

# Oceanic Bottlenose Dolphins off north-eastern New Zealand

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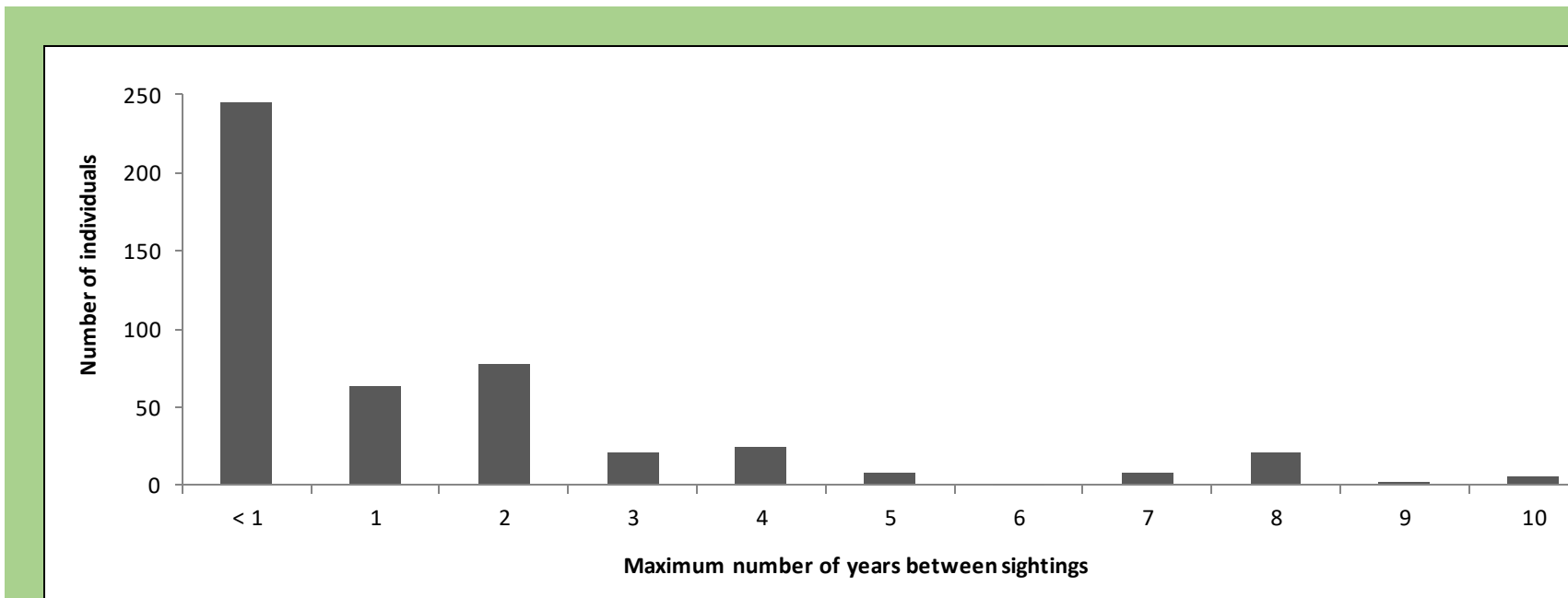
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## Introduction

