BEST VOLUNTARY SCHEME FOR BIODIVERSITY AND ECOSYSTEM SERVICES IN TERRITORIES OF EUROPEAN OVERSEAS

BEST Initiative
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Identifying important marine areas for macaroni penguins (Eudyptes chrysolophus) in the UK and French Overseas Territories

This exciting and ground-breaking project aims to recognize the most important at sea areas for macaroni penguins, a globally endangered species, around the EU Overseas Territories (OTs), to have these designated by the appropriate authorities and to agree on management plans for them with stakeholders. The information collated through the project will contribute to the design of marine protected areas that are being actively developed at present by the South Georgia and South Sandwich Islands Government and the administration of the Natural Reserve of the French Southern Territories.
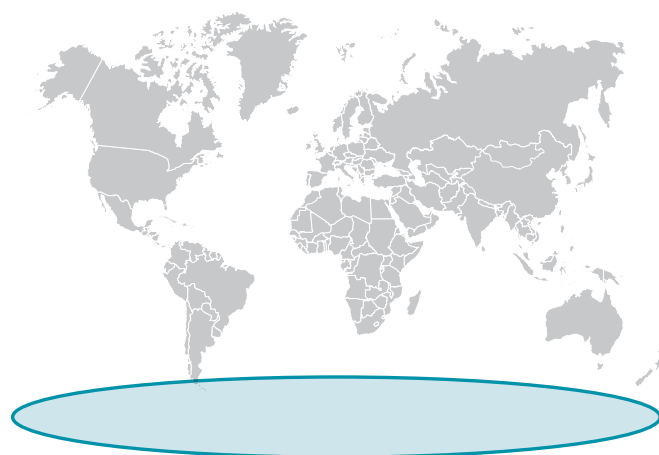
Description of the project

Among seabirds, penguins play a major role in the oceanic food webs although several species are rapidly declining. Large seabird breeding colonies throughout the world are recognised as Important Bird Areas (IBAs) and often receive formal site protection through governmental designation and management plans. However, the limit of these sites is the high water mark, and so the key marine foraging areas and commuting corridors which are vital to seabird survival and reproductive success generally receive no recognition or protection. Identifying important areas for seabirds in the marine environment is urgently required to overcome this problem and produce an ecologically coherent network of protected sites.

These issues are of special interest when considering macaroni penguins (*Eudyptes chrysolophus*) which are regarded as Globally Endangered by Birdlife International and the International Union for Conservation of Nature (IUCN). Macaroni penguins are the most important avian consumer of marine resources on the planet, and approximately 82% of the entire world population breeds within the UK and French OTs of South Georgia and the South Sandwich Islands, Crozet and Kerguelen. Numbers have declined substantially at South Georgia and in the Indian Ocean during the previous four decades. Reasons for the decline are not well understood, but changes in food availability brought about by environmental change are likely to be responsible and may be further compounded by increased competition with fisheries and growing populations of seals and whales around South Georgia. GPS- and satellite-tracking of macaroni penguins carried out at South Georgia, Kerguelen and Crozet will allow us to identify the most important at sea areas and marine habitat characteristics for penguins at the different breeding sites, and to create appropriate marine protected areas for this endangered species.

Our first results show the at-sea distribution of macaroni penguins breeding at South Georgia during the incubation stage. Shown is the time spent per sector at sea, with yellow and red indicating highest residency times, and therefore most intense use of specific areas by foraging macaroni penguins. Grey contours

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represent bathymetry, indicating the topography of the seafloor. The penguin's foraging trips during incubation are oriented to the north of South Georgia, where the birds appear to explore Antarctic Polar Front (APF) waters (indicated by red contours on the map). This indicates that the APF may play a key role for foraging macaroni penguins during the incubation phase of their breeding cycle.
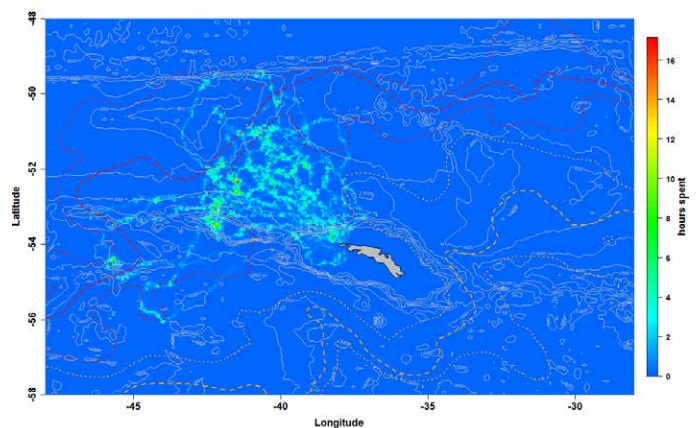
This project aims to identify the most important at-sea areas for macaroni penguins around the EU OTs. We shall use a series of cutting-edge modelling methods to arrive at a robust map of penguin distribution across their EU OT range at all stages of the season. This will lead to identification of important marine areas for macaroni penguins around these OTs, and will contribute towards the design of marine protected areas. We will host a workshop at which we will hope to achieve designation of the identified sites by the relevant authorities and agree upon appropriate management plans with stakeholders. The distribution and availability of preferred penguin habitats in relation to past variations of regional sea surface temperature will also be investigated. This information will be used to infer the potential for climate change to have influence over past and future population trends and requirements to adapt protected area boundaries in the future given realistic scenarios of global warming.

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