

Investigate options for assessing the post-release survival of seabirds that interact with commercial fisheries in New Zealand.



WMIL

Wildlife
Management
International



Objectives

- Investigate research options for assessing the post-release survival of seabirds that interact with commercial fisheries in New Zealand
- Identify operational, biological and environmental factors constraining a project assessing the post-release survival of seabirds that interact with commercial fisheries in New Zealand
- Recommend a research project design to investigate seabird survival post commercial fisheries interaction



Seabird interactions with commercial fisheries

- >1,000 seabirds caught in commercial fisheries and released alive in the three fishing years 2016/17, 2017/18 and 2018/19 (reported by Fisheries Observers)
- Cryptic mortality impacts Risk Assessment modelling



Assessment of methods for
determining post-release survival
of seabirds that interact with
commercial fisheries

A dark seabird is shown in flight, positioned centrally behind the text. The bird's wings are spread, and it appears to be moving from left to right. The background is a soft, out-of-focus mix of light and dark tones, suggesting a natural outdoor setting like a beach or coastal area.

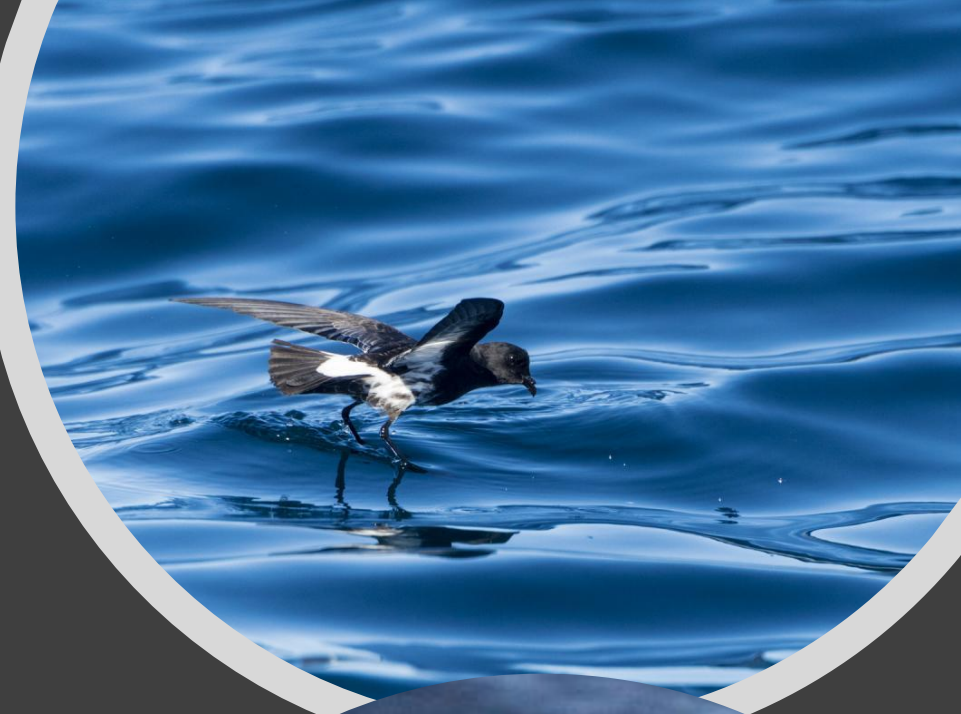


Banding

- Used for >100 years
- Works well for annual adult survival on seabirds at breeding colonies
- Recovery rate of birds banded at sea likely low
- **Banding is not recommended**