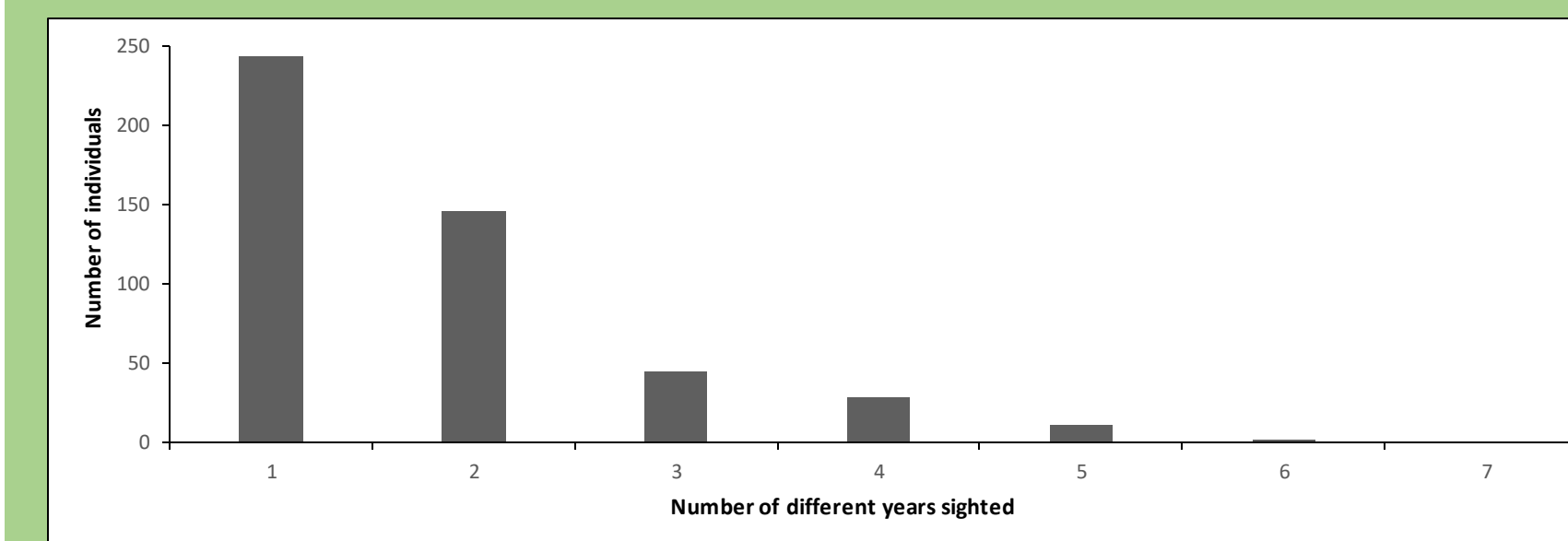
- Two forms of the common bottlenose dolphin (*Tursiops truncatus*) occur in New Zealand (NZ) waters: a widely studied *nationally endangered* coastal form and a little-known oceanic form.
- Despite reported morphological differences, the two forms are considered to be taxonomically identical (Baker *et al.* 2016).
- Bottlenose dolphins are known to associate with a range of cetacean species. However, the functions and/or extent of these associations remain poorly understood.
- Oceanic bottlenose dolphin minimum home ranges, site fidelity, social organisation and spatial overlap with the coastal form were examined from photo-identification records collected off north-eastern NZ between 2005 and 2016.

