JOURNAL
MONKEY MIA NEWS

8 (Spring 2003)
DEPARTMENT OF PARKS AND WILDLIFE

***Welcome to the eighth issue of* Monkey Mia News.**
This newsletter is produced twice a year, giving an update on what's happening in this important region, the Shark Bay World Heritage Area. Monkey Mia News is a non-profit publication to give visitors an understanding of the happenings at Monkey Mia, including the important research undertaken in Shark Bay. Why not become a Monkey Mia Dolphin 'Friend' and receive regular newsletters and other benefits? See back page for details!

Tiger sharks: important players in Shark Bay's seagrass ecosystem.

By Aaron J. Wirsing

Shark Bay is famous for its expansive and diverse seagrass meadows and the thousands of dugongs that rely on them for their existence.

However, other marine creatures also rely on this World Heritage Areas seagrass meadows.

For example a huge number of tiger sharks are found in Shark Bay, and these apex predators may exert a powerful influence on the rich seagrass ecosystem through behavioural interactions with their prey.

In 1997 the Shark Bay Ecosystem Project ShaBERP, an international collaboration of researchers headed by Dr Lawrence Dill of Simon Fraser University, was established to characterise these predator–prey interactions, and to evaluate the importance of the tiger shark in Shark Bay's waters.

The first goal was to determine whether the danger of tiger shark attack influenced the habitat use decisions of bottlenose dolphins. As has been detailed in an earlier article (*Tiger Sharks ... Putting the pieces of the puzzle together'*, issue 2), it was found that the dolphins of the Eastern Gulf of Shark Bay are aware of the danger posed by tiger sharks, and reduce their use of the risky shallow seagrass shoals, where tiger sharks spend most of their time hunting, in the warm season between September and May.

However, the sharks themselves seem relatively unresponsive to patterns of dolphin availability. Rather they appear to be targeting their faourite prey species, one of which is dugong.

A three metre tiger shark fitted with a 'Critter Cam'.
Photographer: Mike Heithaus

Thus, attention shifted to the predator-prey relationship between tiger sharks and these poorly understood sirenians.

Why is the behavioural interaction between tiger sharks and dugongs so interesting? Simply put, it is because it has implications for Shark Bay's impressive seagrass shoals, which in turn support the diverse and charismatic assembalage of large marine verebrates found here, including dolphins.

Dugongs have a huge appetite for seagrass, with large individuals consuming more than 50 kilograms of vegetation each day. Given that Shark Bay is home to between 10,000 and 15,000 dugong, the local dugong population exerts a tremendous amount of grazing pressure on this area's seagrass meadows every year. If left unchecked this grazing pressure may imperil some of the rare seagrass species that dugong favour. These only grow in small, isolated patches.

Grazing pressure by dugongs may also create the disturbance necessary to allow certain pioneering species to take hold in areas where more established varieties of seagrass dominate.

Clearly therefore, by causing changes in dugong grazing patterns, tiger sharks have the capacity to:

(i) benefit certain seagrass species by providing a temporary refuge from herbivory if dugongs avoid preferred but dangerous seagrass patches when sharks are common, and (ii) eliminate or create opportunities for the establishment of pioneering seagrass species. In other words the very composition and structure of Shark Bay's seagrass meadows may in part be an indirect consequence of the responses of dugongs to tiger sharks.

So, do dugong change their feeding behaviour in response to variation in the likelihood of shark attack? The answer to this important question remains unresolved, but early indications imply that it is yes. Preliminary evidence suggests that when tiger sharks are locally abundant, dugongs increase the proportion of time they spend in deep channels, which provide increased safety from patrolling sharks but where seagrass is relatively sparse. This trend may mean that dugongs are willing to sacrifice feeding opportunities in productive but risky areas to avoid sharks, thereby releasing at least some seagrass patches from intensive grazing during the dangerous warm season. This intriguing possibility must remain speculative until other unanswered questions can be addressed in particular whether dugong habitat shifts that have been observed actually translate into changes in feeding patterns.

At present it can be asserted with some confidence that tiger sharks likely play a more vital role in this wondrous seagrass ecosystem than previously thought, and that there will be more interesting findings to come.

Calf development and survival

The first seven months of the new calves have seen remarkable changes as they grow and learn how to survive in the Bay.

Three calves were born to our regular beach dolphins, Puck, Surprise and Nicky. Unfortunately Puck's calf Wada disappeared, possibly the victim of a shark attack offshore. This correlates with the calf survival rate of around 60 per cent in the first year which is the norm in the offshore dolphins of Shark Bay.

Nicky's calf Yadgalah and Surprise's calf Burda come into the beach almost every day and can often be seen playing offshore while their mothers interact with the people who have come to see them.

As the calves grow there is less dependency on their mother for milk. At this stage of their lives they require milk every 30-45 minutes. However, we have seen them starting to successfully hunt fish for themselves. In a calf's first year it will put on approximately seven times its original birth weight, an important survival factor. Fishing techniques such as snacking (belly up chasing small fish to the surface), rooster tailing, leap feeding and bird milling are all learnt from their mothers and other dolphins. This is why it is important to encourage both mother and calf to spend time offshore at this development stage. As the calves grow they become more adept at these behaviours and will slowly replace their mother's milk with fish and other food sources.