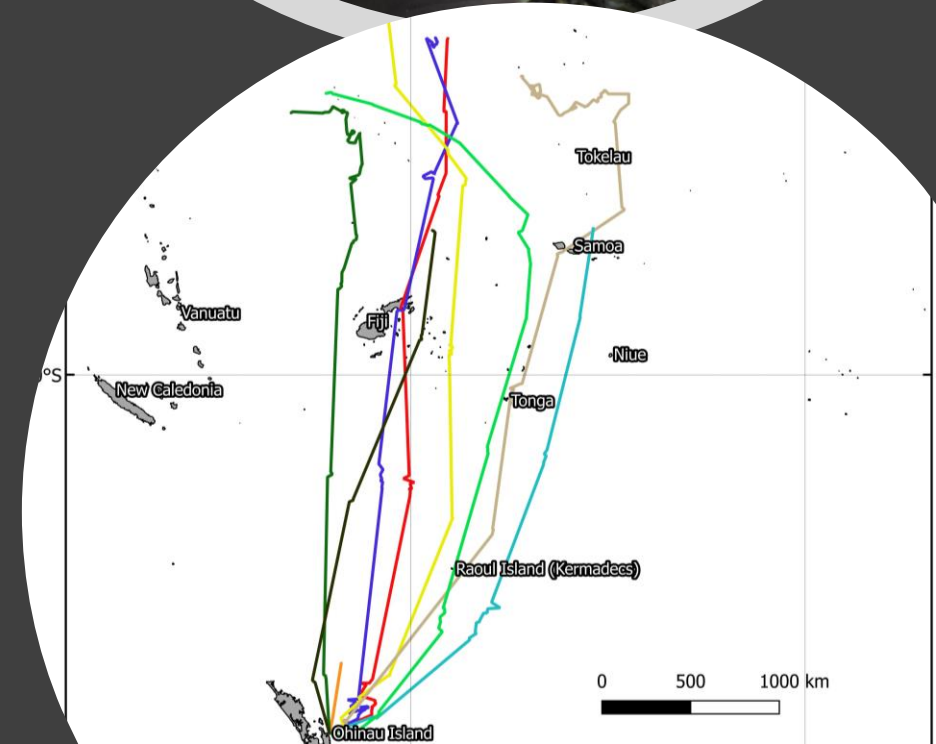
Radio telemetry

- Has been used to locate breeding colonies
- Use for post-release survival of oiled birds, often with aerial surveys
- Due to highly pelagic nature of NZ seabirds difficulty in coverage
- **Radio telemetry is not recommended**



Satellite tracking

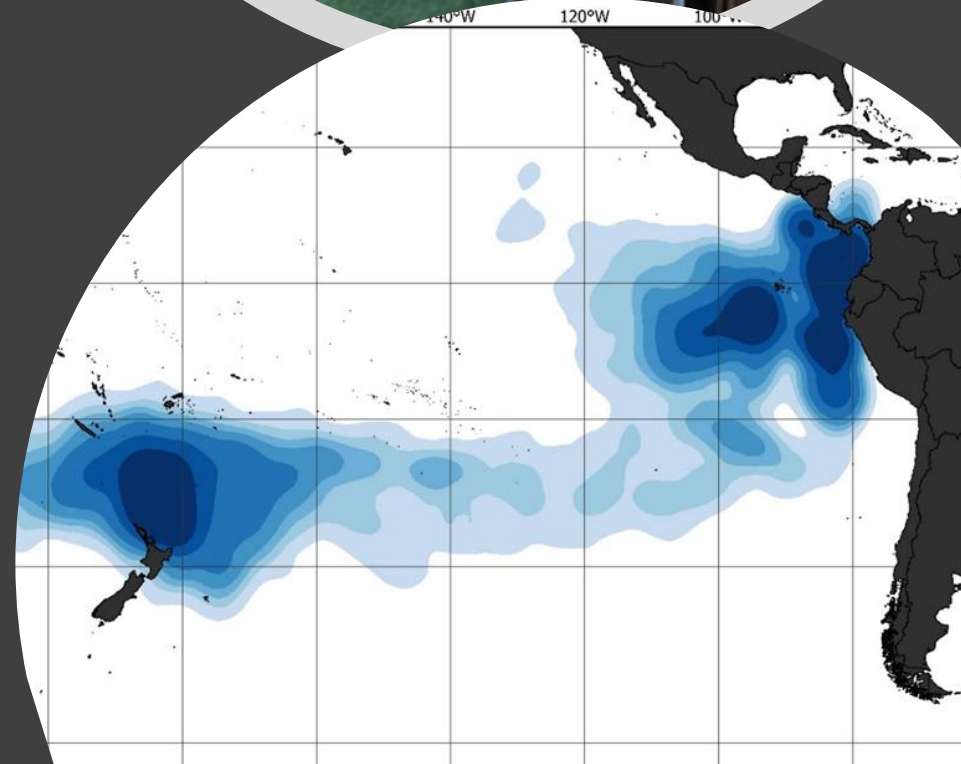
- Use >30 years
- Uses Argos system, up to 40 locations per day
- Recently used to track fledglings dispersing from colonies
- High cost – may reduce sample size
- **Satellite tracking is recommended**