## Results

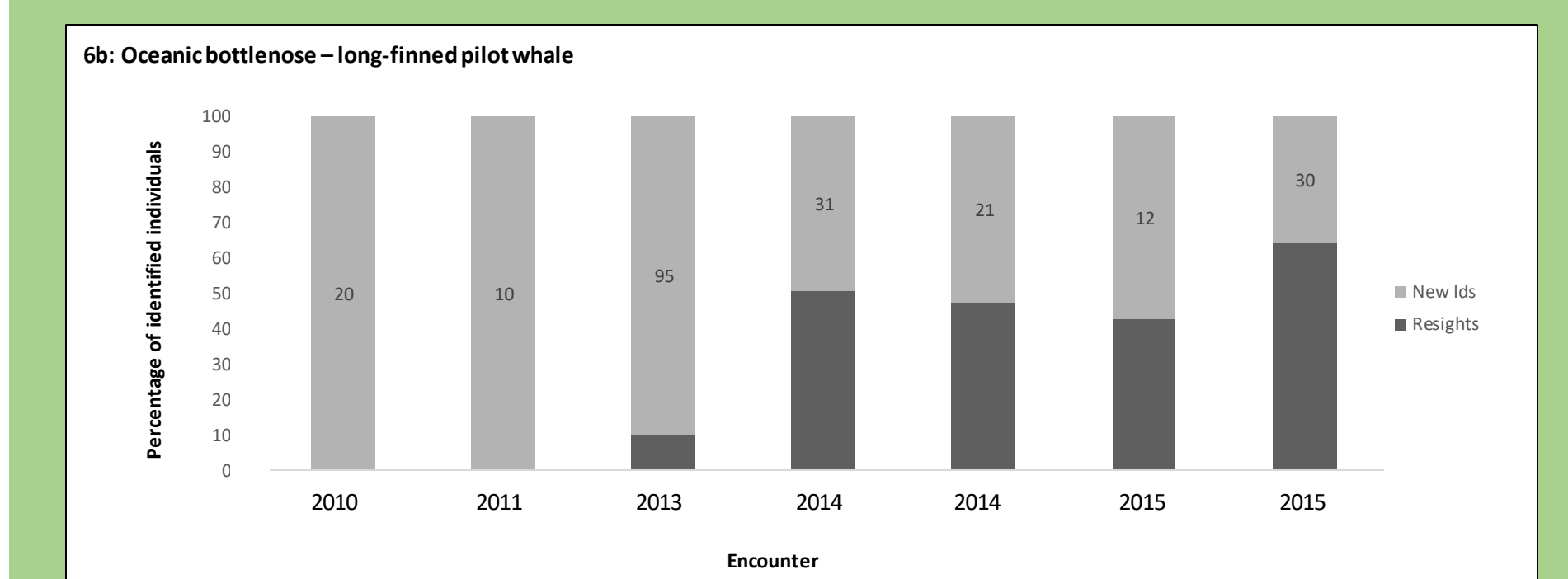
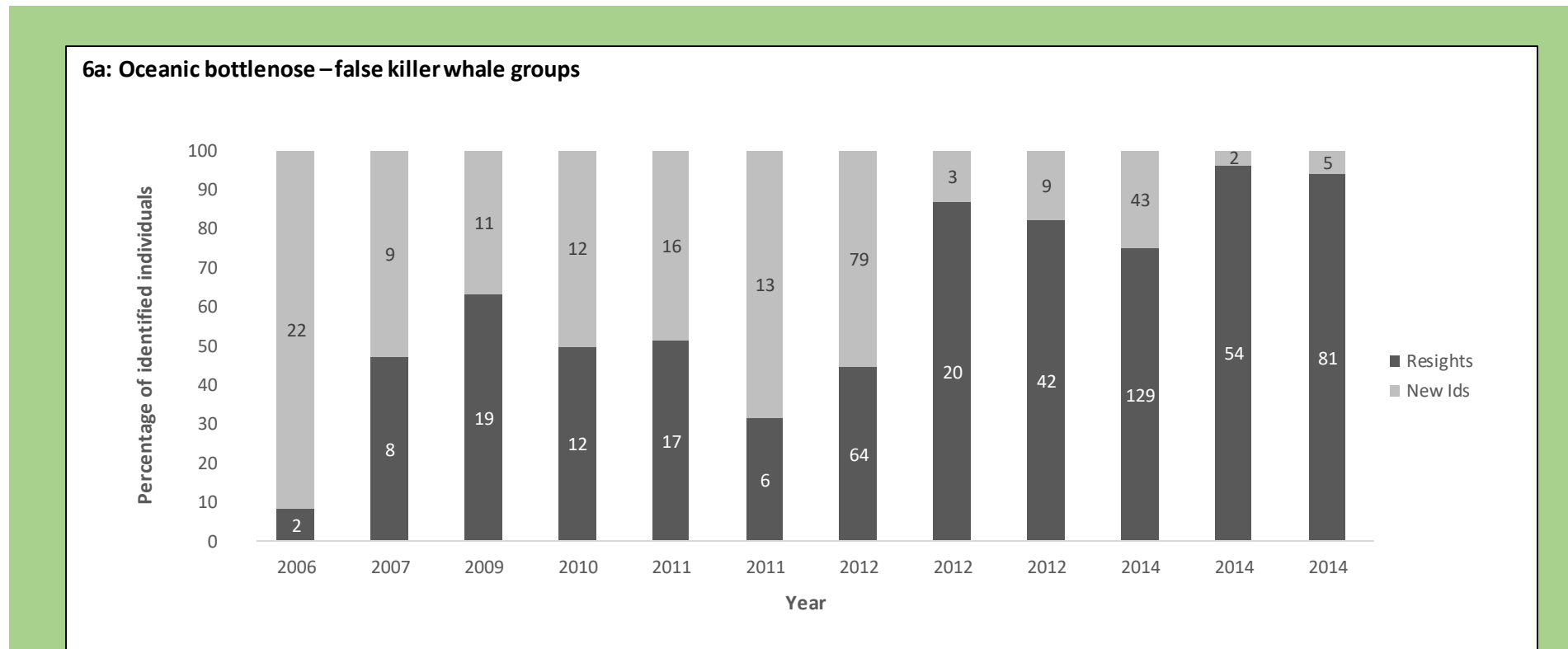
- 61 encounters of oceanic bottlenose dolphins were recorded along a 650 km stretch of coastline off north-eastern NZ between 2005 and 2016.
- Group size ranged from 3 to ca. 500 ( $n = 61$ , mean = 119.6, median = 150, SD = 81.3).
- Oceanic bottlenose dolphins occurred widely in the study area, ranging from shallow in-shore to deep off-shore waters, with home ranges overlapping with those of the coastal form, at least in some areas (Fig. 1).
- All distinctive individuals were linked by association in a single, albeit clustered, social network (Fig. 2).



