Ningaloo

WAMSI Node 3

Ecological and genetic connectivity of rays at Ningaloo Reef

Understanding stingrays

Researchers are investigating the movement patterns, population structure and mating systems of stingrays at Ningaloo Reef, to gather information that is essential to the conservation of the species.

At Ningaloo and in other tropical regions, large stingrays are plentiful along coral reefs and are an important part of the ecosystem. They are also economically significant as a food source, particularly in developing countries, and increasingly, as a tourist attraction.

Rays also have unique life-traits such as slow growth, late maturity and low reproductive output that make them extremely vulnerable to over-fishing.

In spite of their environmental and economic roles, very little is known about the demography, population structure and ecology of tropical stingrays - information that could ensure effective management of these keystone species.

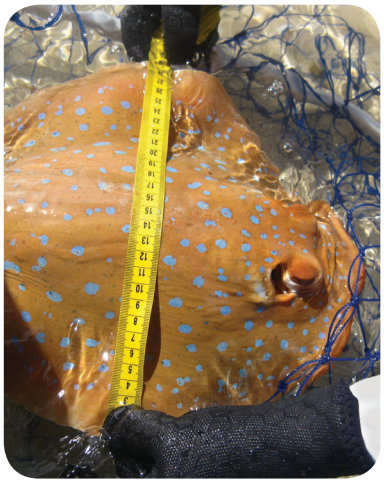
Using acoustic tags and an array of over 100 listening stations spread throughout Ningaloo Reef, researchers are able to follow local movements, determine site fidelity and the influence of oceanographic factors such as water temperature and tides on their movements. Also the influence of age (juvenile or adult) on their migrations can be determined with the acoustic monitoring.

Tissue samples have also been taken to assess the genetic structure of populations and identify patterns of gene flow.

Preliminary outcomes

Results so far have indicated that:

- the centres of activity of juvenile stingrays are concentrated within the limits of the Mangrove Bay Sanctuary Zone however, they frequent larger areas of the reef and occasionally venture outside of the lagoon
- adults of one of the largest species studied (shovelnose ray) reported movements of 130km within a month
- adults of the smallest species studied (blue-spotted fantail rays) show a clear sex-biased migration pattern, where males spent most of the time in deeper waters outside of the reef, and females spent most of their time within 2km of the shoreline in the shallow lagoons of the sanctuary zone
- the broad habitat requirements of these species and sex-biased dispersal mean that sanctuary boundaries are not effective in protecting all life history stages of different species, however ongoing data collection would be required to confirm this preliminary result.



Analysis of both ecological and genetic approaches will continue, and the final results of this project will be released as part of a PhD thesis to be completed in 2012 that is looking at ecological and genetic connectivity of rays at Ningaloo Reef.

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