Global Location Sensing (GLS)

- Developed as a low-cost alternative to satellite tracking
- Widely used for seabird tracking studies
- Requires capture of bird to recover data

- **GLS is not recommended**



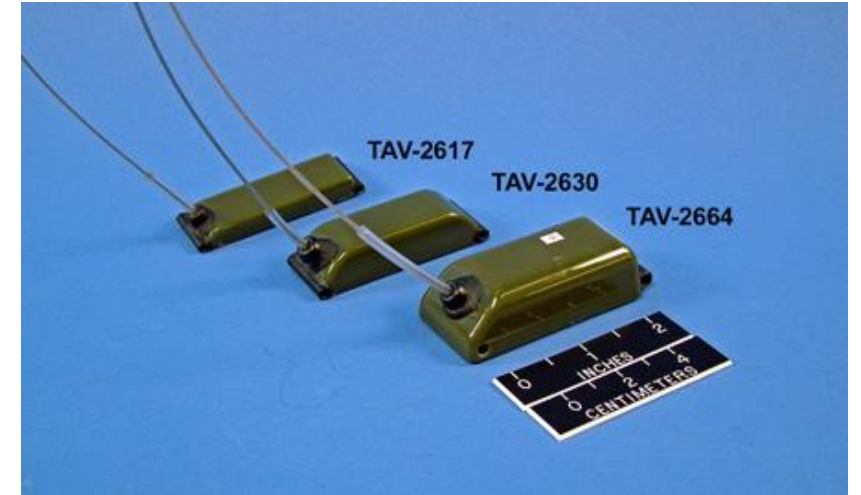
Archival GPS tracking

- Increasingly used over PTT
- Higher number of fixes with high accuracy
- Usually need to recover device
- Can have ARGOS or remote base station download
- *Archival GPS not recommended*



Telonics TAV range

- Telonics Inc, US based company specialising in wildlife tracking
- Developed a range of avian PTT devices