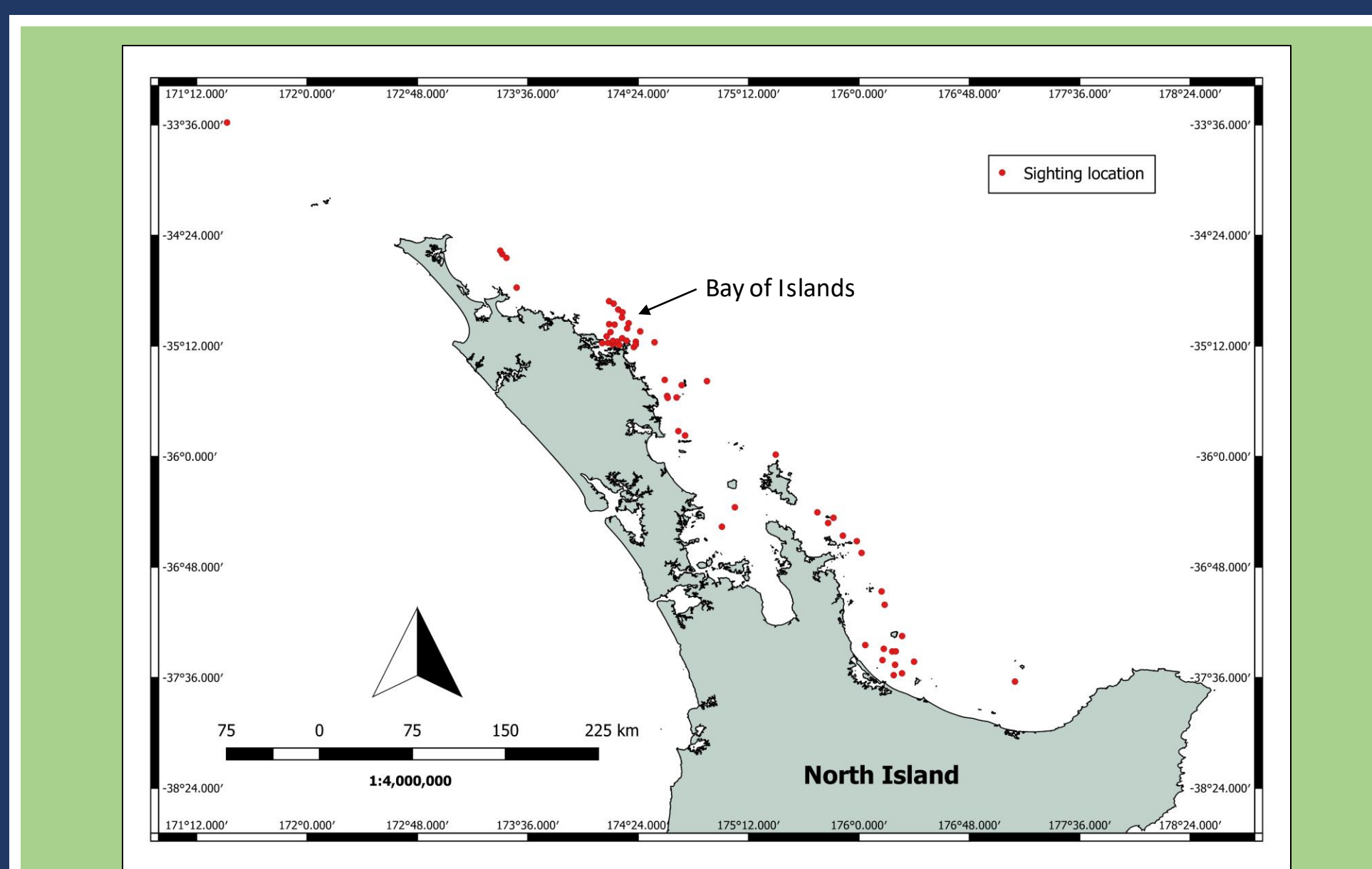
**Figure 3.** Maximum number of years between initial and most recent identification of individual oceanic bottlenose dolphins photo-identified off north-eastern New Zealand between 2005 and 2016.



