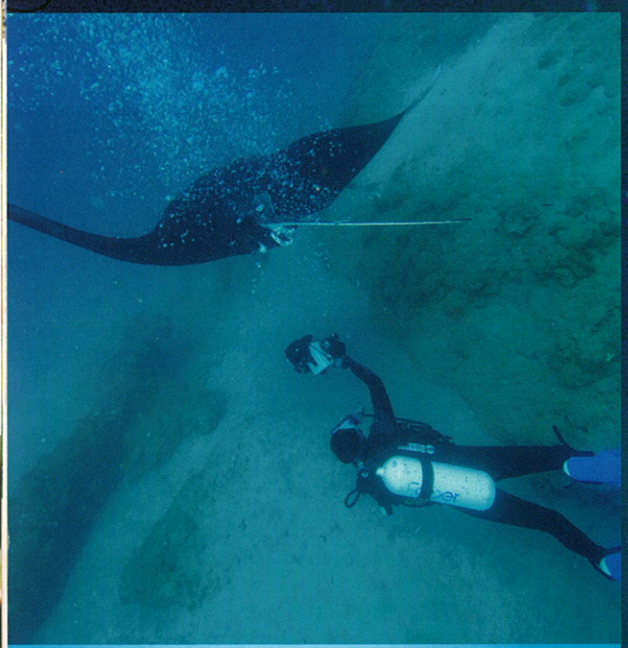
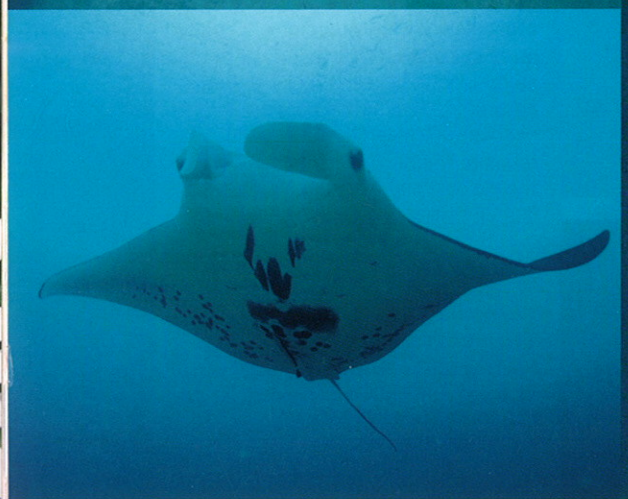
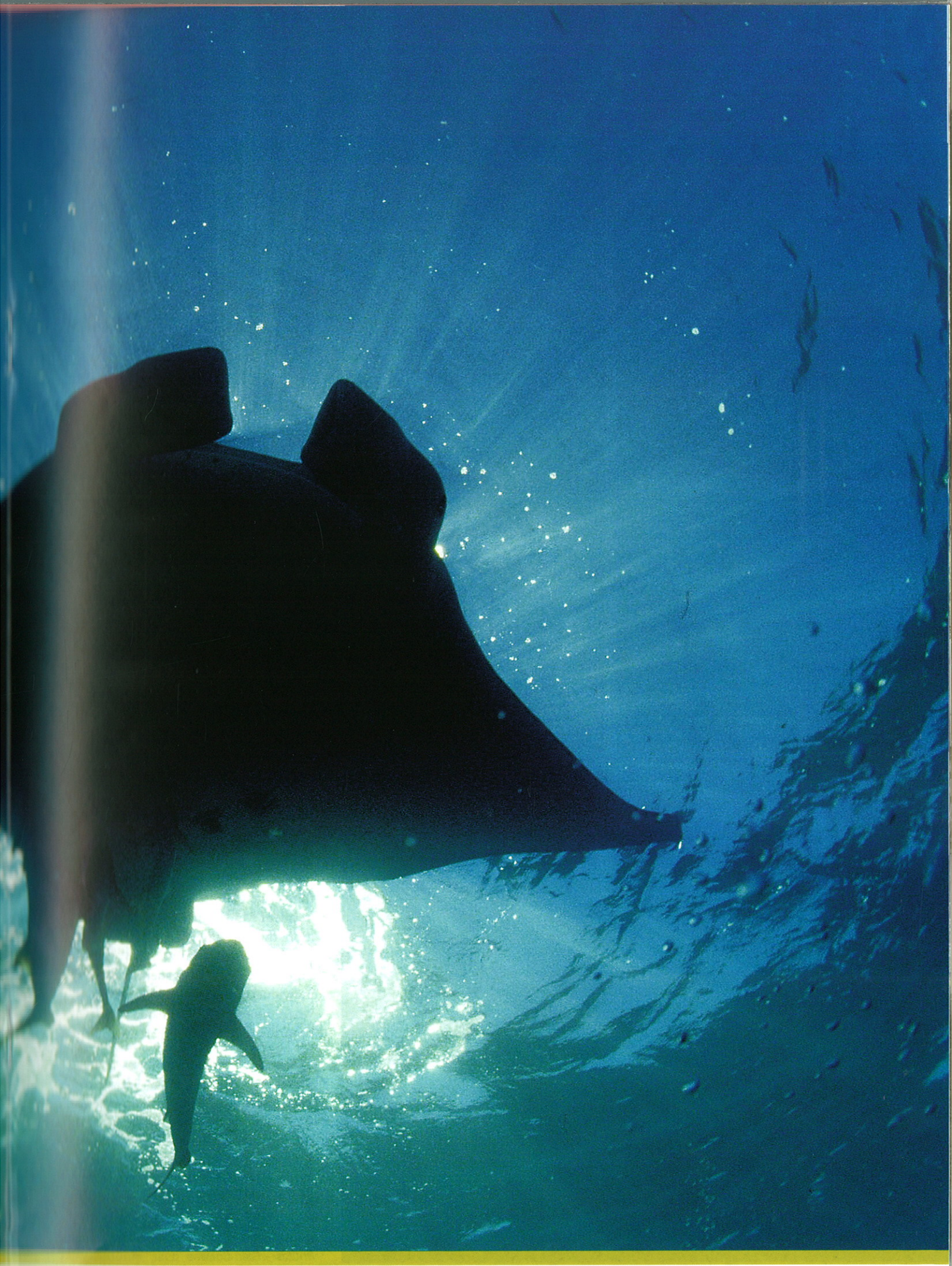
Marvellous mantas





