

# KEY HABITATS OF GREAT AUSTRALIAN BIGHT MARINE PREDATOR SPECIES

## At a glance

### Project title

Identifying areas of ecological significance for iconic species and apex predators in the Great Australian Bight

### Project summary

To synthesise and analyse existing and newly collected data on the at-sea distributions of apex and iconic predators in the GAB to better understand individual species distributions and habitats; identify key regions used by multiple species; and the role of oceanographic features in underpinning species distributions and migratory pathways.

### Project investigators

SARDI and CSIRO

### Program partners

CSIRO, BP, SARDI, the University of Adelaide and Flinders University are working on a \$20 million research program to better understand the environmental, economic and social value of the Great Australian Bight.

### Project contacts

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## Overview

The Great Australian Bight provides critical habitat to a range of apex predators and iconic species, yet why the region is of such great importance to these species is unknown. This project will integrate a diverse range of existing and newly collected data on the at-sea distributions of apex and iconic predators in the Great Australian Bight, to better understand individual species distributions and habitats and identify key regions utilised by multiple species. Such information will be critical to manage key habitats and potential impacts to apex predators and iconic species in the region.

This knowledge will improve information on species for conservation and management purposes; assist the management of impacts from human activities in the Great Australian Bight; and enhance the scientific basis for the development of management strategies and monitoring programs.



## The Challenge

The project will address key questions about the ecology of apex and iconic predator populations in the Great Australian Bight, including:

- their distribution throughout the Great Australian Bight;
- the key oceanographic processes underpinning apex/iconic predator distribution, foraging hot-spots, Areas of Ecological Significance (AES) and the timing of migrations into and away from the Great Australian Bight;
- how responsive apex/iconic predators are to spatial and temporal changes in upwelling and seasonal production;
- how species alter their foraging strategies in response to changes in these variable environmental states;
- where the shared oceanic, shelf-slope and neritic foraging habitats for apex predators and iconic species that constitute AES are located; and
- the connectivity between key habitats (migration paths, foraging and breeding) both within and outside of the Great Australian Bight.

**Left:** Animal tracking datasets help to identify areas of significance for iconic species and apex predators. A global view of some tracks are shown in the image.

## The Research

The project will utilise existing and newly acquired satellite, geolocated and aerial survey location data on a range of iconic species and apex predators in the Great Australian Bight to: i) develop habitat preference and at-sea distribution models; ii) identify Areas of Ecological Significance (AES) and key regions of inter-specific overlap; iii) relate biological and physical oceanographic features to foraging strategies and habitat preference; iv) identify seasonal and spatio-temporal patterns in distribution, abundance and habitat selection in the Great Australian Bight.

The project will use leading modelling techniques to integrate location data from satellite and geolocation tags from over 600 deployments covering at least eight species of seals, seabirds, sharks and southern bluefin tuna. It will also use aerial and acoustic survey data from dolphins and whales with environmental data to develop movement and habitat preference models, and ultimately identify Areas of Ecological Significance (AES) in the Great Australian Bight common to multiple species.

Such information will be critical to identifying and understanding the key habitat needs of species that ultimately underpin their conservation and management.



**Above:** Smart position or temperature transmitting tags are attached to sharks during off shore surveys. Data from these tags, including from the blue shark being released in the image above, is currently allowing researchers to assess the distribution and relative importance of previously undescribed oceanic habitats at the Ceduna Terrace and Fowlers Canyon located to the south of Eyre Peninsula.

## The Impact

This project will integrate and analyse one of the largest animal tracking data sets in the world to provide insights into why the Great Australian Bight region is so significant to apex predators and iconic species. A diverse range of existing and newly collected data on these species will be analysed using novel spatial modelling methods to better understand individual species distributions, habitats, and regions utilised by multiple species. Such information will be critical to manage key habitats and potential impacts to apex predators and iconic species in the region.

## The People

**Professor Simon Goldsworthy** leads the Threatened, Endangered and Protected Species (TEPS) Subprogram at (SARDI). His research has primarily focused on the foraging and population ecology of marine predators, and their trophic and operational interactions with fisheries and aquaculture.

**Dr Fred Bailleul** of SARDI contributes to the TEPS Subprogram. His research has primarily focused on behavioural ecology. He specialises in analysing tracks and behaviour of marine predators in relation to their oceanic environment

**Dr Toby Paterson** is a research scientist at CSIRO with specialist skills in analysing and modelling animal biologging and movement data.



**Left:** Oceanographic conductivity, temperature and depth tag fitted to an Australian sea lion male provide observations on the physical properties of the shelf environment where apex predators forage. Tags are provided through the Integrated Marine Observing System (IMOS). Their network provides the Great Australian Bight Research Program with valuable real-time data to better understand the physical and biological features of the region.

## For more information

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