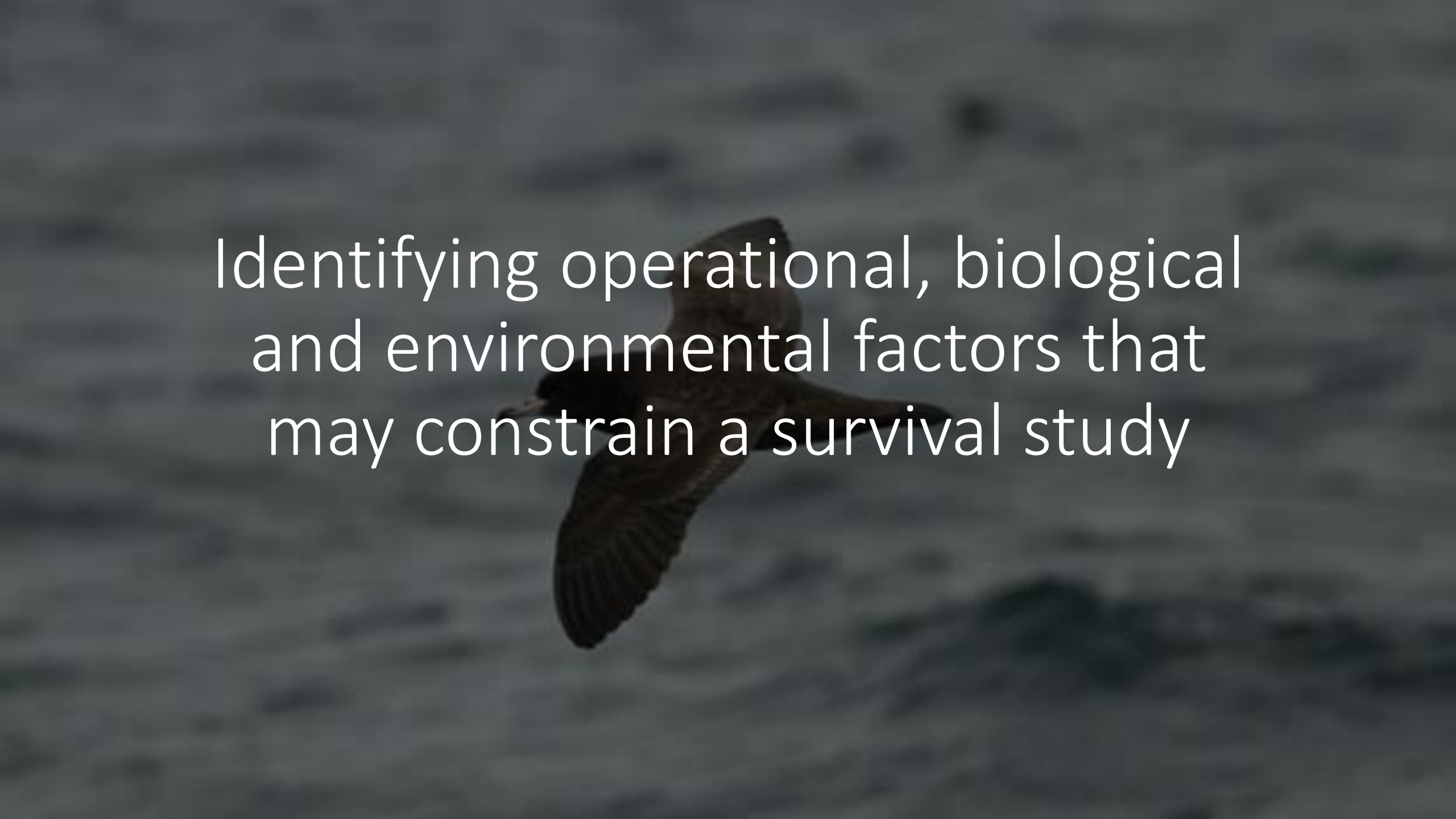


Model	Dimensions L x W x H (mm)	Weight (g)	Operational life (days) with transmissions 24 hours/day	Operational life (days) with transmissions 4 hours/day	Suitable species
TAV-2617	64 x 21 x 10	17	11	66	Medium sized petrels and shearwaters (i.e. black petrel, flesh-footed shearwater, and sooty shearwater)
TAV-2630	63 x 23 x 18	35	51	289	Large petrels, small to medium sized albatross (white-chinned petrel, white-capped, Salvin's albatross, and Buller's albatross)
TAV-2664	76 x 33 x 15	70	103	586	Large albatross (royal and wandering)

TAV Specifications

- Transmit additional data, including mortality, activity, temperature and voltage remaining
- Duty cycle to extend battery life
- Programmable – i.e. duty cycle
- Duty cycle needs programming to target determine survival



A dark bird, possibly a frigatebird, is shown in flight against a cloudy, overcast sky. The bird is positioned centrally, with its wings spread wide, flying from left to right. The text is overlaid on the image in a white, sans-serif font.

Identifying operational, biological
and environmental factors that
may constrain a survival study

Approvals

- Wildlife Act Authority
- Animal Ethics Committee approval
- DOC Banding Office considerations



Reprinted as at 21 December 2018



Wildlife Act 1953

Public Act 1953 No 31
Date of assent 31 October 1953
Commencement see section 1(2)

Subpart 2 of Part 2 of the Legislation Act 2012 have been made in this official reprint.

This reprint provides a list of the amendments incorporated.

Printed by the Department of Conservation.

Contents

Device attachment

- Device life on seabirds
- Minimum of two operators needed to deploy device, one must be experienced
- Bird handling training required



Assessing bird health

- Seabirds interacting with fisheries suffer a range of injuries
- Few injured birds seen at colonies
- Low survival of seabirds at The Nest (Wellington Zoo)
- High mortality of injured seabirds?