Swimming with manta rays has become a popular activity for tourists at Coral Bay. But how are we ensuring our fascination with these creatures is not altering their natural behaviour and why is this important?

by Brad Daw, Frazer McGregor and Samille Mitchell



It's mid morning as the snorkellers enter the ocean near Coral Bay and peer into the watery darkness. They swim in unison, excitedly watching, until slowly, a ghostly black shape begins to emerge.

It's hazy at first but as the manta ray moves closer they can make out its wings, its tail, its filter-feeding mouth. It flies by them with supreme grace, a gentle flap of its wings propelling it effortlessly forward. The manta ray suddenly banks, arching itself upwards. Doing a 'loop the loop', the manta starts feeding on a pocket of plankton. The snorkellers delight and swim after the magnificent creature, in awe of its beauty and grace.

Such an experience is an everyday occurrence at Coral Bay in Ningaloo Marine Park where tour operators offer the chance to swim with manta rays. But are such interactions altering the lives of the very animals these people have travelled so far to admire?

The manta ray

Manta rays (*Manta* spp.) are the world's biggest rays, with wingspans reaching up to seven metres across. Unlike some rays, manta rays are regarded as relatively harmless to humans as they contain neither a stinging barb nor functional biting teeth.

With the largest brain-to-body ratio of any shark or ray, manta rays may be just as curious about us as we are of them. They often approach boats and swim alongside scuba divers and snorkellers. Although they may approach humans, direct contact can be harmful to them as touch can remove their mucus membrane, causing lesions and infections on the skin.

These gentle giants inhabit tropical waters across the world where they are increasingly popular as ecotourism ventures. Sadly they are also commonly seen in fish markets, a by-catch of ever-increasing global gill net fisheries. In Australia, without direct fishing pressure, their conservation status is currently deemed to be secure.

