

# Threatened, Endangered and Protected Species

## SARDI AQUATIC SCIENCES

The subprogram provides research and advice to managers and policy makers on issues associated with marine Threatened, Endangered and Protected Species (TEPS). This subprogram delivers high quality research on the foraging and population ecology of protected marine mammals, seabirds and fish, and their trophic and operational interactions with fisheries and aquaculture to support Government conservation and management, and ecological sustainable development objectives.

### Overview

The primary areas of research include the broad-scale study of the pelagic ecology of the eastern Great Australian Bight, with a focus on the role of small pelagic fish, and the effects of fishing on populations of fish, seabirds and marine mammals. Implicit in this research is an understanding of the trophic pathways that sustain commercial fish production and high-trophic level predator populations, and the development of ecological performance measures and reference points to assess the ecological sustainability of fisheries and ecosystem health.

The application of ecological models and ecological performance measures for management purposes, such as marine protected areas, and the application of high trophic level predators as sentinels of ecosystem and climate change are also being developed.

Other projects include research to support the conservation and management of TEPS, particularly the threatened Australian sea lion. This includes research on the species population and foraging ecology to support conservation and management objectives, and the development of mitigation strategies to reduce the impacts of fishery bycatch.

The subprogram has key capabilities in the ecology of marine mammals, seabirds, sharks, ecosystem trophodynamics, ecosystem based fisheries management, the ecological effects of fishing, protected species interactions with fisheries (operational and trophic), and protected species conservation and management. The subprogram is known nationally and internationally for its innovation in the use of biologging technology (satellite tracking and archival data loggers) as a means to elucidate the at sea behaviour high trophic level predators.



### Research Projects

- Establishing ecosystem based fishery management for the SA sardine fishery
- Mitigating seal interactions in the southern rock lobster fishery and gillnet sector of the Southern and Eastern Scalefish and Shark Fishery SA
- Developing population monitoring protocols for Australian sea lions
- Methods for distinguishing foraging ecotypes in ASL
- Recovery of fur seals populations at Macquarie Island
- The role of genetic and social factors in shaping alternate foraging strategies in Australian sea lions
- Movement patterns of pelagic sharks
- Threatened pelagic sharks in southern Australia: understanding their ecology to enhance development of conservation and management

### Recent Publications

Baylis, A. M. M.; Page, B. and Goldsworthy, S.D. 2008. Colony-Specific Foraging Areas of Lactating New Zealand Fur Seals. *Marine Ecology Progress Series* 361: 279–290

Baylis, A.M.M., Page, B. and Goldsworthy, S.D. (2008) Effect of seasonal changes in upwelling activity on the foraging locations of a wide-ranging central-place forager, the New Zealand fur seal. *Canadian Journal of Zoology* 86(8): 774-789

Goldsworthy SD., Page BC (2007) A Risk-Assessment Approach to Evaluating the Significance of Seal Bycatch in two Australian Fisheries. *Biological Conservation* 139: 269-285

Lancaster, ML, Goldsworthy SD, and Sunnucks P (2007) Multiple mating strategies explain unexpected mixing of New Zealand fur seals with two congeners in a recently recolonised population. *Molecular Ecology*. 16(24): 5267-5276

Lancaster, M.L., Bradshaw C.J.A., Goldsworthy, S.D. and Sunnucks, P. (2007) Lower reproductive success in hybrid fur seal males indicates fitness costs to hybridization. *Molecular Ecology*. 16(15): 3187-3197.

McKenzie, J., Page, B., Goldsworthy, S.D., and Hindell, M.A. (2007) Growth strategies of New Zealand fur seals (*Arctocephalus forsteri*). *Journal of Zoology (London)*. 272: 377-389.

#### Staff

A/Prof. Simon Goldsworthy

Subprogram Leader/Principal Research Scientist

A/Prof Goldsworthy has played a major role in recent years in greatly expanding the knowledge base of the biology and ecology of temperate pelagic ecosystems in Australia. He coordinates a number of significant research programs that focus around foraging and population ecology of pelagic predators, and their trophic and operational interactions with commercial fisheries. He has over 20 years of experience studying a range of pinniped, seabird and fish species, has published over 60 scientific papers and supervised 17 PhD and 13 Honours students. He has honorary positions with the School of Biological Sciences, Flinders University (Full Academic Status) and the School of Earth & Biological Sciences, Adelaide University (Affiliate status).



Paul Rogers  
Senior Research Scientist

Paul has worked on a range of research projects over the past nine years including the population assessment of a range of pelagic fishes, seabirds and marine mammals. These projects have involved conducting research in offshore shelf waters of the Great Australian Bight (GAB). He also co-supervised a field program aimed at assessing benthic performance indicators for the GAB Marine Park's Benthic Protection Zone. His main area of expertise is in the life history and ecology of pelagic finfish and sharks. He has extensive experience in the analysis of spatially-related fishery and ecological data.

#### Contact

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