any interference. SSSIs were designated to prevent scientific investigations being jeopardised by disturbance. Permits to enter these areas are issued only for compelling scientific purposes that cannot be served elsewhere. ASTIs were designated specifically for tourism on the assumption that they are representative areas of wildlife and scenic beauty where the effects of tourist activity may be systematically assessed. No SPAs, SSSIs or ASTIs have been designated at the South Sandwich Islands.

The most important threat to the conservation value of the territory, and of South Georgia in particular, is seabird bycatch arising from fisheries activities outside the Maritime Zone. Introduction and translocation of exotic animal and plant species pose a significant threat to breeding sites. Despite the global importance of South Georgia and the South Sandwich Islands as major seabird breeding locations there are no internationally recognised sites such as World Heritage Sites or Biosphere Reserves on these islands and only three sites are protected for conservation under national legislation. The South Sandwich Islands have no environmental management plan and, critically, no areas have been designated for conservation and so have no form of site protection whatsoever.

International measures relevant to the conservation of sites

International treaties that have been ratified by the United Kingdom and extended to South Georgia and the South Sandwich Islands include the Convention on the Conservation of Migratory Species of Wild Animals 1979 (Bonn Convention), which includes an Agreement on the Conservation of Albatross and Petrels (ACAP), ratified in 2004; the Convention on Trade in Endangered Species 1973 (CITES); the Convention on Wetlands of International Importance 1999 (Ramsar Convention), which provides for the protection of wetlands; and the Convention on Biological Diversity 1992. Of relevance to South Georgia is that the United Kingdom has signed the Convention for the Protection of Seals 1978 and, most importantly, the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR 1980), which applies to both South Georgia and the South Sandwich Islands.

Overview of the inventory

South Georgia

The site comprises the whole of South Georgia and its islands, islets and stacks, covering the entire territory (1,450

square miles/3,755 square km) with all its natural habitats and including the littoral zone, together with the marine habitat of the South Georgia and South Sandwich Islands

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Maritime Zone. They provide for all resident landbirds and seabirds. Most of the island is completely unprotected, although under the 1975 Conservation Ordinance, two areas have been designated ASTIs and three islands (Bird Island, Cooper Island and Annenkov Island), which support significant seabird colonies, are protected as SPAs or SSSIs. Several other areas and islands have been proposed as Protected Areas (PAs) and Environmentally Sensitive Areas (ESAs), but without enforcing legislation.

South Sandwich Islands

A single Important Bird Area (IBA) has been identified, covering the entire group of 11 islands and adjacent islets and stacks (27,760 hectares) together with the marine habitat out to 12 nautical miles. None of the islands is protected under current legislation.

Although virtually all areas at South Georgia have been surveyed ornithologically, the quality of survey has been of variable precision, with the exception of Bird Island where monitoring of colonies of a range of designated species is conducted annually as part of the Commission for the Conservation of Antarctic Marine Living Resources Ecosystem Monitoring Programme. Bird population estimates for the South Sandwich Islands are derived mainly from boat-based broadscale unvalidated surveys conducted in 1997 and 1998, with ground counts for all surface-nesting species at Candlemas Island. Data for cliff-, burrow- and crevice-nesting species are imprecise or

lacking. The inventories for these IBAs are, therefore, unlikely to be exhaustive.

The degree of precision with which the IBA criteria have been applied to species at South Georgia varies significantly due to the variable precision of population data. With the exception of breeding pair estimates for Bird Island, and those for populations of Wandering Albatrosses, Black-browed Albatrosses and Grey-headed Albatrosses throughout the whole of South Georgia, all other published population data are of variable precision and based on surveys carried out at least 20 years ago. Additionally, only the data for Chinstrap Penguins, Gentoo Penguins and Imperial (South Georgia) Shags were thought to be reasonably accurate at the island level at the time of survey. All other ground-nesting seabird population data are based on broad-scale unvalidated surveys. Estimates for the South Georgia Pipit, Yellow-billed (South Georgia) Pintail and all species of burrowing petrels are based on estimates of area of suitable breeding habitat and likely to be the least accurate. Furthermore, it is known that the sizes of some populations have changed considerably in the past two decades. For example, King Penguins have undergone an estimated 11% per annum increase, Macaroni Penguin breeding populations appear to have halved and those of White-chinned Petrels, Black-browed, Grey-headed and Wandering Albatrosses declined by up to 30%.

Sites of global conservation importance

IBA code	Site name	A1	A2	A4i	A4ii	A4iii
GS001	South Georgia	X	X	X	X	X
GS002	South Sandwich Islands	X			X	X

When calculating qualifying thresholds, the three sub-species that breed on the islands are not considered to be full species.

