

LOCATIONAL BAGGAGE



Aotearoa is the seabird capital of the world, hosting more than one third of all seabirds.¹
 The tīti is Aotearoa's most abundant seabird and a taonga species to Rakiura Māori.²
 Tīti are facing many threats, with growing concerns around climate change.³

MY RESEARCH

To model climate change impacts, we need to understand tīti foraging ecology. How do tīti utilise ocean spaces?

This requires the deployment of GPS devices. BUT will this impact foraging success and subsequently chick health?

FORAGING ECOLOGY

Location Speed Depth

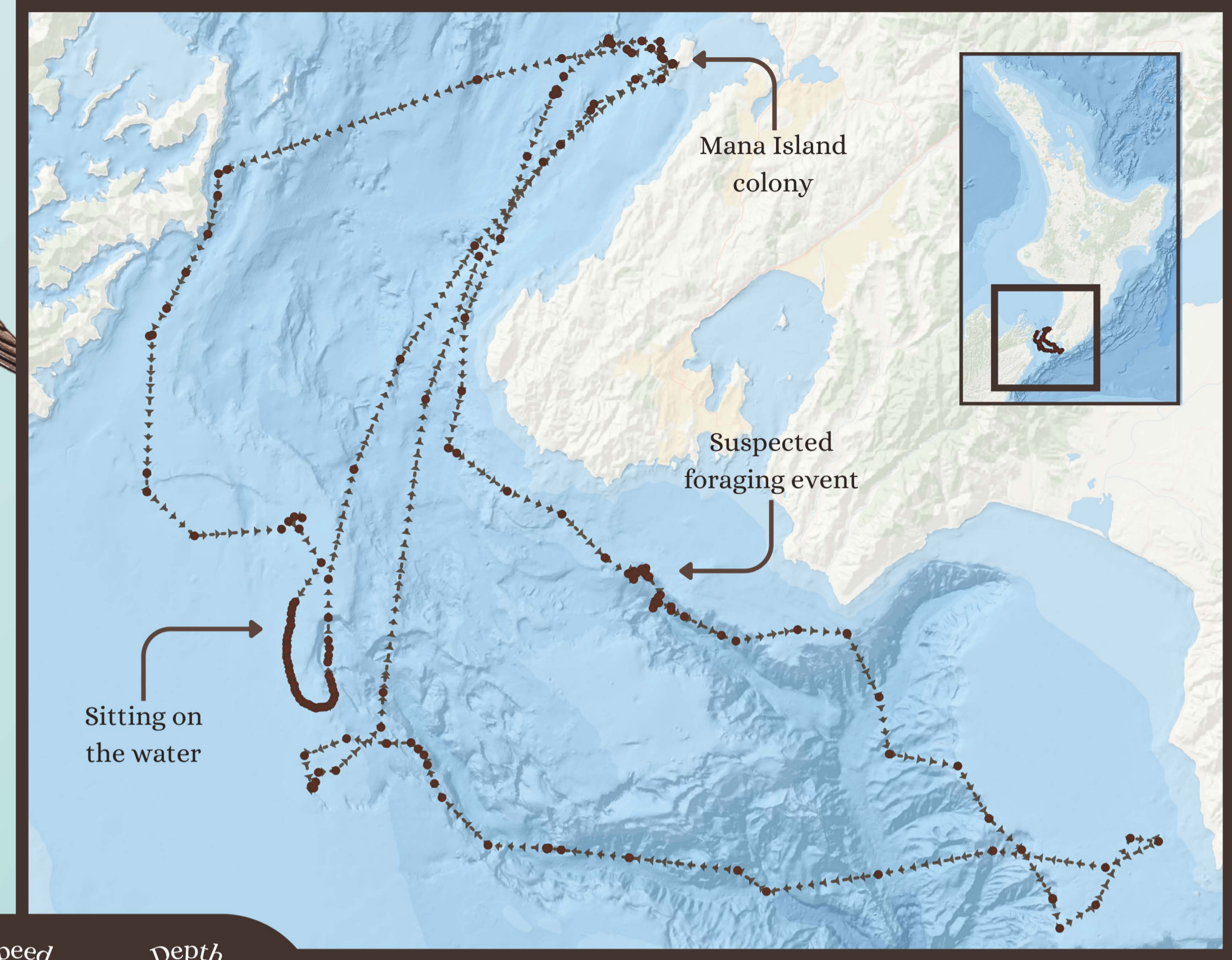


Figure 4: GPS tracking data of adult tīti.

