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INTERNATIONAL  
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# New Zealand blue whales: an update on residency and behavior

Paula A. Olson<sup>1</sup>, Nadine Bott<sup>2</sup>, Carlos Olavarria<sup>3</sup>, Olive Andrews<sup>4</sup>, Rochelle Constantine<sup>5</sup>, Natalie Schmitt<sup>3</sup>, Paul Ensor<sup>3</sup>, Brian S. Miller<sup>3</sup>, Jody Weir<sup>6</sup>, Simon Childerhouse<sup>7</sup>, Miranda van der Linde<sup>8</sup>, Michael C. Double<sup>3</sup>

<sup>1</sup> Southwest Fisheries Science Center NMFS/NOAA, 8901 La Jolla Shores Drive, La Jolla, CA 92037 USA

<sup>2</sup> Department of Conservation, Wellington District Office, PO Box 10420, Wellington, New Zealand

<sup>3</sup> Australian Marine Mammal Centre, Australian Antarctic Division, Channel Highway, Kingston Tasmania 7050 Australia

<sup>4</sup> Conservation International, University of Auckland, New Zealand

<sup>5</sup> School of Biological Sciences, University of Auckland, Private Bag 92019, Auckland, New Zealand

<sup>6</sup> Kaikoura Ocean Research Institute Inc., 13 Maui Street, Kaikoura, 7300, New Zealand

<sup>7</sup> Blue Planet Marine, Canberra, ACT Australia

<sup>8</sup> Rua Doutor Aristides Moreira de Mota, 20 R/C, Ponta Delgada, 9500-054, Azores, Portugal

*Paula.Olson@noaa.gov*

## ABSTRACT

Eight blue whales were photo-identified from coastal waters around New Zealand in 2015: seven from the South Island and one from Raoul Island (of the Kermadec Islands). Our collection of New Zealand blue whale photo-identifications now totals 38 individuals (27 left sides, 25 right sides). The 2015 photos were compared to one another and to 31 identification photos of New Zealand blue whales from the years 2004–2014. One photographic match was found between a whale seen in Cook Strait in both June 2008 and in June 2015. This is the second re-sighted whale of the 38; the first was initially sighted in Cook Strait in 2011 and re-sighted off the east coast of the South Island in March 2013. Two re-sights within a small photo collection such as this one suggests that this is a small population of blue whales that repeatedly visit or are resident in New Zealand waters. Evidence of feeding was observed off the west coast of the South Island in January 2015, in almost the same location where feeding was observed in January 2013. Feeding has been observed in at least four locations around New Zealand, during three seasons, indicating that blue whales utilize multiple areas of productivity around New Zealand. Much remains unknown about the general ecology of blue whales in New Zealand waters and more research is warranted.

KEYWORDS: BLUE WHALE, PHOTO-ID, NEW ZEALAND, FEEDING GROUNDS

## INTRODUCTION

Blue whales (*Balaenoptera musculus* spp.) are found in the waters surrounding New Zealand, but until recently very little was known about them. A New Zealand-specific population of blue whales may exist based on the discontinuity in the distribution of sightings between New Zealand and other regions in the southeast Pacific and on the unique blue whale sounds recorded off New Zealand (Branch *et al.*, 2007; Miller *et al.*, 2014). Although both Antarctic and pygmy-type blue whales have been reported in the New Zealand region (Branch *et al.*, 2007), Miller *et al.* (2014) and Olson *et al.* (2015) determined that the whales producing the New Zealand song were morphologically pygmy-type blue whales.

