



# MANTA PROJECT FIJI

Research Proposal

*“In the end we will conserve only what we love; we love only what we understand, and we will understand only what we have been taught”*

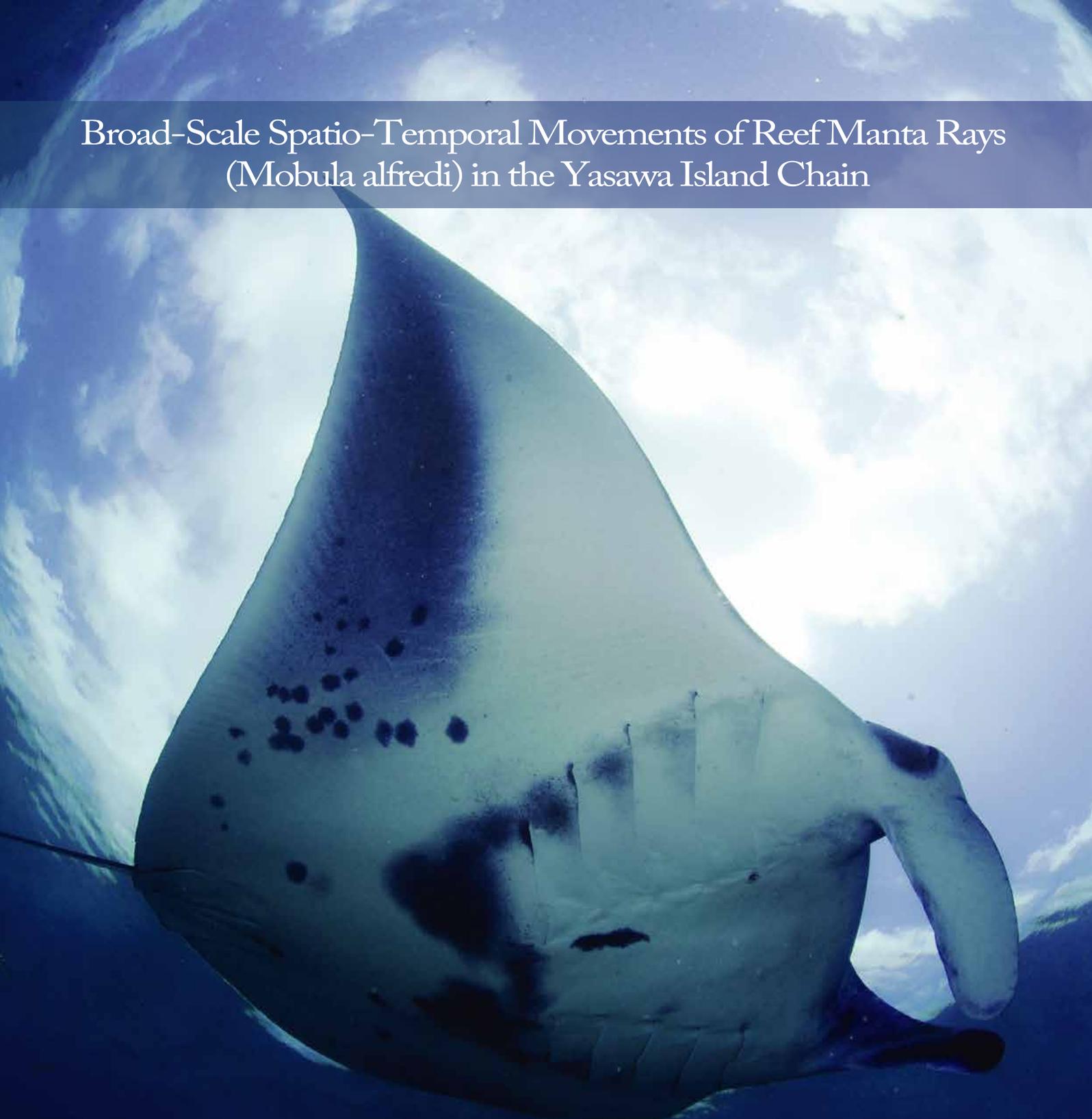
*- Baba Dioum*

Conservation through research, raising awareness and  
collaboration

- The Manta Trust



**MANTA PROJECT**  
FIJI



# Broad-Scale Spatio-Temporal Movements of Reef Manta Rays (*Mobula alfredi*) in the Yasawa Island Chain

## Aim:

To investigate the broad-scale spatio-temporal movements of the Reef Manta Ray (*Mobula alfredi*) in Fiji's Yasawa island chain using satellite telemetry