CONCLUSIONS & NEXT STEPS

- ✓ Minimal impact of GPS on adults and their chicks.
- ✓ Wing loop harness attachments do not jeopardise chick health.
- ✓ GPS devices show finescale foraging movements (Fig. 4).

- ? Analyse accelerometer and depth data.
- ? Deploy GPS devices at Kauwahaia and Whenua Hou.
- ? Model tīti foraging ecology against ocean conditions to assess climate threat.

RESEARCH ETHICS

3 Rs: Replacement, Reduction, **Refinement**

- GPS deployments can lead to:
- ⚡ Increased energy demands.⁴
 - 🛑 Nest abandonment.⁵
 - 💀 Adult and/or chick mortality.⁶

PILOT STUDY

- Lightweight GPS devices.
- Colony visitation camera traps.
- Tape* vs wing loop harness (Fig. 1).

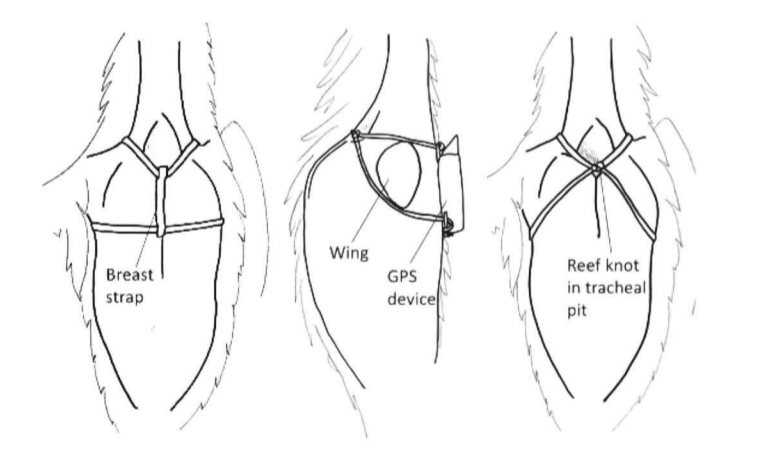
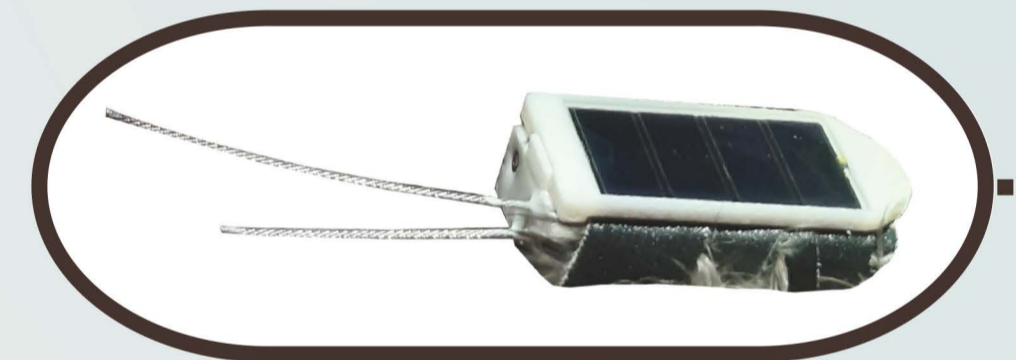


Figure 1: Wing loop harness attachment (Thaxter et al. 2014). Ringing & Migration.



TechnoSmart Axy-Trek Remote - Tape Attachment*

RESULTS

- **No** significant impact of GPS deployment on chick weight, regardless of attachment type ($p = 0.2092$) (Fig. 2).
- Extended foraging trips in GPS tagged adults, but this result is **non-significant** ($p = 0.2249$) (Fig. 3).