The residency, movements, and habitat use of blue whales in New Zealand waters is still not well understood, although recent studies are beginning to show patterns. Blue whales have been detected (visually or acoustically) in all months of the year around New Zealand (Torres, 2013; Miller *et al.* 2014; Olson *et al.* 2015), suggesting the possibility that some New Zealand whales may be non-migratory. One whale, of 31 photo-identified from 2004 to 2014, was re-sighted in different seasons and years (Olson *et al.*, 2015), further suggesting a non-migratory status. Similarly, Torres *et al.* (2015) reported an inter-annual re-sight of a blue whale from November 2010 to January 2014. Seasonally, blue whales appear regularly in June and July in Cook Strait (N. Bott, *personal observ.*). Whether the whales move through the Strait to access other areas in New Zealand (such as the

South Taranaki Bight) or to continue to a migratory destination is unknown. The whales are usually observed to be traveling while in the Strait (N. Bott, *personal observ.*; Olson *et al.*, 2015).

Feeding behavior of blue whales has now been documented in multiple locations around New Zealand, including the Hauraki Gulf, the west and east coasts of the South Island (Olson *et al.*, 2015), and most notably, the South Taranaki Bight (Torres, 2013; Torres *et al.*, 2015). Research by Torres *et al.* (2015) characterized the general habitat features of the South Taranaki Bight, including oceanography and prey composition, and confirmed it as a foraging ground for blue whales. Feeding behavior has been observed during three seasons: spring, summer, and autumn (Torres, 2013; Olson *et al.*, 2015).

Here we present new information based on the opportunistic photo-identification and behavioural observations of New Zealand blue whales from 2015. This builds on the data 2004-2014 that was reported previously (Olson *et al.*, 2015).

## **MATERIALS and METHODS**

Photographs were obtained from four sources:

1. In January 2015, a group of eight blue whales was sighted off Westport, South Island, during a tourist cruise conducted by the *MV Silver Discoverer*. Photographs were collected opportunistically (by OA). The whales were a pygmy-type with wide, broad rostrums (as opposed to Antarctic blue whales) and also exhibited scarred, pockmarked skin.
2. In March 2015, a blue whale was detected east of Cook Strait during the return transit of the *RV Tangaroa* during the New Zealand-Australia Antarctic Ecosystems Voyage (Double *et al.*, 2015). Real time acoustic tracking of blue whales, using sonobuoys, was conducted during the transit and the acoustic team guided the vessel toward the blue whale until the whale was in visual range (Miller *et al.*, 2015). The whale was producing New Zealand-type calls. Once the blue whale was detected visually, the ship approached the whale for photo-identification (by PAO, NS, PE).
3. In June 2015, blue whale identification photographs were collected opportunistically from a skiff during research targeting humpback whales in Cook Strait (by NB and CO). The research is conducted under the auspices of the Department of Conservation in partnership with OMV NZ Ltd. This whale had severely scarred skin.
4. In October 2015, at Raoul Island, large blows consistent with blue whales were detected during SORP<sup>1</sup>-sponsored research directed toward humpbacks. One blue whale approached the research skiff and opportunistic photographs were collected (by OA). The whale was judged to be a pygmy-type blue whale with an estimated body length of 20m. Although Raoul Island lies 1,100km northeast of the North Island, it is part of the Kermadec Islands belonging to New Zealand.

Photographs were judged to meet minimum criteria of quality based on distance to the subject (whale), angle, exposure, and focus. Only photos containing a whale's dorsal fin were used for identification, as the fin is necessary for comparison to the identification photos in other photo collections. Whales were examined for unique natural markings and identified as individuals following methods outlined in Sears *et al.* (1990) and Gendron and Ugalde de la Cruz (2012).

Photographs of individual blue whales from 2015 were compared to one another and to the photographs of 31 New Zealand blue whales (22 left sides, 20 right sides) identified from 2004-2014 (Olson *et al.*, 2015).

## **RESULTS**

### **Photo-identification**

A total of eight individual New Zealand blue whales were photo-identified (6 left sides, 5 right sides), from all four sources during 2015 (Table 1). One whale was re-sighted (photographically matched); it was first seen in Cook Strait in June 2008 and then again in June 2015. There are now two re-sighted blue whales in this collection of 38 individuals; one left side match (1/27) and one right side match (1/25). Figure 1 shows the locations of re-sighted whales.

