False killer whales

and their association with common bottlenose dolphins off north-eastern New Zealand

121

Jochen R. Zaeschmar[1], Ingrid N. Visser[2], Dagmar Fertl[3], Sarah L.Dwyer[1], Anna M. Meissner[1], Joanne Halliday[4], Jo Berghan[5], David Donnelly[6], Karen A. Stockin [1]

[1]Coastal-Marine Research Group, Institute of Natural and Mathematical Sciences, Massey University, Private Bag 102904, North Shore, Auckland 0745, New Zealand; E-mail: jzaeschmar@hotmail.com, [2]Orca Research Trust, P.O. Box 402043, Tutukaka, 0153, New Zealand [3]Ziphius EcoServices, 8112 Springmoss Drive, Plano, Texas 75025, USA, [4]6 Kennedy Street, Opua 0200, Bay of Islands, New Zealand, [5]4 Access Road, Kerikeri 0230, Bay of Islands, New Zealand, [6]Australian Marine Ecology, 82 Parsons Street, Kensington, Victoria, Australia 3031

Introduction

- False killer whale (*Pseudorca crassidens*) occurrence in NZ is largely unknown.
- The species associates with various other delphinids but the extent and/or function of such associations remain unknown.
- The species is currently listed as Not Threatened in NZ (Baker *et al*. 2010).
- Seasonality, site fidelity and association patterns in north-eastern NZ are examined.
- Spatial and temporal aspects of inter-specific associations with common bottlenose dolphins (*Tursiops truncatus*) are also assessed.

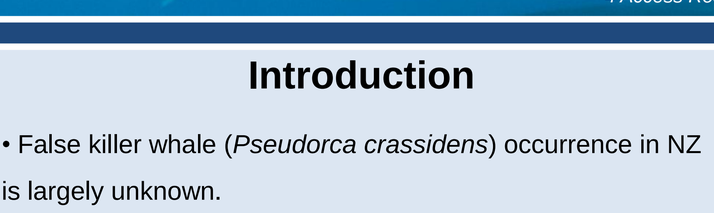

Fig. 1. North-eastern New Zealand showing false killer whale sightings. Single species groups indicated by triangles and mixed-species groups by circles.

Materials and Methods

- Sighting data were collected along *ca*. 650 km of the northeastern coast of NZ, with the majority of records collected in the Bay of Islands (Fig.1).
- Photographs and sighting records from whale watch vessels and small boat surveys were analyzed.
- Notches on or adjacent to the dorsal fin were used as identification features (Baird *et al*. 2008).
- Individuals and photographs, were graded on a scale of 1 to 4 according to the likelihood of successful recapture and matching (Zaeschmar *et al*. 2013).
- A social network diagram was produced in Netdraw 2.123 using a spring embedded layout.
- A Trip Encounter Rate was calculated to assess seasonality (Zaeschmar *et al*. 2013).
- *Ad libitum* behavioural observations, focusing only on the presence or absence of foraging events were recorded.

Fig. 2. Mean monthly sea surface temperature (SST, red line) and trip encounter rate (TER, blue bars) of false killer whales in Bay of Islands, Jan 1995 – Jun 2007.

Results

- Forty-seven encounters of false killer whales recorded between 1995 and 2012.
- Sixty-one distinctive individuals were photo-identified during 15 encounters between 2005 and 2012.
- Eighty-eight percent (*n* = 54) were resighted up to seven years post initial identification.
- Movements as far as 650 km apart were documented.
- Mean group size = 46.7 (range = 20 – 150, SD = 28.5).
- All sightings occurred between December and May (Fig. 2).
- Only 2 'new' individuals identified since 2009 (Fig. 3).
- All individuals photo-identified in the study to date are linked in a single social network (Fig.4).
- Individuals were resighted together as much as 650 km and 7 years apart.
- The highest number of identified individuals sighted together in any two encounters was 29 (January 2007 – December 2009, both Bay of Islands).
- Most observations were recorded in shallow (< 100 m) near shore waters (mean distance from shore = 9.2 km).

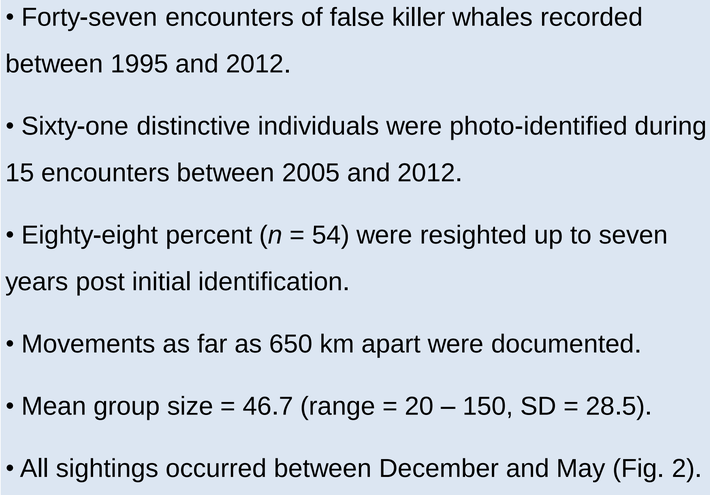

Fig. 3. Percentages of newly (blue) and previously (red) photo-identified false killer whales per encounter off north-eastern New Zealand between 2005 and 2012.