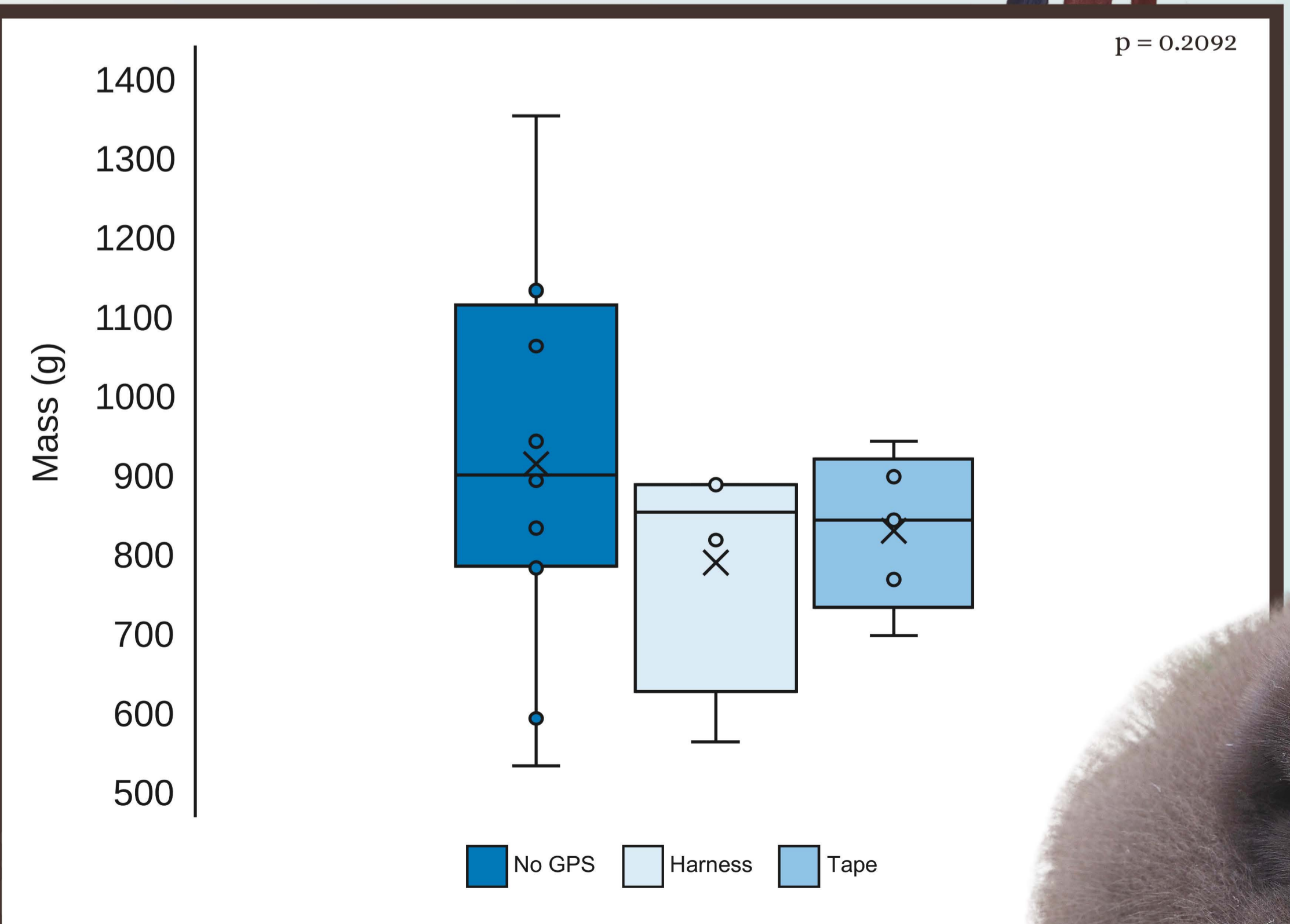


Figure 2: Impact of parent GPS attachment type on chick weight.