- Need assessment of birds to determine which birds to track



Ranking	Injuries	Survival prospects	Justification	Track
A	Broken wing bones	Low	Pelagic seabirds with broken wings are unable to fly, and therefore forage so survival prospects are negligible.	No
	Large open wound to any part of body (wound >2cm)		Large open wounds are significant trauma that a pelagic seabird is unlikely to recovery from.	No
	Grease or oil covering >25% of feathering		Grease and oil compromises water proofing and significant oiling is likely to be fatal to pelagic seabird.	No
B	Broken leg	Moderate	Pelagic seabirds are known to survive with missing legs and feet, so some leg injuries may not be fatal.	Yes
	Minor open wound (wound <2cm, i.e. small wound from hook injury)		Pelagic seabirds are known to survive with hook injuries; therefore, some minor wounds are known not to be fatal.	Yes
	Grease or oil covering <25% of feathering		Grease and oil compromises water proofing and minor oiling may not be fatal.	Yes
C	No visible injuries (i.e. nocturnal deck-strikes)	High	Birds with no visible injuries, mostly birds which are attracted to boats at night due to lights and are classified as deck-strikes.	No



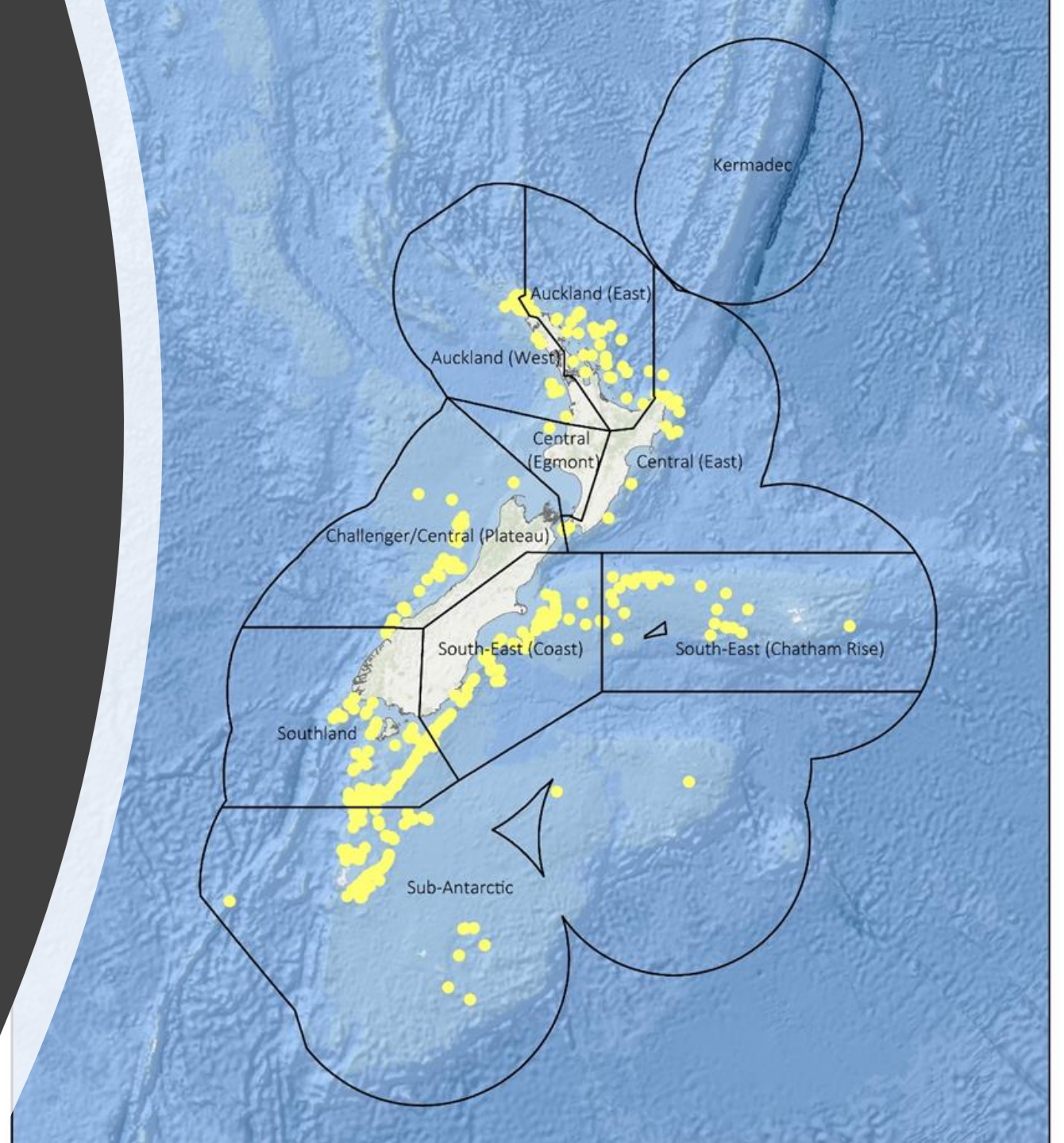
Operational issues

- Health and safety for work on commercial fishing vessels
- Vessel considerations, especially capacity for additional crew



Biological factors

- At sea behaviour – need to track “healthy” control birds to compare results
- Sample sizes
- Location of captures



Environmental factors

- At sea influences
- Annual climatic and marine variables effect seabirds
- Sample sizes may dictate tracking over multiple years, hence consider impacts of interannual variation in marine environment



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Assessing post-release survival of seabirds that interact with commercial fisheries

Inputs

- Satellite GPS trackers
- Wildlife Act Authority
- Animal Ethics Committee Approval
- Skilled GPS deployment
- Seabird health assessment
- Maritime Health and Safety