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<sup>1</sup> Southern Ocean Research Partnership

Table 1. The dates and locations of photo-identified individual blue whales in New Zealand waters in 2015.

Month	Day	Location	Number of photo-identified whales	Behavior	Data source
Jan	26	13 nmi off Westport, South Is.	5	Competitive social; defecation	Andrews
Mar	10	East of Cook Strait	1	Traveling	Double, <i>et al.</i>
Jun	14	Cook Strait	1	Traveling	Bott
Oct	9	Raoul Island	1	Approached skiff; probably traveling	Constantine & Andrews

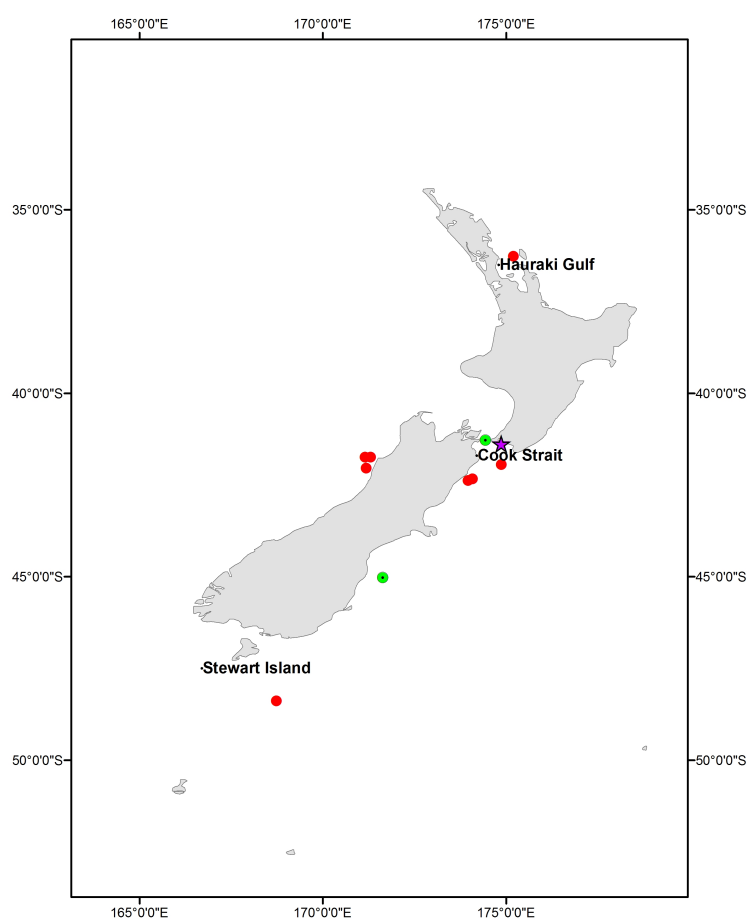


Figure 1. Locations of photo-identified blue whales in New Zealand waters, 2004-2015. The purple star represents the location of a re-sighted whale in Cook Strait in June 2008 and in June 2015. The green circles represent the locations of a re-sighted whale in Cook Strait in June 2011 and off Oamaru, South Island in March 2013. Note that Raoul Island is not displayed on this map; it is located 1,100km northeast of the North Island.

## Behavioral observations

The blue whales observed off Westport, South Island (January 2015) exhibited competitive behaviors such as charging and chasing. Defecation by two whales was also observed; meaning the whales had been feeding in the past 24 hours. (Fig 2.) Krill patches were visible in the water approximately 10m below the surface.

The blue whale in Cook Strait (June 2015) was observed to be traveling, as were the other 12 blue whales photo-identified there. The blue whale photographed just to the east of Cook Strait (March 2015) was also observed to be traveling.

The blue whale sighted at Raoul Island (October 2015) approached the skiff briefly, and was otherwise thought to be slowly traveling.