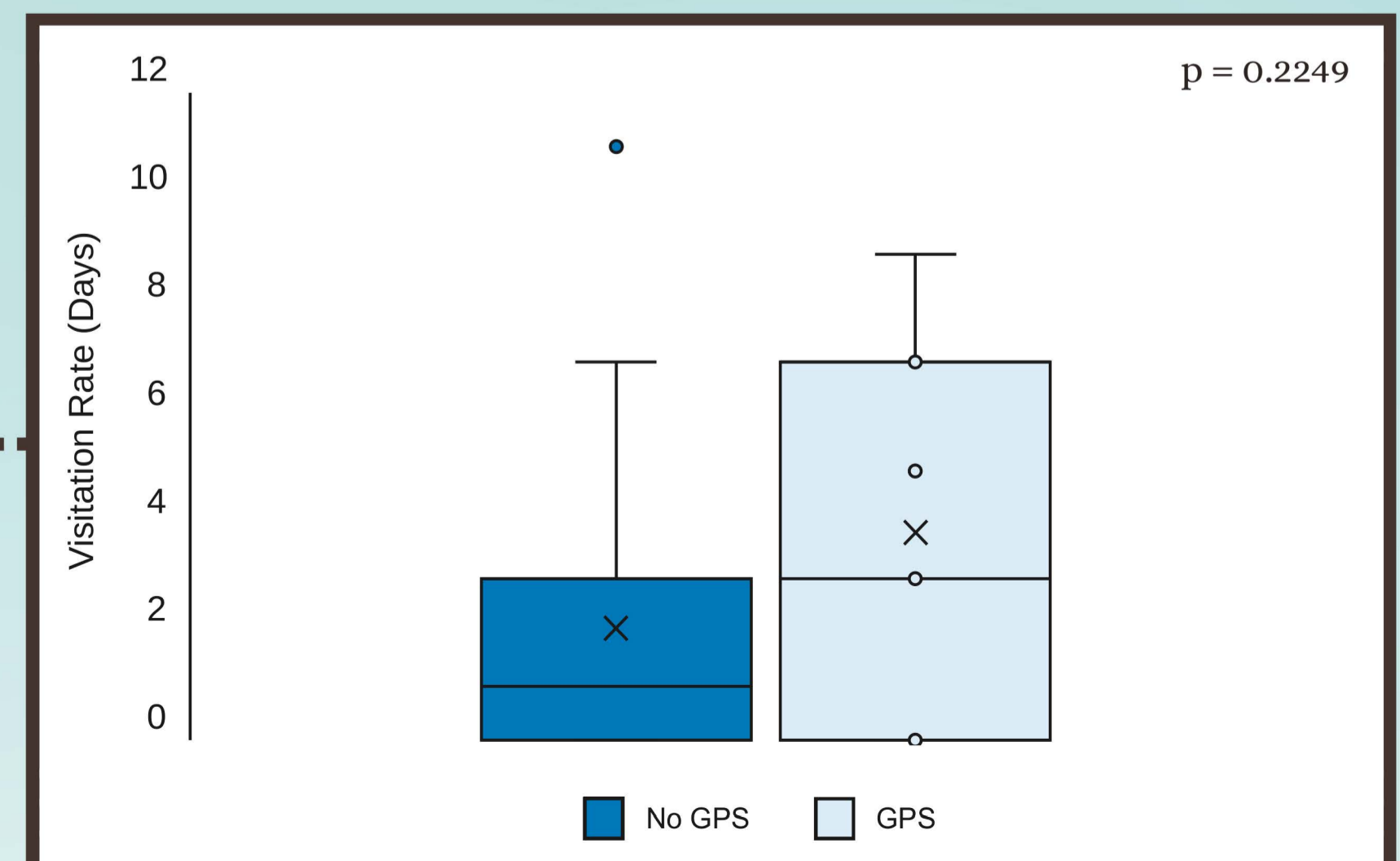


Figure 3: Impact of GPS device on average colony visitation rate of adult tīti.

References

1. Forest & Bird. 2014.
2. Clucas et al. 2012. *New Zealand Journal of Zoology*.
3. Lyver et al. 1999. *Marine Ecology Progress Series*.
4. Phillips et al. 2003. *The Auk*.
5. Mallory & Gilbert. 2008. *Marine Ornithology*.
6. Hatch et al. 2000. *Waterbirds*.