## RESEARCH QUESTIONS

1. What are the broad-scale movement patterns of reef manta rays around islands in the Yasawa Island chain and in wider Fijian waters?
2. What is the spatio-temporal distribution of reef manta rays throughout the Yasawa Island chain?
3. Do reef manta rays display site fidelity to other key sites within the Yasawa Island chain?

Manta rays contribute upwards of 1.59 million USD to the Fijian economy annually. There are only a handful of sites in Fiji where tourists can interact with mantas in a reliably consistent way. However even at these sites the manta rays are only seasonally located and we have very little understanding of the distances and locations these animals move to at other times of the year.

These questions will allow us to start to understand the movements of these animals, allowing us to develop more effective conservation management strategies for the species, which is vitally important for the conservation of the Fijian manta ray population.



## EQUIPMENT & PROCESS

Satellite telemetry is a very effective tool in tracking the broad-scale movements of many large marine species. We propose to use SPOT (Smart Position and Temperature) tags from wildlife computers for the duration of the study. The SPOT is an Argos satellite transmitter coupled with temperature and wet/dry sensors which transmits positions to the Argos satellite system. Transmissions can be picked up in near real time with accuracies as good as 250m.

SPOT tags transmit positional data when at the surface, for species such as the reef manta ray, this is a very effective method of data transmission due to the feeding ecology of the animal. When the animal comes to the surface (most likely for feeding), the tag will breach the water surface, triggering the wet/dry sensors, once triggered the tag will send consecutive satellite transmissions which are used to calculate the location of the animal.

The SPOT Argos uplink schedule is completely user customisable. This allows us to schedule exactly how many transmission are attempted each hour of the day, meaning we can increase the temporal resolution during parts of the day or year that are of greatest interest. Transmissions can also be suspended when Argos satellite coverage is poor or when the animal locations are known, allowing for better battery conservation.

SPOT tags have been designed for a wide range of species, with tags having customisable shapes for each species group, allowing for the most effective deployment and drag free characteristic when deployed on the animal.

SPOT tags are deployed using a pole and spear (Hawaiian Sling); a pole with the tag attached at the end with a rubber ring to help insert the tag into the back of the manta. The tag is inserted into the dorsal musculature of the ray, either side of the body cavity, a titanium anchor and tether will hold the tag within the muscle tissue. Tagging produces a range of responses from mantas, from a small flinch to quickly swimming away before circling back round to see what had happened. Previous tagging projects have shown that tagging doesn't affect the mantas behaviour long term and they quickly return to normal behaviour.

A video of a member of the Manta Trust tagging Oceanic Mantas (<http://bit.ly/1jaUmBG>) shows the full tagging process.

Deployed SPOT tags will transmit data for a maximum of 300 days. By deploying tags during the latter part of the manta season at Barefoot Resort we hope to gain incredibly valuable data about the migration patterns of these fascinating and increasingly threatened animals.



Tag Deployment

Satellite Tag



Manta Ray with Tag



## WHY IS THIS PROJECT IMPORTANT

This research will pave the way for a better understanding of Fiji's manta population nationally as well as locally for the Yasawa region. The data gathered will be the first of its kind in the country and allow better conservation management strategies to be developed in order to help conserve Fiji's reef manta ray population.

Manta rays are increasingly targeted for their gill plates, which in China are believed to hold healing properties, treating a range of ailments, unfortunately many of these claims are not based on any scientific evidence.

Mantas take 10-15 years to mature and produce normally one single live-born pup just once every 3-5 years. This conservative life history and reproductive cycle makes these animals very vulnerable to exploitation. With so little known about manta movement ecology and reproduction in Fiji, this data could prove vital in establishing important breeding and birthing grounds in the area.

This would enable us to establish areas which are particularly affected by fishing, with the potential to propose effective conservation management strategies. This will help greatly with manta conservation, not only in Fiji, but around the world, enabling us to pinpoint known aggregation sites where management strategies can be implemented.