Inter-specific associations with bottlenose dolphins

- During 91.5% (*n* = 43) of encounters, close associations with bottlenose dolphins were observed (Fig. 5).
- These associations spanned the entire range of the study area and occurred during all encounter months.
- Mean group sizes for bottlenose dolphins within mixed-species groups = 62.8 (range = 5 - 250, SD = 42.8).
- Photo-identification revealed repeat inter- and intra-specific associations.
- At least 34.2% (*n* = 51) of bottlenose dolphins photo-identified, exhibited repeat associations with false killer whales, with 28.2% (*n* = 42) resighted in such groups in more than one year.
- Individuals were observed together with false killer whales up to 1832 days (*ca*. 5 years) post initial association and up to 650 km apart.
- Foraging by at least one species was observed during 39.5% of mixed-species encounters (*n* = 17).

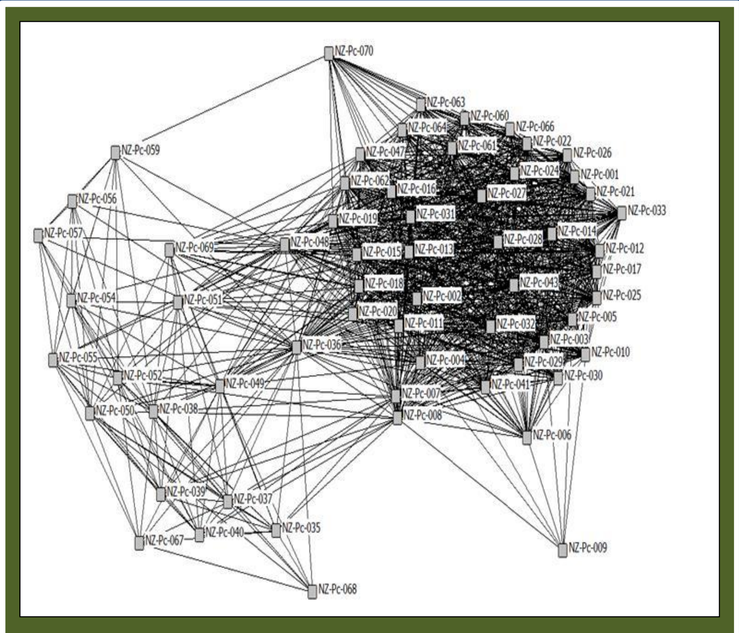

Fig. 4. Social network of 61 false killer whales photo-identified off north-eastern New Zealand during 15 encounters between 2005 and 2012. Individuals with their corresponding catalogue number are represented by nodes. Note: Clustering suggests the existence of two social clusters.

Discussion

- Site fidelity of false killer whales in near shore waters despite a strong seasonal peak in occurrence.
- All individuals indentified so far are linked by association in one single social network.
- Repeat associations between individuals are documented.
- Inter-specific associations with bottlenose dolphins are not random in the study area.
- Seasonal occurrence close to shore possibly linked to the shoreward flooding of a warm ocean current between December and May.
- A small local and possibly closed population as identified in Hawaiian waters (Baird *et al*. 2010) cannot be ruled out.
- A dedicated species-specific study is recommended to elucidate questions regarding population size, home range and extent and function of inter-specific associations.
- **Given these findings, a reassessment of the current conservation status in New Zealand may be prudent.**

Fig. 5. Close associations between a false killer whale and a bottlenose dolphin off north-eastern New Zealand. Photo: Mazdak Radjainia

Acknowledgements

Thanks to Massey University Institute of Natural and Mathematical Sciences, Department of Conservation, and all the owners, crews and passengers from the whale watch vessels who provided photographs and sighting information.

References

Baird, R. W., A. M. Gorgone, D. J. McSweeney, D. R. Salden, M. H. Deakos, A. D. Ligon, G. S. Schorr, B. Jay and S. D. Mahaffy. 2008. False killer whales (*Pseudorca crassidens*) around the main Hawaiian Islands: Long-term site fidelity, inter-island movements, and association patterns. Marine Mammal Science 24: 591-612.

Baird, R. W., G. S. Schorr, D. L. Webster, D. J. McSweeney, M. B. Hanson and R. D. Andrews. 2010. Movements and habitat use of satellite-tagged false killer whales around the main Hawaiian Islands. Endangered Species Research 10: 107-121.

Baker, C. S., L. Chilvers, R. Constantine, S. Du Fresne, R. H. Mattlin, A. van Helden and R. Hitchmough. 2010. Conservation status of New Zealand marine mammals (suborders Cetacea and Pinnipedia), 2009. New Zealand Journal of Marine and Freshwater Research 44: 101-115.

Zaeschmar, J. R., I. N. Visser, D. Fertl, S. L. Dwyer, A. M. Meissner, J. Halliday, J. Berghan, D. Donelly and K. A. Stockin. 2013. Occurrence of false killer whales (*Pseudorca crassidens*) and their association with common bottlenose dolphins (*Tursiops truncatus*) off northeastern New Zealand. Marine Mammal Science.

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA