

BACKGROUND

Oceanic manta rays are **globally endangered**,¹ but in Aotearoa–New Zealand are classified as **data deficient**.² While they are commonly sighted along the north-eastern coast of the North Island throughout the austral summer to autumn, little is known about **where they go and what drives this movement**.

Movement ecology allows us to **predict species' responses to future environmental changes and anthropogenic impacts**, and is critical for informing effective conservation management.

STUDY SITE

This research focuses on the **Hauraki Gulf** | Tikapa Moana | Te Moananui ā Toi—a highly productive region influenced by a subtropical current, and a **potential hotspot** for manta rays.

SATELLITE TAGGING

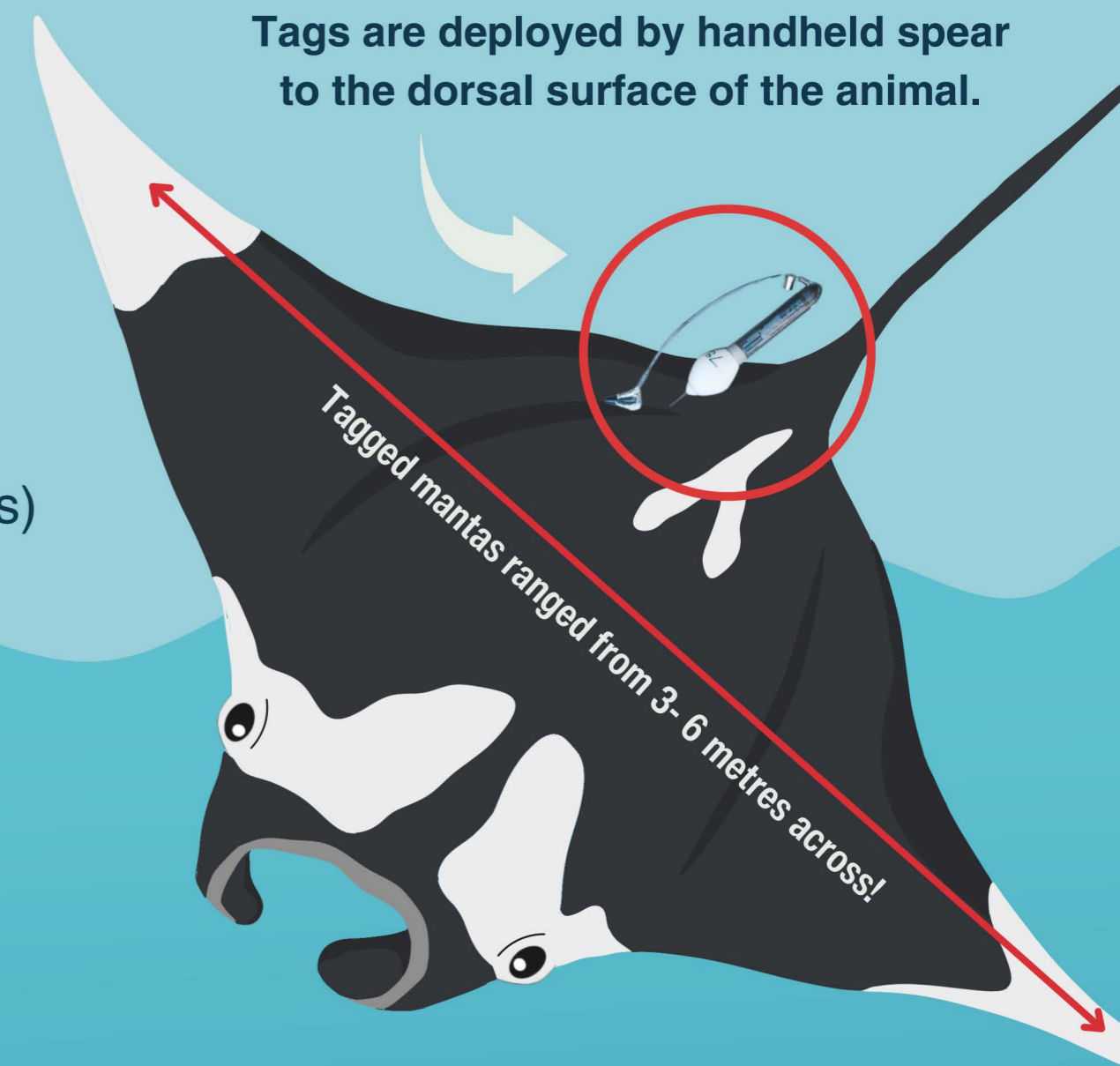


- GPS location
- Depth
- Temperature

Of the **20** tags:

- 6** Showed high levels of movement in the Gulf
- 2** Tags recovered → super high-resolution data! (1s)

Tags are deployed by handheld spear to the dorsal surface of the animal.

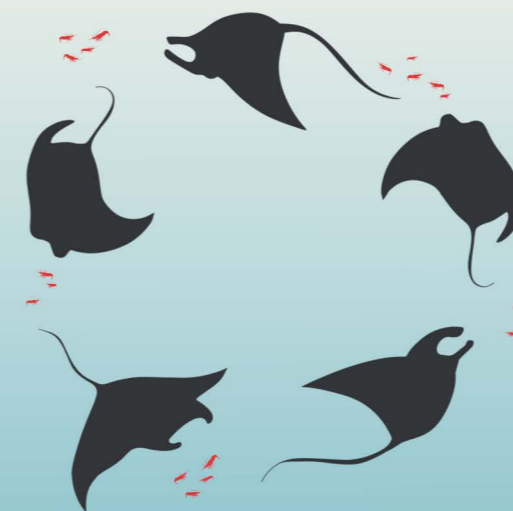


MANTA KEY:

- MANTA 1
NAME: PTT #197235
SEX: FEMALE
- MANTA 2
NAME: PTT #238016
SEX: MALE

HORIZONTAL MOVEMENT

GPS locations indicate surface activity. Manta rays **somersault feed** on zooplankton at the surface. These results indicate **individual variability in movements** around the outer Gulf, the barrier islands, and the southern Gulf area of the Coromandel.



Manta rays are poikilothermic, which means their internal temperature fluctuate with the environment

Manta rays primarily feed on zooplankton such as krill, but sometimes also on small fishes

