From this we calculated the number of pairs at each site and hence a total population value. Results will be published in an upcoming scientific paper.

What is the outcome for the British Antarctic Territory? We now know that our part of Antarctica has ten emperor colonies (21% of the total number of colonies), four of them newly found (Fig. 3), and over 25% of the world's population of this charismatic animal. This study will provide a baseline to monitor future change.

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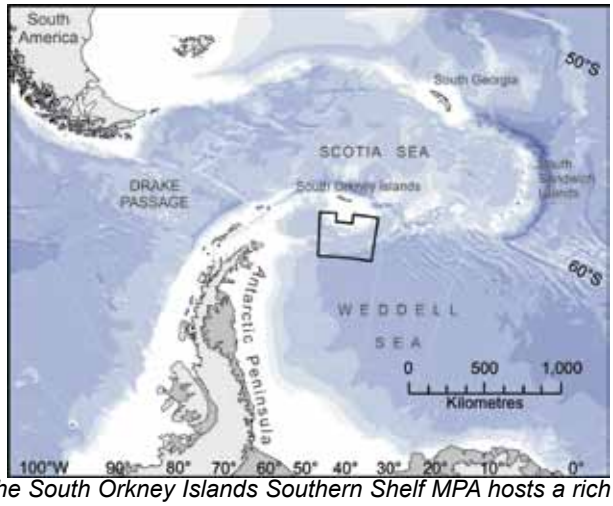
Identifying marine areas for conservation in British Antarctic Territory (BAT602)

Through a project funded by the Overseas Territories Environment Programme, the UK has been at the forefront of Antarctic marine conservation. Outcomes from the project, led by Dr Phil Trathan and Dr Susie Grant from the British Antarctic Survey, resulted in the designation of the world's first marine protected area (MPA) located entirely within the 'High Seas'. The South Orkney Islands Southern Shelf Marine Protected Area was agreed by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) in November 2009.

The MPA covers a large area of the Southern Ocean, south of the South Orkney Islands. The MPA was the result of four years of development work. It is just less than 94,000 square kilometres,



The South Orkney Islands Southern Shelf MPA hosts a rich biodiversity of benthic organisms, comparable to known sites such as the Galapagos.

which is more than four times the size of Wales. No fishing activities and no discharge or refuse disposal from fishing vessels are allowed in the area. This will allow scientists to better monitor the effects of human activities and climate change on the Southern Ocean.

The marine protected area for the South Orkneys includes important sections of an oceanographic feature known as the Weddell Front, which marks the northern limit of waters characteristic of the Weddell Sea and the southern limit of the Weddell Scotia Confluence. The Weddell Scotia Confluence is a key habitat for Antarctic krill, one of the main species harvested in the Antarctic and a key focus for CCAMLR. The MPA also includes important foraging areas for Adélie penguins that breed at the South Orkney Islands, and important submarine shelf areas and seamounts, including areas that have recently been shown to have high biodiversity.

The South Orkneys MPA will thus better conserve marine biodiversity and forms the first link in a representative system of marine protected areas for the Antarctic. Planning to develop the other parts of the system are under active consideration by CCAMLR scientists. The network will help conserve important ecosystem processes, vulnerable areas, and create reference sites that can be used to make scientific comparisons between fished areas and no-take areas. Such networks will become increasingly important as climate change impacts become increasingly evident in the future.

In acknowledgment of the achievement made by CCAMLR, the World Wide Fund for Nature has awarded CCAMLR with a very prestigious award – a *Gift to the Earth* (GttE). The GttE award recognises the commitment of CCAMLR to delivering a representative system of MPAs by 2012, in time to meet the recommendations of the *World Summit on Sustainable Development* in 2002.

CCAMLR entered into force in 1982, all Members of the Commission have fisheries or research interests in the Southern Ocean. The Commission operates as a fisheries management framework for the Southern Ocean, but, unlike a conventional management forum, CCAMLR is an intrinsic part of the Antarctic Treaty System. It therefore has wider conservation responsibilities or the Southern Ocean and the wider Antarctic ecosystem.

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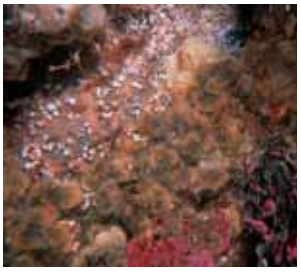
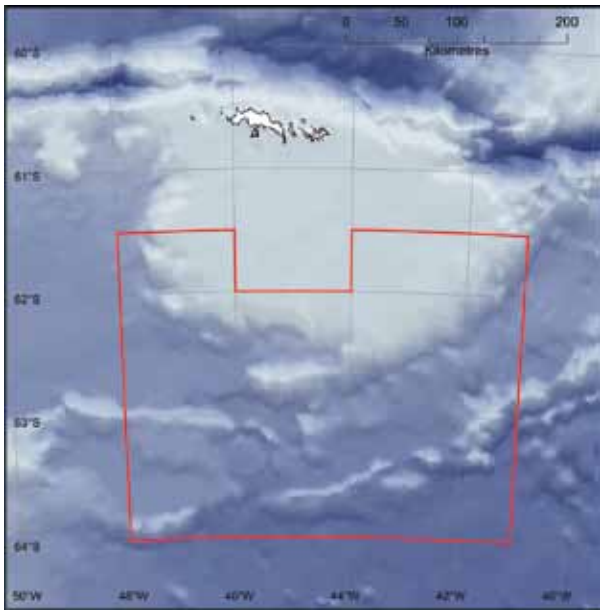


Example of benthos found in the area. Photos: BAS



Map showing location of the new marine protected area, south of the South Orkney Islands. The new status of the area will be enforced by CCAMLR Member states.

