

11 Marine Ecological Processes and Prediction (MEPP)

Leader: Dr David Brewer

11.1 Overview

Ensuring Australia's and the region's food security through sustainable fisheries production and aquaculture while conserving key habitats and species is the objective of national policy objectives such as the Sustainable Harvest Strategy (*Securing our fishing future*, 2005), marine bioregional planning, the National Representative System of Marine Protected Areas and the *Environmental Protection & Biodiversity Conservation Act 1999*. Australia established four National Research Priorities in 2002, including An Environmentally Sustainable Australia, with goals for the sustainable use of marine biodiversity, responding to climate change and variability, and transforming existing industries to reduce their impact on the sea.

The Marine Ecological Processes and Prediction (MEPP) Program addresses key components of the national research priorities and Australian policy objectives by understanding the dynamics of oceanic and coastal ecosystems and providing the knowledge base to inform both policy-making and the sustainable management of marine resources through the provision of observational data tools and models.

The Program's science leaders are recognised as national or international authorities in their fields research: Dr Russ Babcock (Pol-Eureka Prize winner), Dr Nic Bax (Joint Professorial appointment with University of Tasmania), Dr Rodrigo Bustamante (PEW Fellow), Dr Peter Last (Whitely Medal winner), Dr Anthony Richardson (ARC Future Fellow, Joint appointment with University of Queensland), Dr Ron Thresher (Don McAllister medal nominee), and Dr Chris Wilcox (Gates foundation-World Bank award winner). The impact of MEPP scientists can be seen in strong publication metrics, with an average of 76 peer-reviewed Journal publications produced per year during 2005-09.

The integration of MEPP Program capabilities in large scale integrated field programs and data collection, remotely sensed and high-end technological data collection, specialist knowledge in key community types, and quantitative ecological data analysis with other CMAR capabilities in the Integrated Marine and Coastal Assessment and Management (IMCAM) and Marine Biogeochemistry (MB) programs provides a powerful national capability in assessing and delivering understanding of Australia's marine systems. For example, MEPP teams have led research to assess and understand the drivers and dynamics of offshore pelagic systems (apex predators, mesopelagics, plankton communities, and linked benthic habitats) to describe the spatial, temporal, and trophic dynamics and ultimately to deliver a spatially adaptive management system for sub-tropical and temperate pelagic fishery resources. Other teams have assessed the impacts of trawling on a diverse and comprehensive range of tropical communities and species (turtles, sharks, rays, fish, invertebrates, sea birds) resulting in world-class information underpinning leading fisheries management practices.

Authoritative contributions have been made to understanding the impacts of climate change on marine communities and program staff were instrumental in designing the National Representative System of Marine Protected Areas being implemented by the Australian Government.

Bringing together the skills to deliver solutions to complex issues increasingly requires the forging of strong relationships with other groups. The MEPP Program works in collaboration with other CSIRO divisions (CSIRO Sustainable Ecosystems, CSIRO Mathematical & Informatics Sciences). The Program provides the leadership of the national Prediction and Management of Marine Biodiversity Research Hub, a government-funded collaboration among Australian marine researcher agencies that provides strategic advice to decision-makers and products that contribute directly to marine bioregional planning. The Program's capability is enhanced by use of key infrastructure such as the Marine National Facility, the Australian National Fish Collection (ANFC), for which MEPP provides the managing capability and also key users of the facility, acoustic and physical sampling and observation equipment, molecular laboratories, seawater systems and other facilities.