Manta rays are filter feeders, feeding mostly on zooplankton and fish larvae by filtering water through their gills as they swim. Manta rays are known to frequent 'cleaning stations' near reefs where small fish swim into their gills and over the skin to eat parasites and remove dead skin in a mutually beneficial relationship.

Manta rays are renowned for their grace, effortlessly 'flying' through the water. They are also powerful enough to propel their entire body out of the water if startled or to escape a predator or suitor—an amazing sight for anyone lucky enough to witness it.

Ningaloo mantas

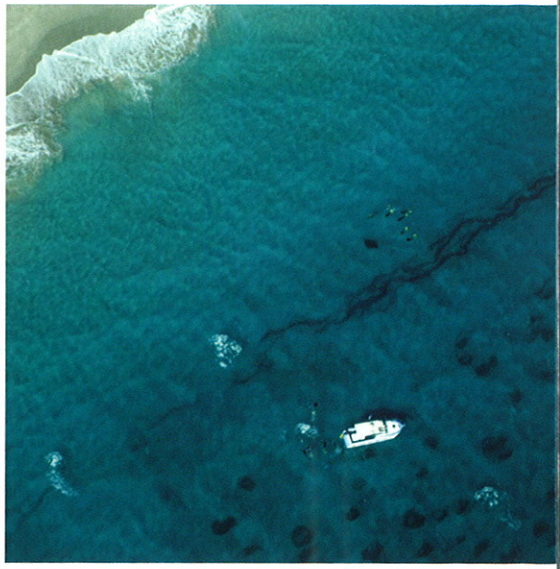
The Ningaloo Coast of Western Australia is thought to harbour a globally significant manta ray population, with ongoing observations revealing that the most consistent large aggregations in the marine park occur in and around Bateman Bay, a 20-minute boat ride north of Coral Bay. Bateman Bay is also the prime location for one of the most popular and rapidly growing tourism activities in the area—manta ray interaction tours.

In 2006, the Coral Bay Progress Association obtained funding from Coastwest to set up the Manta Ray Monitoring and Education Program. This program is using the unique ventral pattern on manta rays to photographically identify individual rays. As of early May 2009, more than 470 individual manta rays had been sighted during in-water interactions within the relatively small Bateman Bay area. Most of manta rays were seen foraging within 200 metres of the beach, or at shallow lagoonal cleaning stations. Of these, more than one third have been re-sighted, with some 'resident' individuals now recorded more than 40 times.

Worldwide, only two other similar programs have identified more individual manta rays—in Mozambique, where more than 850 manta rays have been identified over five years, and in

Previous page
Main Manta ray.
Photo – Clay Bryce/Lochman Transparencies

Insets Diver filming manta ray.
Manta ray.
Photos – Glen Cowans



Top left A snorkeller obtaining an identification photograph.
Photo – Meg Green

Top Manta ray interaction often occurs very close to the beach.
Photo – Marianna Tombini

Above Diver on Ningaloo Reef.
Photo – Glen Cowans

the Maldives where a long-running program has recorded well over 1,000 individuals, throughout the Maldivian archipelago.

The results of the Ningaloo program to date indicate that the Bateman Bay lagoonal area and the greater Ningaloo Reef complex are highly significant for manta rays in a national and global context.

