Ningaloo

WAMSI Node 3

The Foraging and Population Ecology of Manta Rays within Ningaloo Marine Park

Photo courtesty of Meg Green

Manta rays in Ningaloo

Manta rays have become an important tourism icon within the Ningaloo Marine Park (NMP), however little is known of their habitat use and ecology. In an effort to better protect manta rays and their critical habitats, this project aims to determine base line population information as well as what attracts manta rays to certain high use areas of the park.

Background

Manta rays, as with other large sharks and rays, have been shown globally to be vulnerable to human impacts such as fishing, habitat loss and tourism, which at present are relatively low within NMP. As prey-specific predators who target the larvae of many reef animals present in plankton, the presence or absence of manta rays over time may be a key indicator of the seasonal health of the tropical reefs they inhabit.

With human pressures increasing within NMP it is important to obtain baseline ecological information such as population size and habitat use. Suitable management of this iconic animal requires an understanding of residence times, seasonal behaviours and effect of disturbance, all of which are addressed in this project.

As the largest year-round consumer of plankton, manta rays are a significant predator within the NMP ecosystem. Knowledge of where they sit in the local food chain (using a combination of manta tissue and samples of various prey items) will give us a better understanding of their dependence on plankton provided by the Ningaloo Reef relative to the open ocean. Tissue samples will also be used for genetic analysis to help determine linkages within the entire west coast population.

Photographic records of individuals with unique markings have been used to determine the demographics of the population, while the collection of

microscopic plankton throughout the area has confirmed that the presence of food is one of the main reasons for seasonal aggregations of manta rays.

Acoustic tracking has been used as part of an Australia wide study (the Australian Animal Tracking and Monitoring System) to determine habitat use and movement patterns within the park for a number of individuals.

Getting to know the manta rays of Ningaloo

To date over 500 manta rays have been identified in NMP, including a small 'core' group of mainly mature females who appear to be resident year round in the park and a large seasonal transient population of mature males and juveniles.

Preliminary information gathered from the acoustic tags demonstrated that some transient individuals travelled throughout the entire park within a single month possibly searching for seasonal pulses of food, whilst several animals (both resident and transient) were found to travel outside the park into Commonwealth waters and to dive to depths greater than 100 metres.

The core group regularly visits oceanographically unique areas where tides and currents produce large areas of slack water. Here, they target pulses of plankton, as well as seasonal larvae of 'reef resident' sea-floor crustaceans such as crabs and prawns. The transient population arrives en-masse in late summer/ early fall to make the most of abundant prey attributed to coral spawning events.

Photographic identification shows that the local tourism industry, which operates year round, interacts mainly with the core group of resident animals. However new animals are also encountered in highly productive and often cryptic key areas during courtship activities, or during seasonal pulses of prey.

Manta ray responses to human interactions are being monitored over time to determine if anecdotal reports of changing behaviour are happening. It appears that the level of disturbance and the success of the in-water interaction with manta rays depends on the original behaviour of the manta. For example, if an animal is feeding on high density prey it is rarely disturbed but an individual which is sporadically feeding, being 'cleaned' by wrasse or engaged in courtship behaviour is easily disturbed.

The protection of critical habitat for manta rays along with protection from disturbance is important to maintain the health of the current manta ray population. Should human pressure through disturbance by tourism or other activities cause the rays to avoid key feeding or nursery areas, it could have wider implications for the health of the population and its role in the Ningaloo ecosystem as well as the ultimate success of the manta ray tourism industry.

Next steps

This study has focused primarily on an area of high tourism pressure near Coral Bay in the centre of NMP. Further research is required along the remainder of the west coast where additional manta ray aggregations are known to occur.

Genetic analysis of geographically separate populations as well as the work done here will determine the need for state-wide protection of this species.

In addition there is a second highly migratory species of manta ray (oceanic manta rays) which visits NMP during the whale shark season. This larger species is known to be under considerable global fishing pressure yet we know even less about its migratory routes. Future research will target the prey preferences of this species within the Park and its migratory routes beyond.

This project is part of a doctoral thesis which will be provided to the Western Australia Marine Science Institution (WAMSI) upon completion. Additional support has been provided through a BHP Billiton scholarship. The photographic identification component of this project was catalysed by funding from Coastwest in 2005.

Photo courtesy of Meg Green

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