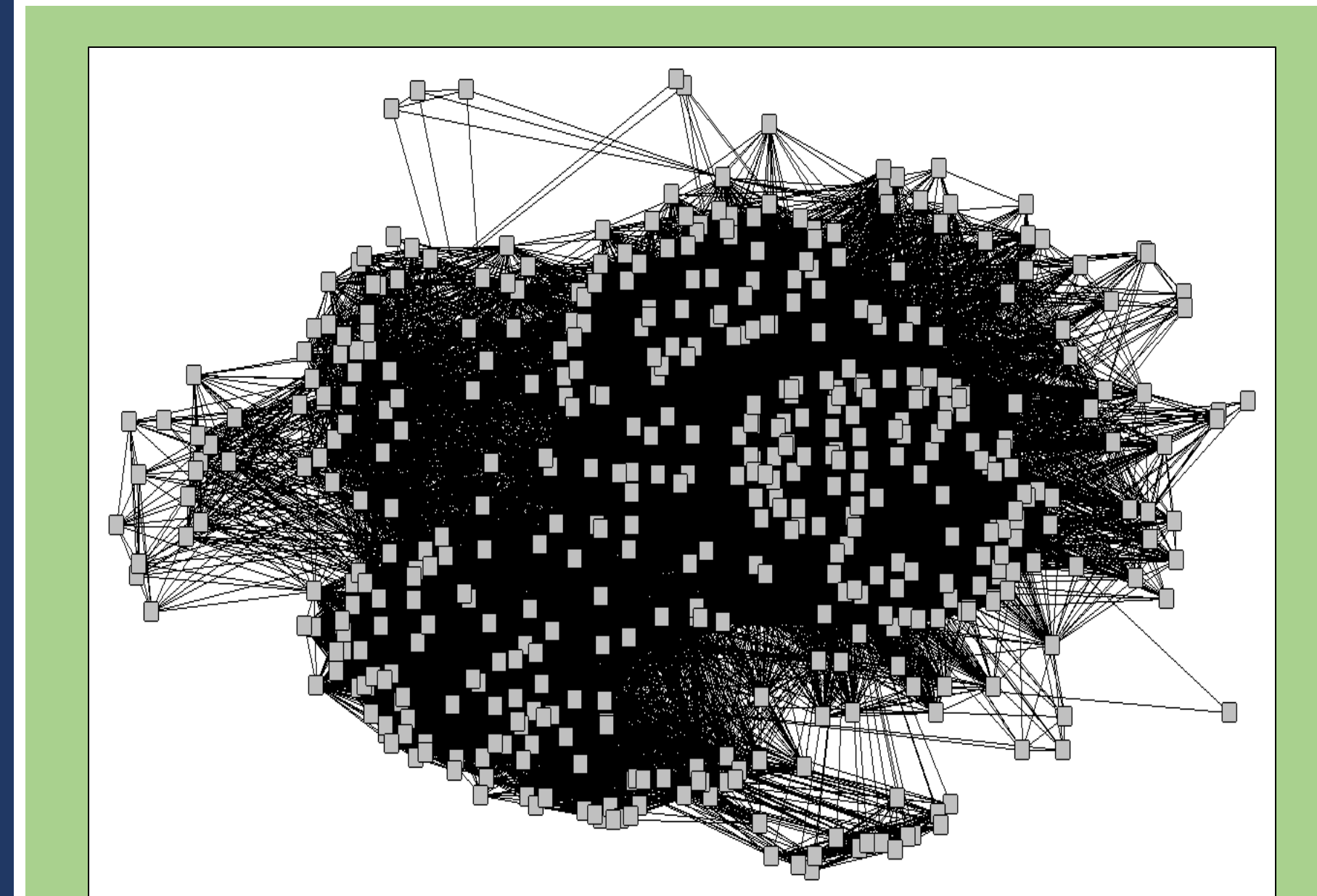
**Figure 4.** Number of different years in which individual oceanic bottlenose dolphins were sighted off north-eastern New Zealand between 2005 and 2016.