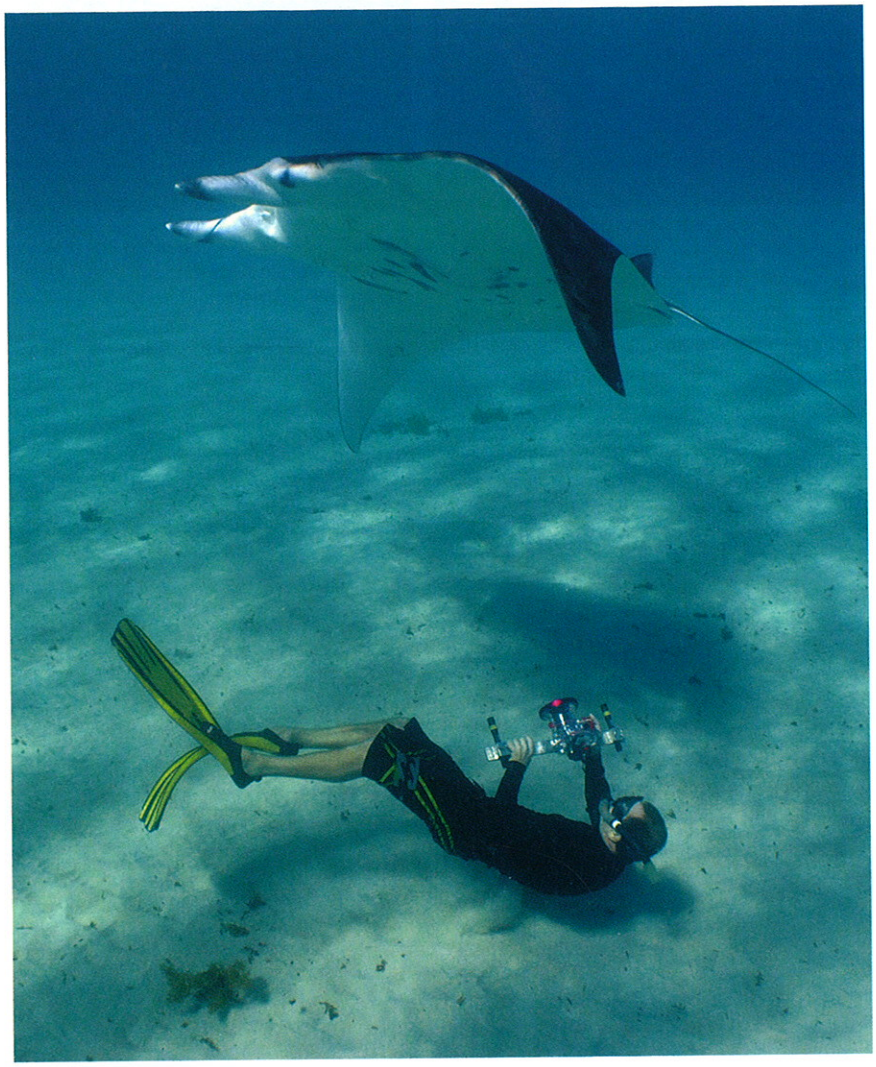
Why Ningaloo?

So why is Ningaloo such an important area for manta rays? The answer could lie in the reliable food sources available to these remarkable creatures. Studies at Ningaloo have revealed that manta rays will forage alone or in schools of up to 100 individuals, changing their foraging behaviour from slow bottom skimming to elaborate somersaults depending on the density and size of zooplankton swarms. These foraging behaviours are commonly seen within the shallow lagoon of Bateman Bay, sometimes as close as two metres from the beach, and offshore on shallow banks and in deeper channels inside the barrier reef crest.

A PhD project run through Murdoch University is investigating the exact nature of these planktonic fluxes to determine the importance of this seemingly unique area and work out whether such fluxes are produced within the lagoon areas or are oceanic zooplankton concentrated by the hydrodynamics of the lagoon. Research to date has shown that manta rays within Bateman Bay are mostly searching for and targeting very specific crustacean swarms that live in a plankton phase for their whole lives and are known as haloplanktonic. They also appear seasonally at specific locations to target small spawning events of meroplanktonic crustaceans such as crab larvae, which only spend some of their time in a plankton phase. Both crustacean types may be endemic to the Ningaloo area.

Manta ray migration

While the Bateman Bay area appears from photographic records to be an important location for a number of mature 'resident' individuals who know exactly where to find year-round prey, there are many transient and seasonal mantas that travel much further afield in search of large zooplankton pulses associated with seasonal water temperature variations. The latest tracking and re-sighting data



have shown that manta rays will move long distances along the Ningaloo Reef to forage for food and search for mating opportunities. Records since November 2007 show mantas making multiple north-south traverses of the reef, some of up to 160 kilometres in a week, and also foraging to depths of more than 100 metres.

