

Black, white & grey: Antarctic orca (*Orcinus orca*) in New Zealand waters

Ingrid N. Visser^{1*}, Tracy E. Cooper¹, William J. Rayment² (*Corresponding author, ingrid@orca.org.nz)
1. Orca Research Trust (www.orcaresearch.org) 2. Department of Marine Science, University of Otago, Dunedin

ABSTRACT, METHODS & POSTER
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INTRODUCTION: Orca populations are at times distinguishable by their pigmentation. Antarctic Type B orca have, amongst other aspects, large ‘parallel’ eye patches (Fig. 1). Type C orca have, amongst other aspects, small ‘angled’ eye patches (Fig. 1). Both Type B & C have a ‘dorsal cape’, a pigmentation delineation line from the eye patch to the saddle patch (Fig. 1 & 4) and grey caudal peduncles (Fig. 3, 4 & 5). See Visser (1999) & Visser & Mäkeläinen (2000) for more details).



Figure 1. Eye patch differences (size and angle) between Type B (left) & Type C (right) Antarctic orca. Note the ‘dorsal cape’ line (arrows).

RESULTS: Ten instances of Antarctic Type B & C orca occurred in New Zealand (NZ) waters between 1997-2023 (Table 1, Fig. 2). Where it could be determined, the direction of travel for Antarctic Type B orca was only to the south, whilst for Type C orca both north and south travel was documented (Table 1).

Seasonally, the Austral autumn (March to May) had the most sightings of both Types combined (n=5), i.e., 50% of the records, followed by summer (December to February, n = 3) and spring (September to November, n=2). Interestingly, during the Austral winter (June to August) when prey in Antarctic waters is potentially at its lowest, and/or harder to obtain due to ice cover, there were no sightings in NZ waters.

All Events with Type C orca, where photos were available, included young offspring (neonates, calves, juveniles) (Table 1, Fig. 3 & 4). Two of the three Events with Type B’s, included young offspring (Table 1).



Figure 3. Sightings of Antarctic orca were frequently within kilometres of the NZ coastline, such as this encounter (Event #7), with Type C’s. Note the mustard-coloured and angled eye patch of the neonate.



Figure 4. Cookie cutter shark bites (orange arrows) were observed on both Type B (top) & Type C (bottom) Antarctic orca in NZ waters. Scars (top) and Open wounds (bottom) were documented. See Table 1 and Dwyer & Visser (2011) for details.

Table 1. Antarctic Type B (blue) and Type C (red) orca sighted in NZ waters. CCSB = Cookie cutter shark bite (Open or Scar); ϕ = this data from satellite tagging, so no photographs; Δ = not possible to ascertain as photos low resolution; * = an additional record since the abstract for this poster was accepted. Event #’s correspond to Fig. 2. In January 2015, 10 Type C orca were tagged and travelled through NZ waters, to the subtropical Kermadec trench (in northern NZ waters). See Lauriano et al (2020) & Pitman et al (2019) for details.

Event #	YYYYMMDD	Type	Location	Young Offspring Present	CCSB (Open, Scar)	Travel Direction
1	19970501	B	Bay of Islands, Northland	Yes	Yes (O, S)	South
2	20010124	C	Bream Bay, Northland	Yes	Yes (S)	South
3	20030119	C	Tutukaka, Northland	Yes	Yes (O, S)	South
4	20060301	C	Bream Bay, Northland	Yes	Yes (S)	North-West
5	20110303	C	Bay of Islands, Northland	Yes	Yes (O, S)	North
6 ϕ	201501XX	C	East Cape, Gisborne & Kermadec Trench, Northland	Not known ϕ	Not known ϕ	North
7	20150422	C	Bay of Islands, Northland	Yes	Yes (O, S)	South
8	20161127	B	Campbell Island, sub-Antarctic	Not known Δ	Not known Δ	Not stated
9	20200903	B	Cape Saunders, Otago	Yes	Yes (S)	South
10*	20230410	C	Kaikōura District, Canterbury	Yes	Yes (O, S)	North

Figure 2 (right). Map of sightings of Antarctic Type B (blue) & Type C (red) orca around NZ (see Table 1 for details). Arrows indicate matches between sightings for one female orca (Fig. 5).

CONCLUSIONS: That these long-range travels did not occur during the austral winter (when one would expect the orca to have fewer foraging opportunities in Antarctic waters due to increased ice cover), suggests a driving force other than foraging is behind their movements. Potentially these individuals may be sentinels of a changing Antarctic ecosystem or they may be ‘pioneers’, searching for new habitat. The high prevalence of calves may shed light on their motivation.

Regardless, both Type B and Type C Antarctic orca clearly use NZ waters. The ecological links these visits create between NZ and Antarctica, warrant further investigation.



Figure 5. A female Type C orca, sighted off Bream Bay, Northland on 20010124 (Event #2, Table 1) was subsequently photographed twice more in Northland waters (Event #4 on 20060301 & #5 on 20110303, Table 1). She was documented in the Ross Sea, Antarctica (black arrow, left) approximately 3 years later, on 20140127, ~4,660 km to the south of her northern-most sighting, i.e., in NZ waters.

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1. Orca Research Trust (www.orcaresearch.org)
2. Department of Marine Science, University of Otago, Dunedin

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ABSTRACT

In the Antarctic marine ecosystem, orca (*Orcinus orca*) ecotypes, which are typically defined by their prey preferences, are considered the apex predator. Like all apex predators, they may be few in numbers, but their presence (or absence) has a strong influence on the ecology of the area. Individuals have been documented over a range of time frames (intra- and inter-year observations) in the Ross Sea. Additionally, two distinctively pigmented Ross Sea Antarctic ecotypes (termed Type B and Type C) have been documented in New Zealand (NZ) waters on eight occasions between 1997-2020. There, orca were documented off the North and South Islands, as well as in the sub-tropical Kermadec Islands trench and the sub-Antarctic Islands. Group sizes ranged from 4 to 20+ and they were documented travelling both northwards and southwards. The presence of fresh wounds from cookie cutter shark (*Isistius* sp.) bite marks were documented when the orca were heading south (i.e., presumably after having been in the sub-tropics). These long-range travels occurred in all seasons but winter, including during the austral summer (when one would expect the orca to be foraging in the prey-rich waters of Antarctica), suggesting a driving force other than foraging is behind their movements. These groups of orca do not appear to be 'out of habitat' as such, but rather may be sentinels of a changing Antarctic ecosystem or they may be 'pioneers' – searching for new habitat. Naturally, these two hypotheses are not mutually exclusive and alternative hypothesis should not be excluded.

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METHODS

Sightings were collected by the authors during field research. Additional records were collated from calls to the Orca Hotline (0800 SEE ORCA), from other researchers, members of the public, cetacean watching companies and via social media. Photographs were used for, *inter alia*; (1) categorizing the orca into ecotype (see introduction for details); (2) photo-identification of individuals to establish inter- and intra- site fidelity and patterns of movement over time; (3) to establish group composition (e.g., neonates were classified based on the mustard-coloured pigmentation, foetal folds and/or relative size, whilst adult males were classified based on the size of their dorsal fins) and; (4) to assessing the presence of cookie cutter shark (*Isistius* sp.) bite marks. Location of sighting, as well as direction of travel were noted.