Outputs

Healthy seabirds
30 healthy seabirds captured and tracked

Injured seabirds
30 injured seabirds tracked post-release

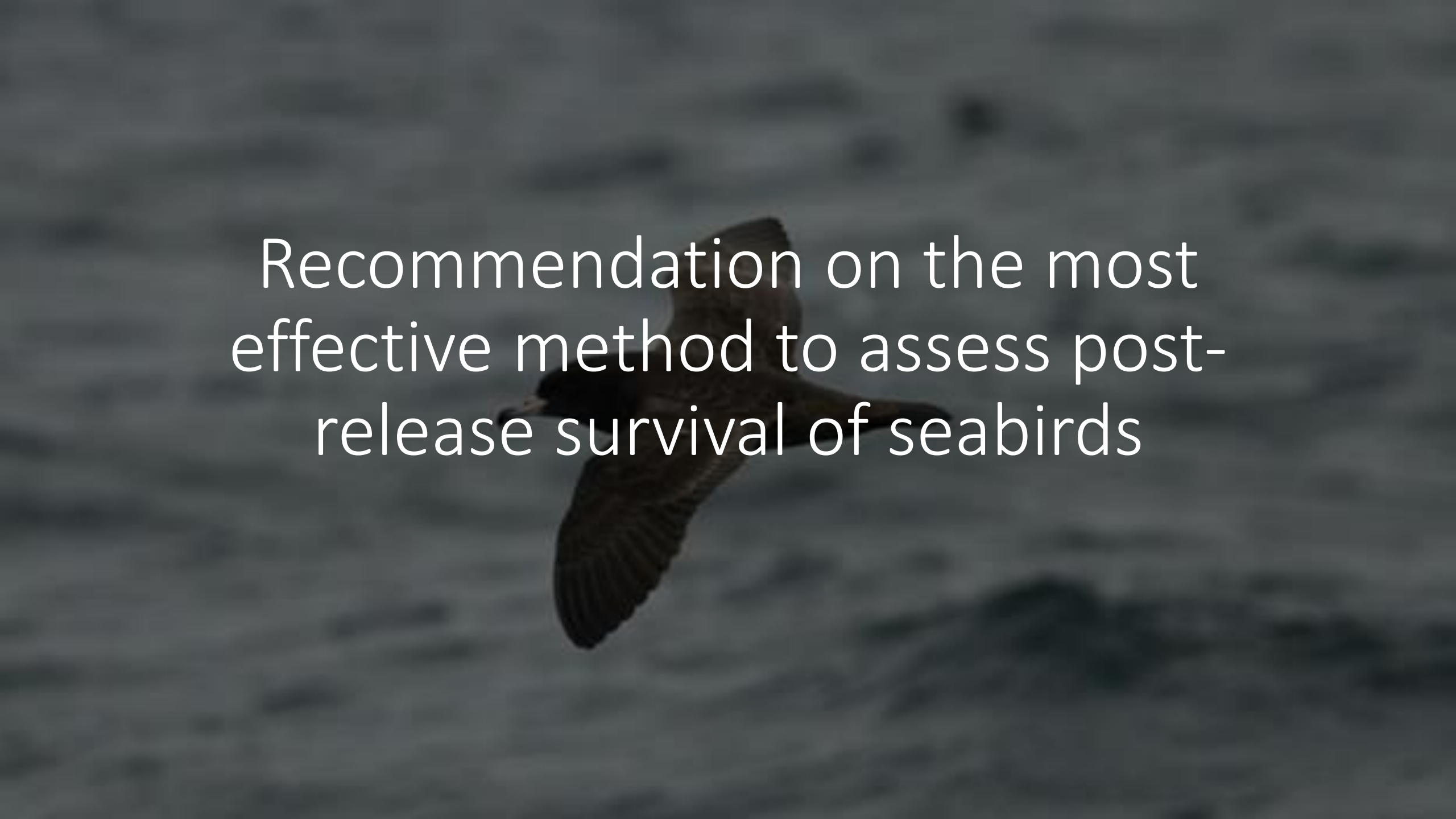
Outcomes

Healthy seabirds
Post-release behaviour of healthy seabirds assessed to compare to injured birds

Injured seabirds
Post-release mortality determined
Post-release behaviour of injured seabirds assessed

Assumptions
Ability to capture and track adequate numbers of seabird's birds

External Factors
At sea factors influencing seabird behaviour and survival

A dark seabird, possibly a booby, is shown in flight against a cloudy sky. The bird is positioned centrally, with its wings spread wide, flying from left to right. The background consists of soft, greyish clouds. The text is overlaid on the image in a white, sans-serif font.

Recommendation on the most
effective method to assess post-
release survival of seabirds

Risk assessment of survival study

Factor	Impact severity	Factor manageability	Controls	Risk
Wildlife Act Authority (1953)	High	Easy	Appropriate applications submitted with documented evidence to support application	Low
Animal Ethics Committee approval	High	Easy	Appropriate applications submitted with documented evidence to support application	Low
Banding Office considerations	Low	Easy	At least one qualified bander (Level 2 or greater seabird bander) present during field-based programme	Low
Device life on a seabird	High	Moderate	At least one skilled and experienced operator presents during field-based programme to attach device to bird	Low
Operators required for GPS device attachment	High	Difficult	Two operators needed, including at least one skilled and experienced operator presents during field-based programme to attach device to bird	High