In September 2008, 25 per cent of individuals observed in the Exmouth Gulf were found to be individuals that had been initially identified within Bateman Bay (a swimming distance of some 180 kilometres south). Others have only ever been observed in the northern section of Ningaloo Marine Park and the Exmouth Gulf, suggesting a complicated system of overlapping home ranges common to many shark and ray species.

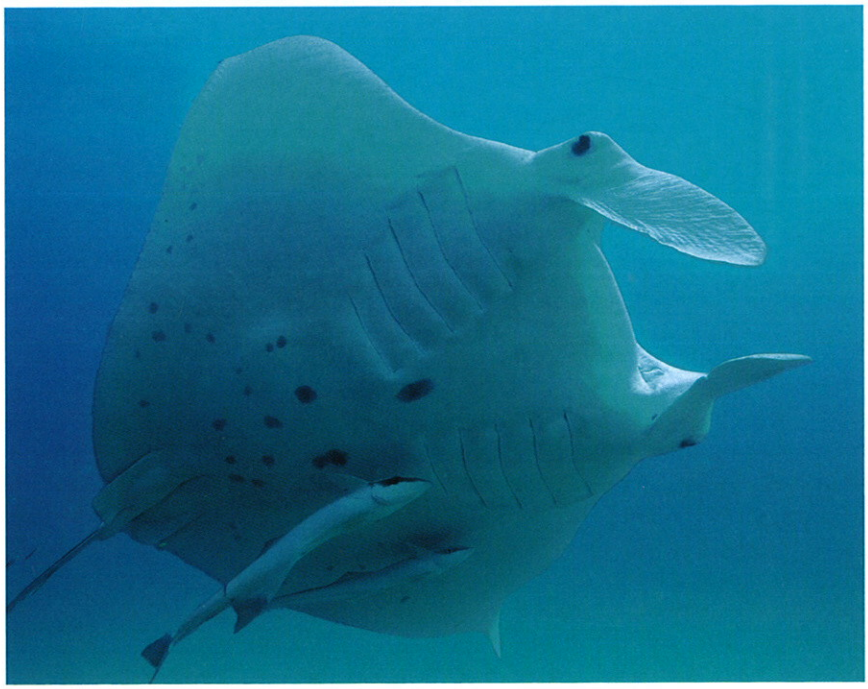
Further insight into manta site fidelity and migration is being made possible thanks to the Australian Acoustic Tracking and Monitoring System's Ningaloo Reef Ecosystem Tracking Array. This project has involved installing fixed receiving stations along the Ningaloo Marine Park to detect a variety of tagged sharks, rays and fishes that pass nearby. As part of this project, 37 manta rays have now been tagged to determine their movements and habitat use within the marine park. Preliminary results show that mantas use lagoonal sections of the reef far more frequently than expected and travel long distances over very short periods.

One individual tagged in November 2007 was detected four days later, 100 kilometres north inside Mangrove Bay. Four days later it had returned to the original tagging location. This individual continued to search for food along the reef for a fortnight until it settled into Bateman Bay where

Top left An all-black manta ray cruising the shallow waters of Bateman Bay.
Photo – Paul Markey

Left Laser sizing a 3.8-metre mature female manta ray.
Photo – Luke Riley

Right Boats anchored at Coral Bay.
Photo – Bill Belson/Lochman Transparencies



Below right Manta ray.
Photo – Glen Cowans

it remained for three months. Other tagged mantas (both male and female) have been detected within Bateman Bay over a 12-month period while others show a much more seasonal pattern, returning to the same areas almost to the day each year. What this means for tourism is that the year-round reliability that is unique to Bateman Bay is likely to be highly dependent on a focal group of animals that are essentially resident within the wider Bateman Bay area.

Manta antics

While the Bateman Bay area appears to be an important area for manta rays to source food, years of observations by tour operators and more recent photographic evidence has shown it to be equally important as a site for essential non-foraging behaviours such as the formation of mating chains, copulation activity, birthing and numerous maintenance activities such as being cleaned of parasites. In May 2009, researchers accompanied by Department of Environment and Conservation (DEC) staff were thrilled to encounter the smallest photographed manta in the identification catalogue. The small female was accurately sized using parallel lasers at a little over 1.5 metres. Age estimates are difficult to confirm in these often elusive animals, but given a birthing size of approximately one metre, this female was likely to have been only a few months old.