Calves in the bay are weaned between three and six years of age, with an average age of around four years. The development of each calf's foraging behavior depends on the length of time the mother will spend nursing. One juvenile in the bay was seen to be still nursing from its mother at eight years of age!

Yadgalah is a female calf and there is every possibility that she will stay and associate with Nicky for most of her life. Burda, being a male, will be weaned and later leave to form alliances with other male dolphins (these are usually two to three other male dolphins around the same age). They will rarely be seen at the dolphin beach.

Piccolo, Joy's Friend and her calf in a playful position.
Photographer: Ian Anderson

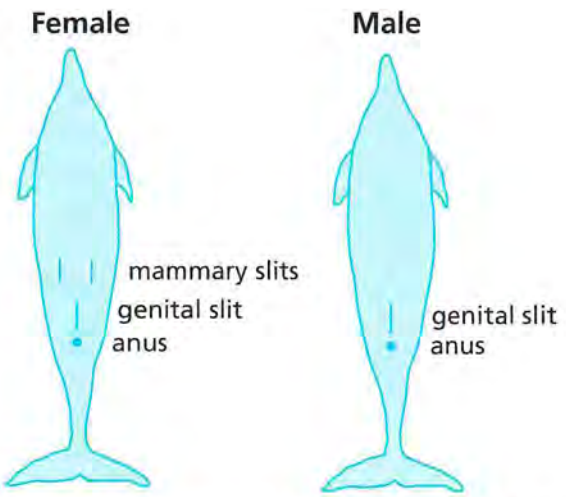
Reader requests: Your questions answered!

Which dolphins currently visit the beach?

At the moment we have six regular visiting dolphins. These are Nicky, the most frequent and longest visiting, with her eight-month-old calf Yadgalah, Surprise with her calf Burda also eight months old, and Puck and her 'teenage' daughter Piccolo. As dolphins live in a fission-fusion society, their comings and goings are not static and individuals often swim on their own. Quite often others will visit too, with a list of 20 other visitors including Kiya, Shock and Sparky. During mating periods, some males will come to the shore in pursuit of the beach visiting females. Below are the most up to date beach dolphin family trees. Because females give all the parental care, and without DNA testing it is not possible to determine fathers, we refer to dolphin family trees as 'matrilineal' meaning mother and female kinship.

How do you identify the gender of a dolphin?

Not easily! Dolphin's genitals are internal meaning you will not see them just by looking at the underbelly. They are housed behind a visible genital slit, possessed by both females and males. Females also possess two mammary slits, one on either side of their genital slit. This is shown in the following diagram.



Ventral view of a female and male bottlenose dolphin displaying gender differences.

DOLPHIN FAMILY TREE

Nicky
December 1975
Mother: Holeyfin died 1995, 35 years

♂	♀	♀	♂	♂	♀
1990–1994	1987–1989	1993–1994	1998–2002	1995	2002
Finnick	Nippe	Nikita	Nomad	Holikin	Yadgalah

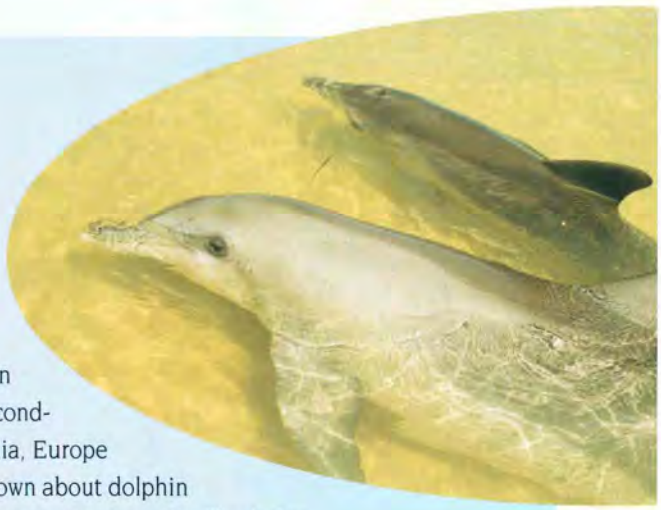
Puck
December 1976
Mother: Crooked fin; died 1992, 32 years

?	?	♂	♀	♂	♂
1988–1989	1990–1990		2002–203	1992	1997
unnamed	Petal (6 days old)	Pepe	Wada	Piccolo	Kiya

Surprise
Mother: unknown

♂	♀	♂	♂
1992–1993	1994	1998	2003
Shadow	Shock	Sparky	Burda

Dolphins of Monkey Mia Research Foundation



The mission of the Dolphins of Monkey Mia Research Foundation is:

'To better understand and protect the dolphins and wildlife in Shark Bay through research.'

Long-term research on the Shark Bay and Monkey Mia dolphins has been conducted by an international team of researchers since 1982. This is the second-longest running dolphin project worldwide. Researchers come from Australia, Europe and North America. Most of what is known about dolphin behaviour, social structure and ecology, comes from the Shark Bay team. *The Dolphins of Monkey Mia Research Foundation* was established in 1998 to support the long-term research on the Monkey Mia and Shark Bay dolphins. Your donations will help protect and monitor more than 600 dolphins and will assist in this exciting scientific endeavour! Contributions to research can be forwarded to the address below.

For more information, please contact us by mail or through our website.

The Dolphins of Monkey Mia Research Foundation
PO Box 140, Claremont, WA 6010
www.monkeymiadolphins.org

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