Site accounts

GS001: South Georgia: mainland, islands, islets and stacks

Ref number	GS001
Admin region	South Georgia and the South Sandwich Islands
Coordinates	54°17'S 36°47'W
Area	375,500 ha
Altitude	0–2,965 m
IBA categories (details below)	A1, A2, A4i, A4ii, A4iii
Status	Mainly unprotected

Site description

The site comprises the whole of South Georgia and associated islands, islets and stacks, as well as the marine habitat out to 12 nautical miles, as described in the 'General introduction' to this chapter.

Birds

See the accompanying table for details of key species (note the date given refers to the year the census was conducted and not the date of publication). A total of 31 bird taxa are known to breed and there are 17 resident seabird species. Of these, the Blue Petrel, Common Diving-petrel, Grey-backed Storm-petrel, Fairy Prion and Black-bellied Storm-petrel are confined virtually exclusively to rat-free areas. The majority of Antarctic Prions, South Georgia Diving-petrels and Wilson's Storm-petrels also breed in rat-free Tussac areas, although some populations occur at the higher inland margins of vegetated land if rats are present lower down. South Georgia is the most northerly known breeding site for Adelie Penguins and Snow Petrels. The island has more vagrant records than any other sub-Antarctic island, reflecting its proximity to the South American continent and its location in the path of prevailing westerly winds. Bird Island has the highest bird diversity of any area at South Georgia, with a total of 25 confirmed breeding species, followed by Annenkov Island with 24, and Cooper Island and Willis Islands with 20 species, respectively.

Other threatened/endemic wildlife

Antarctic Fur Seals *Arctocephalus gazella* (3 million individuals and increasing), Southern Elephant Seals *Mirounga leonina* (400,000 individuals) and Weddell Seals *Leptonychotes weddelli* (30 adult females) breed on South Georgia. Leopard Seals *Hydrurga leptonyx* and Crabeater Seals *Lobodon carcinophagus* are regular visitors. There are no endemic plants. About one-third of the 230 species of arthropod fauna are endemic. One species is preyed upon by an introduced carabid. All insects are at risk of predation by rats and mice. There are 70 species of freshwater invertebrate and six species of spider. The coastal waters are inhabited by small numbers of Orcas *Orcinus orca* (LR/cd), Southern Right Whale *Eubalaena australis*, Blue Whale *Balaenoptera musculus*, Fin Whale *B. physalus*, Sei Whale *B. borealis*, Minke Whale *B. acutorostrata*, Humpback Whale *Megaptera novaeangliae*, Sperm Whale *Physeter catodon*, Southern Bottlenose Whale *Hyperoodon planifrons*, Long-finned Pilot Whale *Globicephala melas*,

Hourglass Dolphin *Lagenorhynchus cruciger*, Spectacled Porpoise *Australophocaena dioptrica*, and unidentified beaked whales.

Conservation issues/threats

The site includes two ASTIs, two SSSIs and one SPA, all proclaimed in 1975. The two SSSIs and the SPA have been included in the list of five proposed Protected Areas, and all rat-free areas have been proposed as Environmentally Sensitive Areas, but without enforcing legislation. Predation on seabirds by rats, overgrazing of native vegetation by Reindeer, degradation of vegetation and soil erosion caused by Fur Seals, and the introduction of alien plants and insects are altering the native flora and fauna of large areas of the site. The greatest and most immediate threat to the terrestrial environment is the introduction and spread of Norway Rats. Despite the unique biodiversity of South Georgia's rodent-free areas, the majority of them, and notably the entire rat-free mainland coast, are completely unprotected. Increased glacial retreat and global warming may present additional potential threats if the ice barriers that currently isolate rat-free areas disappear. Rats were successfully eradicated from Grass Island (30 ha) in 2000 and the government has expressed an intention to support further eradication programmes, including extirpation of at least one of the two herds of introduced Reindeer. Trawl and longline fisheries are believed to be the major cause of mortality of South Georgia's Wandering, Black-browed and Grey-headed Albatrosses, and White-chinned Petrels. Fishing activity within the Maritime Zone around South Georgia is regulated by internationally adopted measures agreed by the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). Measures taken to reduce the number of birds killed within the zone have proved to be extremely effective, and regular fisheries surveillance ensures there are no illegal or unregulated fishing activities. However, it is apparent that the lack of seabird bycatch mitigation measures in fishing activities outside the zone continues to generate high rates of incidental seabird mortality, reflected in the current 4% annual decline in the breeding populations of Wandering and Black-browed Albatrosses. Other threats include pollutants from vessels wrecked on the islands' shores, the dispersal of pollutants (believed to be minimal) from vessels passing through territorial waters and from the abandoned whaling stations, and the indiscriminate use of deck and ice lights on vessels within the Zone, resulting in mortality of burrowing petrels in