These findings and ongoing observations indicate that the Bateman Bay area may well be a preferred and critical habitat for a number of manta rays who use it for a range of essential life cycle activities. It is without doubt the most significant site along the Ningaloo Reef known so far for manta rays and may well be unique in its importance on a regional basis.

As Bateman Bay is also one of the main areas for tourist interactions with manta rays, it is essential that this important area is given greater protection so these remarkable creatures can continue to delight both local and international tourists.

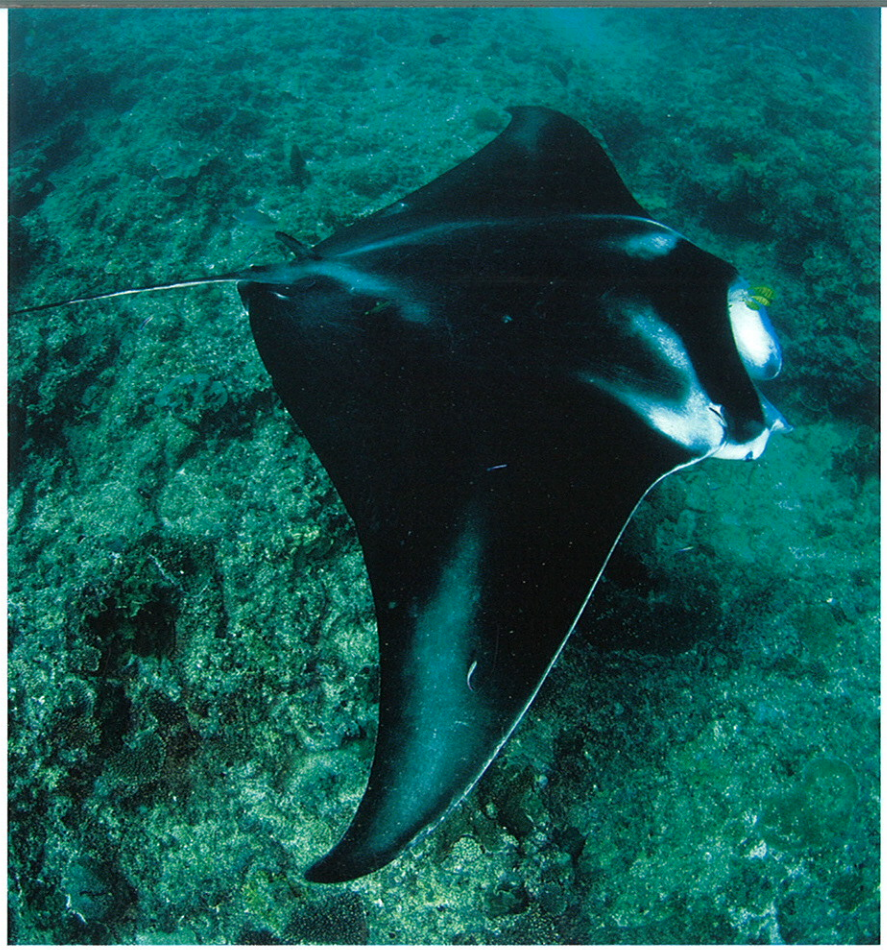
Ningaloo tours

Six tour operators currently offer manta ray interaction tours from Coral Bay, introducing an estimated 10,000 passengers a year to the magical world of the manta ray. Based on the ticket price alone, this equates to an industry worth more than $1.2 million a year, not to mention indirect economic benefits from accommodation and other spending.

The fact that manta ray tours operate every day of the year (weather depending) from Coral Bay means that they are the core wildlife-based adventure tour for many operators, unlike whale shark and whale watching tours, which are highly seasonal.

Coral Bay is particularly popular for manta ray interaction tours because of the reliability and ease of sightings year round. While there are seasonal fluctuations, records have shown that manta rays can be found 90 per cent of the time, with an interaction success rate estimated at more than 80 per cent.