## MANTA RAYS OF THE YASAWA ISLANDS

The Yasawa Island chain hosts one of the most important sites for mantas we know of in the whole country. A small channel between Naviti and Drawaqa Islands becomes a vital feeding and cleaning ground during the winter months in Fiji, from April through to September.

Since 2012 we have had over 2400 sightings and identified 83 individuals who we know to have visited this channel. Manta rays are widely known now in literature to show high site fidelity, meaning individuals use specific sites almost exclusively in certain months of the year, this is no more clear than in the manta channel. Of the 83 manta rays identified multiple large females are regular visitors to this site, being sighted multiple times every week for the duration of the season.

We currently have little knowledge of other key sites in the Yasawa chain that provide the critical habitat manta rays need to thrive in Fiji's waters. We hope that this project will uncover some of those mysteries and lead to further development of robust conservation management strategies.



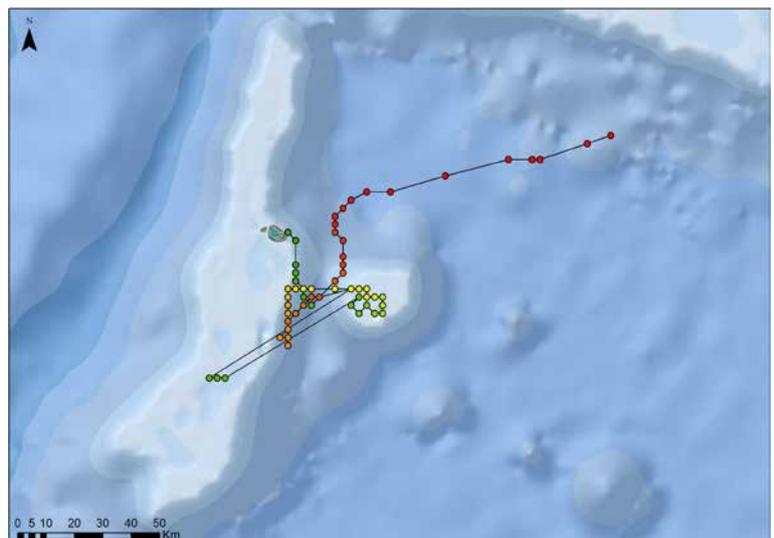
Pictured here to the left is FJ-MA-0012, affectionately known at Barefoot Resort as Omar. This large female was first seen in 2009 and has been seen every year since. Omar was already a large female when we first saw her in 2009, making her most likely over 35 years old.

We have seen her pregnant multiple times, mating scars can be seen as white lines on her left pectoral fin in this image.

Image to the right is a 59 day satellite track of a reef manta ray from the Manta Trust project in Seychelles. Circles green through to red indicate the mantas travel path over a period of time.

It can be seen here that the manta spent the majority of the early period in a home range before moving out over deeper water to another shallow shelf before the tag stopped transmitting.

This project would hope for similar result resolution



## PERSONNEL

This project will be conducted under the research permit of Manta Project Fiji in partnership with Barefoot Manta Resort and be supported by the University of the South Pacific and the Department of Fisheries.

Personnel involved will be as follows:

### *Researchers*

**Luke Gordon** - Principal Researcher - Project Leader, Manta Trust Fiji  
**Rob Macfarlane** - Principal Researcher - Marine Biologist, Barefoot Manta Resort  
**Chelsey Peterson** - Research Assistant - Research Assistant, Manta Trust, Fiji

### *Advisor*

**Dr. Guy Stevens** - Chief Executive/Founder, The Manta Trust

## BUDGET

Research Equipment	Item	Quantity	Price per Unit (USD)	Total (USD)
	SPOT-253 Tags	5	\$1900	\$9500
	Satellite Time	10 months	\$63 p/m (per tag)	\$3150
	Tag Anchors	5	\$15	\$75
	Hawaiian Sling	1	\$42	\$42
	Tag Tether	5	\$17	\$85
			<b>TOTAL</b>	<b>\$12852</b>



---

# MANTA PROJECT FIJI

---

In Affiliation with