Important Bird Areas in the United Kingdom Overseas Territories

Key species

Criteria	Key species	Number of breeding pairs (if known)
A1, A4ii	Wandering Albatross <i>Diomedea exulans</i>	2,857 (2004)
A1, A4ii	Black-browed Albatross <i>Thalassarche melanophrys</i>	90,600 (2003)
A1, A4ii	Grey-headed Albatross <i>Thalassarche chrysostoma</i>	77,436 (2003)
A1, A4ii	Southern Giant-petrel <i>Macronectes giganteus</i>	5,000 (1987)
A1, A4ii	Northern Giant-petrel <i>Macronectes halli</i>	4,310 (1987)
A1, A4ii	White-chinned Petrel <i>Procellaria aequinoctialis</i>	2,000,000 (1979)
A2	South Georgia Pipit <i>Anthus antarcticus</i>	3,000 (2004)
A4i	Antarctic Tern <i>Sterna vittata georgiae</i>	2,500 (1979)
A4i	Yellow-billed (South Georgia) Pintail <i>Anas georgica georgianus</i>	1,000 (1987)
A4i	Imperial (South Georgia) Shag <i>Phalacrocorax (atriceps) georgianus</i>	10,322 (1997)
A4ii	King Penguin <i>Aptenodytes patagonicus</i>	450,000 (2002)
A4ii	Gentoo Penguin <i>Pygoscelis papua</i>	105,000 (1987)
A4ii	Macaroni Penguin <i>Eudyptes chrysolophus</i>	<1,000,000 (2004)
A4ii	Light-mantled Albatross <i>Phoebastria palpebrata</i>	7,500 (1976)
A4ii	Cape Petrel <i>Daption capense</i>	10,000 (1987)
A4ii	Blue Petrel <i>Halobaena caerulea</i>	70,000 (1979)
A4ii	Antarctic Prion <i>Pachyptila desolata</i>	22,000,000 (1979)
A4ii	Wilson's Storm-petrel <i>Oceanites oceanicus</i>	600,000 (1979)
A4ii	Black-bellied Storm-petrel <i>Fregetta tropica</i>	10,000 (1979)
A4ii	South Georgia Diving-petrel <i>Pelecanoides georgicus</i>	2,000,000 (1979)
A4ii	Common Diving-petrel <i>Pelecanoides urinatrix exsul</i>	3,800,000 (1979)
A4ii	Brown Skua <i>Catharacta lonnbergi</i>	1,000 (1979)

South Georgia and the South Sandwich Islands

Key species (contd)

Criteria	Key species	Number of breeding pairs (if known)
A4ii	Snowy Sheathbill <i>Chionis alba</i>	2,000 (1979)
A4iii	More than 10,000 pairs of seabirds breed regularly at this site	

particular. Expansion of the Fur Seal population at South Georgia is significantly impacting seabirds in areas of high seal density, through destruction of breeding habitat in Tussac grassland. Yellow-billed (South Georgia) Pintails and South Georgia Pipits are also affected. Loss of protective foliage cover leads to increased skua predation; burrow entrances may be blocked or damaged by seals, and courting Wandering Albatrosses may abandon traditional display sites. The disturbance from the repeated passage of seals has resulted in a redistribution of nest sites for this species and for Giant-petrels in certain areas, and the disappearance of breeding populations of Antarctic Prions and Blue Petrels in the areas that are worst affected.

Further reading

See full details at end of chapter.

Berrow *et al.* (2000), Croxall and Kirkwood (1979), Croxall and Prince (1979, 1983), Croxall *et al.* (1984), Headland (1984), Lewis Smith and Tallowin (1979), McIntosh and Walton (2000), Poncet *et al.* (2006), Prince *et al.* (1994), Prince and Payne (1979), Thomas *et al.* (1983), Trathan and Daunt (1996), Woehler and Croxall (1997).

Site accounts

GS002: South Sandwich Islands

Ref number	GS002
Admin region	South Georgia and the South Sandwich Islands
Coordinates	55°36'S 27°00'W
Area	27,760 ha
Altitude	0–1,375 m
IBA categories (details below)	A1, A4ii, A4iii
Status	Mainly unprotected

Site description

The site comprises the whole of the South Sandwich Islands and associated islands, islets and stacks, as well as the marine habitat out to 12 nautical miles, as described in the 'General introduction' to this chapter.