**Figure 6a & 6b.** Percentage of newly identified (New Ids) and previously identified oceanic bottlenose dolphins (Resights) observed in association with (A) false killer whales and (B) long-finned pilot whales off north-eastern New Zealand between 2005 and 2016. Multiple encounters within the same area and month were pooled and encounters with <10 identified individuals omitted.



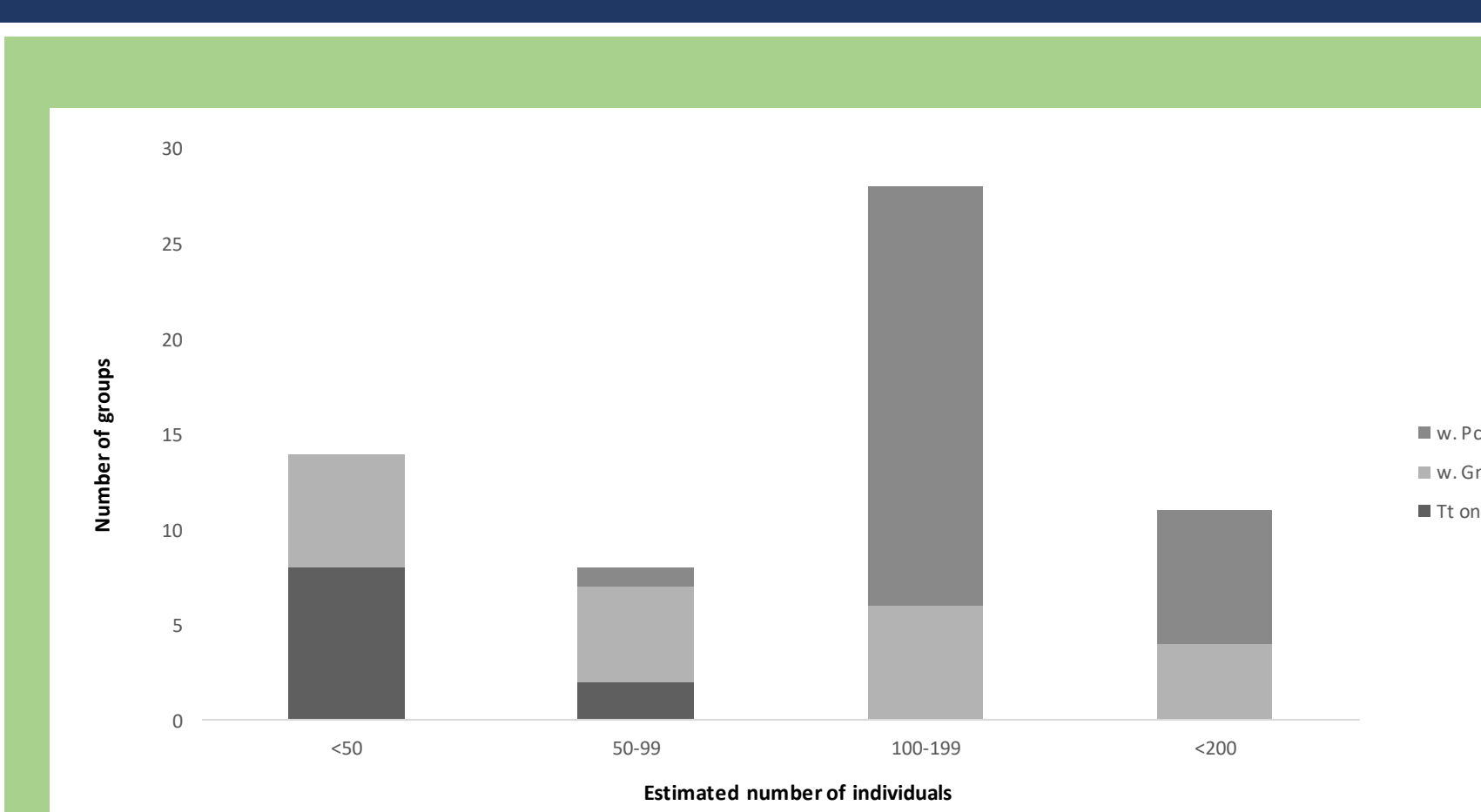
**Figure 1.** North-eastern New Zealand, showing the 61 sighting locations of oceanic bottlenose dolphins, 2005-2016