Training	High	Moderate	Fisheries Observer time committed to training in GPS attachment methodology; and/or at least one skilled and experienced operator presents during field-based programme to attach device to bird or use experience operators	Medium
Health and Safety	High	Easy	Develop appropriate Health and Safety plans in co-operation with commercial fishing vessel	Low
Vessel considerations	High	Difficult	Appropriate vessel selection for project ensure ability for two operators to be onboard	High
At-sea behaviour	Medium	Moderate	Track a similar sample control "healthy" birds in all season injured birds tracked	Medium
Sample size	High	Moderate	Carry out multi-year project to ensure sample size adequate to ensure accurate assessment of survival rates (≥ 30 birds)	Medium
At-sea influences	Medium	Moderate	Track a similar sample control "healthy" birds in all season injured birds tracked	Medium

Study design

- Satellite tracking using Telonics TAV series PTT
- Used skilled/experience operators
- Assess seabird health and track appropriate birds
- Track sample of “healthy” birds caught at sea as “control” sample



Study design

- Track medium sized seabirds in Northern NZ (FMA1 and 9)
- Track albatross species in Southern Ocean (FMA5 and 6)
- Track ≥ 30 birds from each group
- Tracking period of ≥ 14 days, devices programmed to maximise fixes
- Track sample of control “healthy” birds by capturing unharmed
- Two operators used, with at least one skilled experienced seabird biologist



Acknowledgements

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