Parks Australia science news

July 2019

Welcome to the fourth edition of the Parks Australia science news. In this issue our feature story is on the project to establish an ecosystem health benchmark for Ashmore Reef Marine Park. We also update you on the results of cat control trials on Christmas Island, and reveal the latest discoveries from our Bush Blitz survey in the ACT.

Ashmore Reef Marine Park: an Indian Ocean oasis

In the aqua blue waters off northern Western Australia, two days sail from Broome, sits Ashmore Reef Marine Park. Recognised nationally and internationally as a biodiversity hotspot, much of the park is a Sanctuary Zone, affording it Australia's highest level of marine protection. It is also a wetland of international importance under the Ramsar convention.

Ashmore Reef Marine Park is one of 58 Australian Marine Parks that, as a network, help to protect Australia's offshore marine environment. The marine park comprises two lagoons and three islands (East, Middle and West) within its outer boundaries. These sheltered waters support seagrass beds, corals and associated reef fish, a small dugong population and foraging habitat for marine turtles. At West Island Lagoon, zoned Recreational Use, permanent moorings provide a holdfast and shelter for traditional Indonesian fishing boats, intrepid yachties and the occasional tourism vessel.

Ashmore is the region's largest emergent reef—this means that, in places, the corals breaks the ocean surface, creating areas of permanent land. Covered with sand and low lying vegetation, West, Middle and East Islands offer rare and important resting, feeding and breeding habitat for a diversity of species in a vast oceanscape. Migratory shorebirds, en route to sunnier climes, stop to replenish energy supplies on their long journeys; seabirds gather here in thousands to breed; and green, hawksbill and the occasional loggerhead turtle come here to nest.

Encompassing 583 km2, Ashmore Reef Marine Park extends far beyond the reef's outer boundary, protecting pelagic and seafloor habitats as well. Here, ocean currents from the Indian Ocean, Timor and Arafura Seas drive enhanced productivity in an otherwise low-nutrient environment.

Ashmore Reef has been protected since the late 1980s but its remoteness presents some very real challenges for research and management. To date, efforts to understand and monitor Ashmore's ecosystems have been sporadic. Furthermore, a variety of research methods have been used which has made tracking changes over time difficult. In July 2018, a new management plan for Australian Marine Parks in Australia's North-west came into effect (North-west Marine Parks Network Management Plan 2018). A key marine science objective is to strengthen our understanding of the health of ecosystems in this remote marine park through monitoring the condition of the environment over time. In line with this objective, a monitoring project was established to undertake a whole of ecosystem "health-check" of Ashmore Reef Marine Park, the first of its kind for the park.

Prolific birdlife at Ashmore Reef Marine Park. Image: Parks Australia & CSIRO.

Project objectives

This monitoring project will help improve our understanding of the natural values of the marine park, including the:

- population status and diversity of seabirds and shorebirds;
- composition and cover of native vegetation (on the islands), seagrass and corals; and

- abundance and diversity of key marine species—in particular sea cucumber, trochus (a type of sea snail) and giant clam, each historically harvested by Indonesian fishers—and mobile fish communities.

To improve management outcomes, the project will also focus on the interactions between species, including those that provide resilience within the ecosystem, and those of potential pressure on conservation efforts, including:

- interactions associated with non-native invasive species, specifically buffel grass, tropical fire ants and the Asian house gecko, and

- interactions between nesting seabirds, plants, ants and those within different plant communities.

Brown boobies raising a chick. Image: Parks Australia & CSIRO.

Getting out in the field

CSIRO successfully tendered for the Ashmore Reef project in late 2018 and the field surveys were

completed in May and June 2019. Given the project's scale, the work was divided into two voyages: the first focused on the terrestrial components and the second on the marine.

A highly experienced research team came together to complete the voyages, combining cutting edge science techniques with tried and tested methodologies, to build on historical survey efforts. Excitingly, this project incorporated state of the art remote sensing technologies to count seabirds, map vegetation and create detailed digital elevation models. The use of eDNA, extracted from water samples, was also explored to assess its application in monitoring some of the rarer or more cryptic marine species, such sea snakes and certain fish. Innovative field methodologies such as these are critical for both overcoming limitations noted in previous studies and increasing the efficiency of future work.

In addition to collecting core data, the team took advantage of this rare in-field opportunity to undertake counts of dugong and hermit crabs, and establish temperature data loggers to record changes in sand temperature over time.

The field work has now been completed and the team are back in the lab. Preliminary observations from the field suggest the marine park is in reasonably good shape, but we won't know for certain until the data is analysed. Final results are due in early 2020.

CSIRO scientists surveying vegetation. Image: Parks Australia & CSIRO.

The management application

As marine park managers, the information and understanding developed from this project will enable us to assess changes in ecosystem health, evaluate the impacts of previous management interventions and inform the development of future programs and activities. The aim of this project was to establish an ecosystem benchmark for the marine park, and the work undertaken will contribute greatly to achieving this.

Stay up-to-date on the progress of this project via the **Australian Marine Park Science Atlas**, **Australian Marine Parks website** or our social media accounts.

If you're interested in hearing about future Australian Marine Park research opportunities, please check the AusTender website or email marineparks@environment.gov.au.

Installing temperature loggers among turtle nests. Image: Parks Australia & CSIRO.

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