Birds

See the accompanying table for details of key species. A total of 16 seabird taxa are known to breed. There are no resident landbird species. In addition to those given below, populations include two pairs of King Penguins, recorded breeding on Zavodovski Island in 1997, the most southerly known breeding location for this species. There are no accurate estimates for burrow-nesting species but it is likely that the combined populations for Antarctic Prions, Black-bellied Storm-petrels and Wilson's Storm-petrels total a few tens of thousands of pairs. The only known population of Antarctic Prions occurs on ice-free Leskov Island. Black-

bellied Storm-petrels have been recorded nesting on the stable ice-free areas of Candlemas, Saunders and Zavodovski Islands, while Wilson's Storm-petrels are believed to nest on every island in the group. Imperial Shags nest in small colonies on coastal and offshore rock stacks, mainly around Montagu and Bristol Islands, with a total population of 300–400 pairs. Kelp Gulls and Antarctic Terns nest in small numbers, with possibly up to 100 pairs of each. Nearly one million pairs of Chinstrap Penguins nest on Zavodovski Island. This island is also the most northerly breeding location for Southern (Antarctic) Fulmars, which nest on the steep cliffs of all islands except Bellingshausen. Two-thirds of this species' population breed on Cook, Montagu and Visokoi Islands. Cape Petrels and Snow Petrels nest in scattered colonies on all islands, often in association with Southern (Antarctic) Fulmars. Adelie Penguins nest in small colonies on Thule, Candlemas, Montagu, Cook, Bristol and

Key species

Criteria	Key species	Number of breeding pairs (if known)
A1, A4ii	Southern Giant-petrel <i>Macronectes giganteus</i>	2,000–4,000
A4ii	Chinstrap Penguin <i>Pygoscelis antarctica</i>	1,500,000
A4ii	Adelie Penguin <i>Pygoscelis adeliae</i>	8,000–15,000
A4ii	Gentoo Penguin <i>Pygoscelis papua</i>	2,500–5,000
A4ii	Macaroni Penguin <i>Eudyptes chrysolophus</i>	55,000
A4ii	Cape Petrel <i>Daption capense</i>	8,000–9,000
A4ii	Southern (Antarctic) Fulmar <i>Fulmarus glacialisoides</i>	70,000–110,000
A4ii	Black-bellied Storm-petrel <i>Fregatta tropica</i>	100s–1,000
A4ii	Brown Skua <i>Catharacta lonnbergii</i>	700–1,000
A4iii	More than 10,000 pairs of seabirds breed regularly at this site	

South Georgia and the South Sandwich Islands

Bellingshausen Islands, with a large colony of around 50,000 pairs on Saunders Island. With the exception of two pairs of Adelie Penguins breeding on Annenkov Island at South Georgia, the population on Candlemas Island is the most northerly known for this species. Gentoo Penguins and Macaroni Penguins breed in small numbers among the Chinstrap Penguins on Thule, Visokoi, Candlemas and Saunders Islands. The latter species also breeds on Zavodovski Island, where there are over 50,000 pairs, the largest population in the archipelago. Southern Giant-petrels breed on two islands only, with over 1,500 pairs on Candlemas and possibly similar numbers on Zavodovski.

Other threatened/endemic wildlife

Antarctic Fur Seals *Arctocephalus gazella* breed in small numbers on Zavodovski, Visokoi, Candlemas, Thule and Saunders Islands, with nearly 1,800 pups recorded in 1997. Small numbers of Elephant Seals *Mirounga leonina* and Weddell Seals *Leptonychotes weddelli* are present but there has been no confirmed breeding. Leopard Seals *Hydrurga leptonyx* and Crabeater Seals *Lobodon carcinophagus* are regular visitors. No endemic plants have been recorded.

Conservation issues/threats

The single most important issue regarding the conservation

value of the South Sandwich Islands is the lack of site protection and an environmental management plan. Localised volcanic activity such as recent eruptions at Montagu Island presents a natural threat to seabird colonies where lava flows, ash deposits and earth tremors significantly modify seabird breeding habitat. Non-breeding species potentially at risk from fisheries activities while foraging in these waters include albatrosses and White-chinned Petrels, although regulation of fishing activity within the Maritime Zone around the islands by the SGSSI Government within the CCAMLR framework is such that the level of incidental seabird mortality is negligible. The incidence of bird strike due to use of deck lights and ice lights at night is unknown, and is unlikely to be a threat to the archipelago's burrowing petrel populations.

Further reading

See full details at end of chapter.

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