The tourism industry relies on being able to offer their product with as higher level of certainty as possible. Therefore, sustainability of the presence of manta rays in significant numbers is vital to the success of their operations. Tour operators are as enamoured with the manta rays as their passengers, and are concerned about protecting not only the animal but the areas deemed critical to their ongoing presence. Some



Left Manta ray.
Photo – Shannon Conway/Sallyanne Cousans Photography

Above Snorkellers with a group of surface-feeding manta rays.
Photo – Bec Towers

operators express real concerns that the sheer number of tours may have the potential to disturb manta rays and cause behavioural changes at essential 'cleaning stations' where tour activities are often focused. They also express concern about disturbance to manta rays and the risks to swimmers from interactions with manta rays engaged in courting and mating.

As such, the tour operators have been working with DEC to develop a code of conduct for interactions.

A concerning case has come to light at Bora Bora in French Polynesia where uncontrolled manta ray tours inside a tropical lagoon have directly attributed to the local manta rays abandoning the entire lagoon in preference for the deeper, less-accessible water. Not only has this displaced the manta ray population but it has also caused the local tour industry great hardship—situations DEC is keen to avoid for both manta rays and tour operators in WA.

DEC will continue to work with tour operators on a new plan to ensure the ongoing sustainability of manta ray tourism in Bateman Bay and surrounds. The plan will guide the industry in a similar way to the whale shark interaction management program, developed between DEC and tour operators and internationally regarded for its success in satisfying human curiosity about whale sharks while protecting the sharks themselves. Such a program will also need to manage non-commercial activities in the area as recreational boating activity increases throughout the Ningaloo Marine Park. Public education and awareness are as essential to a positive result as the management of commercial activities.

Plan for the future

In developing the manta ray management plan, DEC is working closely with tour operators who have largely supported increased management of the industry and the development of a new code of conduct. While details of the management measures are still being worked out, it is expected to contain requirements for all tour operators to adhere to the code of conduct as part of their commercial tour licences. The new code will also lay out new requirements for maximum numbers of people allowed in the water with a manta ray, as well as restrictions on approaching manta rays that are engaged in mating behaviour.

Into the future

Once adopted, such a plan should enable tour operators to continue introducing visitors to the world of the manta ray, while also protecting the species. After all, increased awareness and appreciation of the species can only help in their preservation. With the right management, people will be able to continue donning snorkel and mask, slipping into the waters of the Ningaloo Marine Park and marvelling at the manta ray's beauty and grace. And the mantas will be able to continue going about their daily lives, unperturbed by the human visitors.

Brad Daw is a Department of Environment and Conservation (DEC) marine and coastal wildlife officer for Ningaloo Marine Park based in Exmouth. He can be contacted on (08) 9947 8027 or by email (brad.daw@dec.wa.gov.au).

Frazer McGregor is undertaking research towards his PhD at Murdoch University on the trophic ecology of manta rays at Ningaloo Reef.

Samille Mitchell is a *LANDSCOPE* editor and DEC publications officer. She can be contacted on (08) 9389 4020 or by email (samille.mitchell@dec.wa.gov.au)

Volume 25 Number 1 Spring 2009

contents

Regulars

Publishing credits

Executive Editor Ron Kawalilak.

Editors Samille Mitchell, Rhianna King.

Scientific/technical advice
Kevin Thiele, Paul Jones, Keith Morris.

Design and production Natalie Jolakoski, Gooitzen van der Meer, David Abel.

Cartography Promaco Geodraft.

Marketing Estelle de San Miguel.
Phone (08) 9334 0296 *Fax* (08) 9334 0432.

Subscription enquiries
Phone (08) 9334 0481 or (08) 9334 0437.

Prepress and printing Advance Press, Western Australia.

© ISSN 0815-4465

Please do not send unsolicited material, but feel free to contact the editors.

Visit www.dec.wa.gov.au

Published by the Department of Environment and Conservation, 17 Dick Perry Avenue, Kensington, Western Australia.

Department of
Environment and Conservation

Our environment, our future