## DISCUSSION

Two re-sights within a small photo collection such as this one suggests that there is a small population of blue whales that repeatedly visit or are resident in New Zealand waters. Torres *et al.* (2015) also reports a re-sighted whale; in this case a female that was first sighted in the Hauraki Gulf in November 2010 and subsequently in the South Taranaki Bight in January 2014. Of the total three re-sighted individuals to date, two of the re-sights have been inter-seasonal (June-March; November-January), again suggestive of residency.

The group of eight blue whales observed off Westport, South Island was in almost the same place where groups of feeding whales were observed in 2013 (Fig. 2). There are also anecdotal and unreleased reports of blue whales feeding at this location for several months during 2013 and 2015. Given that feeding has now been observed in at least four locations, during three seasons, it is apparent that blue whales utilize multiple areas of productivity around New Zealand. The area off Westport would be a good candidate for future research on New Zealand blue whales during the summer months.

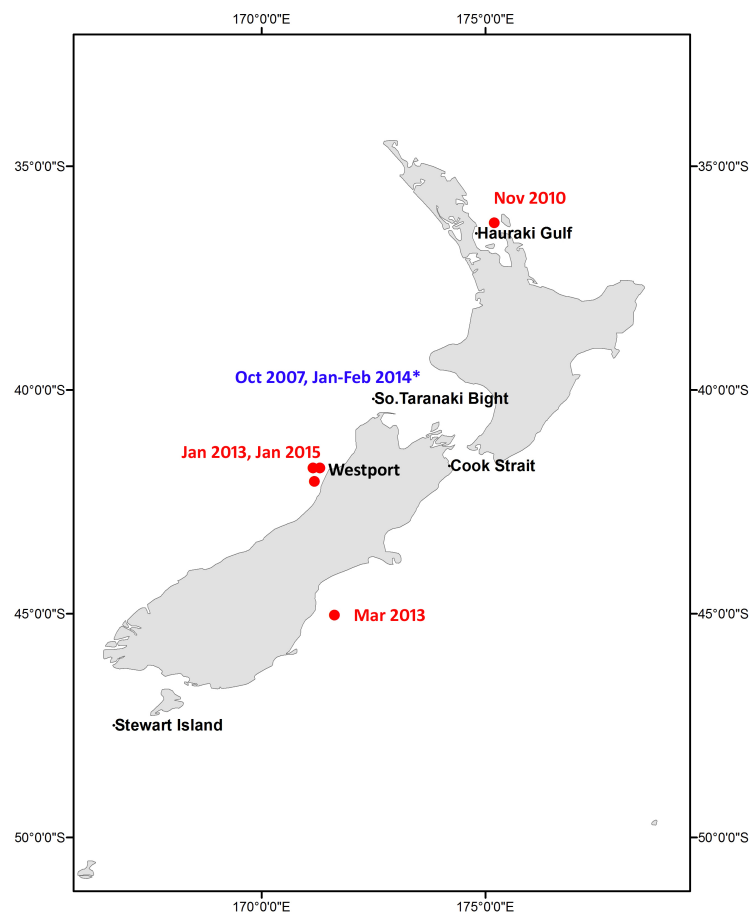


Figure 2. Dates and locations of feeding blue whales in New Zealand waters.

\*From Torres (2013) and Torres *et al.* (2015).

The project at Raoul Island was one of the first conducting dedicated cetacean research in the Kermadec Islands (Constantine *et al.*, 2016). While humpbacks are the most commonly sighted baleen whales there, blue whales have been known to occur. Humpbacks appear seasonally in the area during their southward migration, but how blue whales may utilize the area is not known. New Zealand type blue whale calls have been recorded in the winter months in Lau Basin, approximately 1000km to the north of Raoul Island (Balcazar *et al.*, 2015). It may be that the blue whale sighted at Raoul Island in October was moving southward as well, toward feeding areas at New Zealand. This is the first photo-identified blue whale from the Kermadec Islands.

In total, seven new blue whale identifications and a re-sight were added to our collection of photo-identified blue whales – all from opportunistic platforms. Opportunistic data such as these are a valuable resource in the study of New Zealand blue whales.

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