VERTICAL MOVEMENT

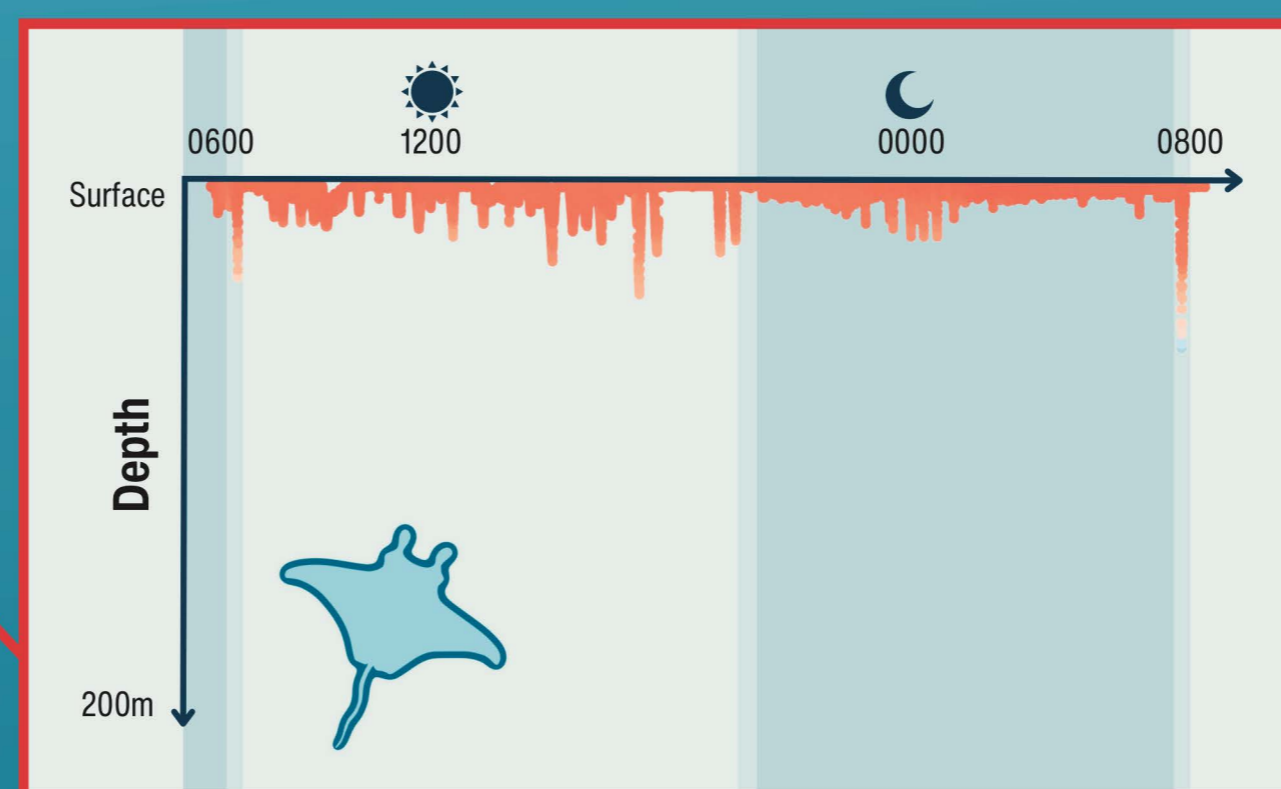
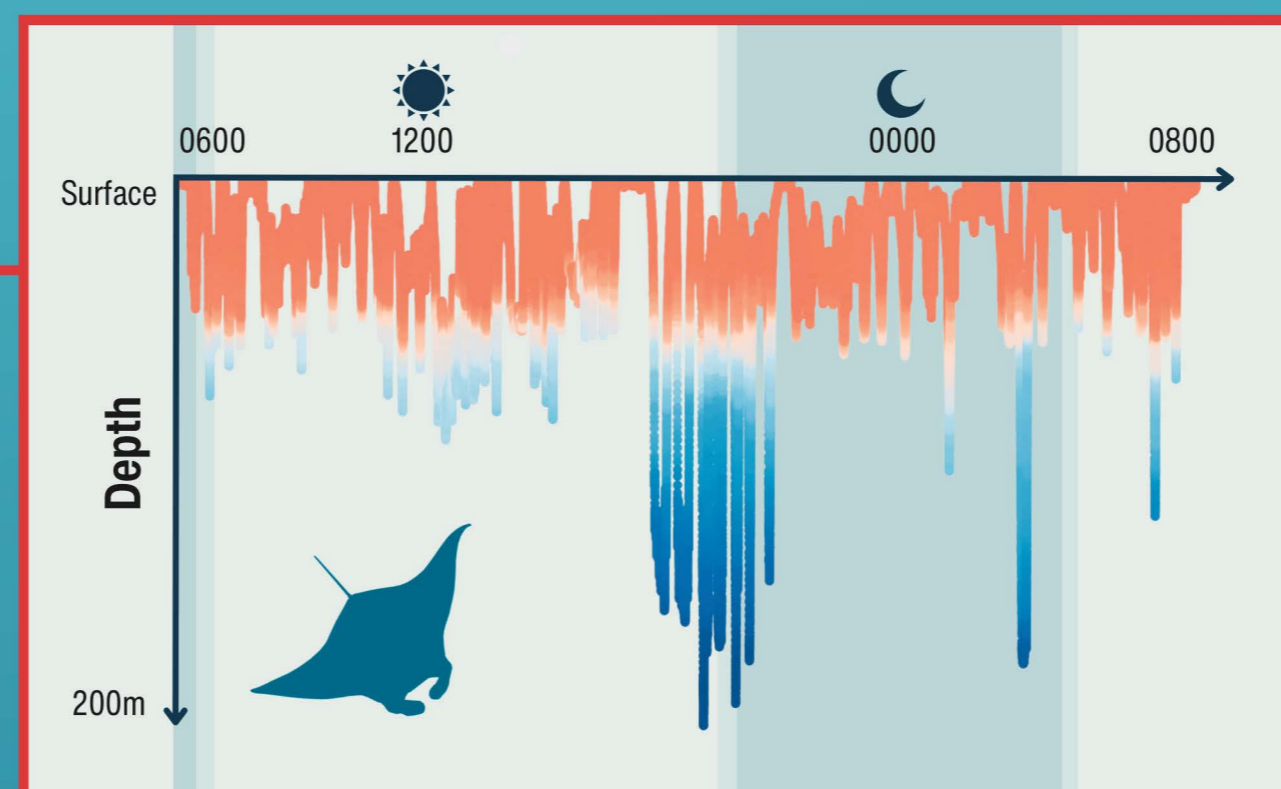
Manta rays regularly dive to **depths of 50m+** and occasionally over 200m.

Elsewhere isotope studies show that manta rays sometimes feed on mesopelagic fishes (200–1000m).³

Diving might also serve as an energy-efficient way for mantas to travel through 'gliding'.⁴

It has also been suggested that deep dives serve a navigational purpose, allowing mantas to better detect earth's magnetic field.⁵

Further analysis of Gulf mantas will reveal drivers of their dive behaviour.



NEXT STEPS:

- Future work will aim to **infer behavioural states** such as transiting and foraging from movement tracks, and identify any patterns to this behaviour.
- We will then investigate how **environmental variables influence manta ray presence and behaviours**, and look into potential **drivers of diving behaviour** within the Hauraki Gulf.