**Figure 2.** Social network diagram of 478 very distinctive and distinctive oceanic bottlenose dolphins photo-identified off north-eastern New Zealand between 2005 and 2016. Individual dolphins are represented by nodes, with more connected animals placed closer together.

## Interspecific associations

- Unlike the coastal form, oceanic bottlenose dolphins frequently formed interspecific associations with other delphinids.
- During 83.6% of encounters ( $n = 51$ ), the oceanic form was observed in close association with false killer whales (*Pseudorca crassidens*) and/or long finned pilot whales (*Globicephala melas*).
- Bottlenose dolphin group sizes were generally larger in mixed-species groups (Fig. 5).
- Rate of discovery of 'new' individuals is decreasing and appears to differ between association types (Figs. 6a & b).



**Figure 5.** Group size estimates for 61 encounters of oceanic bottlenose dolphins observed in heterospecific groups (Tt only, dark grey), in association with long-finned pilot whales (w. Gm, light grey) and with false killer whales (w. Pc, grey). North-eastern New Zealand 2005-2016.

## Methods

- Sighting data were collected along ca. 650 km of the north-eastern coast of NZ, with the majority of records collected from the Bay of Islands (Fig.1).
- Photographs and sighting records from tour vessels and small boat surveys were analyzed.
- Standard photo-identification methods were applied to identify individuals (e.g. Würsig and Jefferson 1990).
- A social network diagram was produced in Netdraw 2.123 using a spring embedded layout.

- Site fidelity was evident, with 49.0% of the 478 identified distinctive or very distinctive individuals sighted during more than one year, and with resightings spanning up to 10 years (Figs. 3 & 4).
- So far only one of the individuals identified in this study matched any of the individuals from the two coastal bottlenose dolphin identification programmes from the study area. This indicates that interactions between the two forms, although observed on one occasion, are minimal.

## Discussion

- We present the hypothesis that coastal and oceanic bottlenose dolphins are parapatric in NZ waters.
- While the shared taxonomy indicates both ecotypes form part of a single large meta-population, we recommend that the two forms be managed independently for conservation purposes.
- The observed interspecific associations appear to form an important part of oceanic bottlenose dolphin ecology in the study area. Standard group formation benefits may apply.

## Acknowledgements

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## References

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Würsig, B. and Jefferson, T.A., 1990. Methods of photo-identification for small cetaceans. *Individual recognition of cetaceans: Use of photo identification and other techniques to estimate population parameters*, pp.43-51.