Ocean climate and Rockhopper penguin foraging strategies (FAL603)

The New Island Reserve and research facilities which the New Island Conservation Trust provides have again been fortunate in receiving funds from OTEP for an important research project. New Island, sited on the far-west side of the Falkland Archipelago and on the edge of the Falkland Current, is in a prime position for such research. Here large numbers of

seabirds breed as a result of this current and the food resources it offers. Rockhopper penguins have suffered a dramatic population decline, which it is believed, is linked to oceanographic conditions.

Several studies are currently investigating the breeding biology, foraging patterns and diet composition of rockhopper penguins at New Island.

The OTEP-funded project *Ocean climate and rockhopper penguin foraging strategies* investigates the foraging behaviour and foraging areas used by breeding rockhopper penguins during different stages of the annual breeding cycle. During the breeding season 2009-2010, 40 individuals were equipped with GPS data loggers during the incubation, guard and crèche stages. These data loggers allow us to identify the different foraging areas used by adults during the breeding season as well as their diving behaviour. Temperature sensors incorporated in the devices, allow us to relate the birds' behaviour to small scale ocean climate. To identify inter-annual differences, we will continue the study during the breeding season 2010-2011. Results will be related to remote sensing data, such as satellite images of sea surface temperature and chlorophyll. So far, we have shown that male rockhopper penguins during the incubation period, forage vast distances away from the colony on the Patagonian shelf, whereas birds of both sexes stay closer to the colony during all other breeding stages. This indicates good food availability around New Island.

Diet composition of rockhopper penguins at New Island is determined mainly by stable isotope analysis. Using different tissues formed during the breeding season (egg membranes, chick down, blood samples), during moult (adult feathers) and during winter migration (toe nails and blood taken on arrival of the birds at the start of the breeding season). These allow us to identify differences in diet composition and areas used for foraging during the non-breeding season. Carbon stable isotopes change with latitude, and from benthic to pelagic environments, while nitrogen stable isotopes give information about the trophic level (e.g. fish reflects higher nitrogen isotope levels than crustaceans). To better interpret the isotopic values found in penguin tissues, the Fisheries Department of the Falkland Islands kindly provided fish and squid samples, one of the main prey species of rockhopper penguins.

Rockhopper Penguins passing through the electronic weigh-bridge being used to gather some of the data for this project. *Photo: Laurent Demongin*

Our work on rockhopper penguins at New Island includes also studies on breeding success and chick growth. Nests were followed through the entire season and chicks were weighed from hatching to fledging to obtain growth curves. At the end of the breeding season, we marked a total of 100 chicks with micro-chips. Additionally, breeding adults were also marked with micro-chips during the entire breeding season. These birds can be detected when passing the automatic gateway system at the entrance of the colony which records transit times and masses. Micro-chips have been used on adults and chicks in previous years and the system therefore enables us to calculate return rates of adults and immatures over several years and also records nest attendance patterns and changes in body mass throughout the breeding season. Studies on breeding success and population dynamics are carried out in cooperation with Dr Maud Poisbleau and Laurent Demongin (previously Max-Planck Institute, currently University of Antwerp, Belgium).

Dr Maud Poisbleau and Belgian PhD student, Jeff van Camp preparing to take a Spectrometer measurement from the yellow crest of a Rockhopper. Photo: Georgina Strange, Design In Nature/NICT

The research on rockhopper penguins at New Island is currently funded by the Overseas Territories Environment Programme (OTEP) and by the Deutsche Forschungsgemeinschaft (DFG; fund QU148/1-ff) and supported by the New Island Conservation Trust and the Max-Planck Institute for Ornithology.

Project partners: Nina Dehnhard (PhD student) & Dr. Katrin Ludynia (Postdoc)
Group leader: Dr Petra Quillfeldt (Seabird Ecology Group, Max-Planck Institute for Ornithology, Vogelwarte Radolfzell, Germany)

Ian Strange & Georgina Strange. New Island Conservation Trust, New Island. furseal@horizon.co.fk

Heart Shaped Waterfall – public access and amenities, St Helena (STH502)

The Heart Shaped Waterfall is one of St Helena's most picturesque and iconic natural attractions, cascading one hundred metres down a perfectly heart-shaped cliff. Although close to the capital Jamestown, the waterfall is difficult to get to. The old path is overgrown with invasive scrub, and in places it is steep enough to deter all but the most adventurous. Even Napoleon, who resided less than half a mile away at the Briars, never reached it.

The St Helena National Trust is now opening up access to the waterfall by creating a new footpath and installing six bridges which were due to be completed in September. The new trail includes viewpoints, walkways and interpretation boards. Endemic plant species – including the rare Bastard Gumwood – have already been planted, so that visitors will one day be able to experience how the area might have looked to early settlers.

The Trust was generously donated the land up to the waterfall by the Honorary French Consul in 2007. The Overseas Territories Environment Programme provided the funding to complete this work.

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