

Comparison of Antarctic blue whale photographs from JARPA II to the Antarctic Blue Whale Catalogue

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ABSTRACT

Fifty-two individual Antarctic blue whales were identified from photographs collected during JARPA II surveys in the Antarctic during seven austral summer seasons between 2005/2006 and 2012/2013, in IWC Management Areas III, IV and V. Comparisons of identification photographs from JARPA II were made to a collection of 305 photo-identified Antarctic blue whales compiled into the Antarctic Blue Whale Catalogue. Three whales matched to individuals in the collection with time intervals of 2 years (for 1 whale) and 7 years (for 2 whales). The addition of 49 newly identified Antarctic blue whales from JARPA II brings the total number of photo-identified Antarctic blue whales up to 354. The sighting histories of individual Antarctic blue whales from photo-ID provide data for capture-recapture estimates of abundance as well as information on the movement of individual blue whales within the Antarctic region.

KEYWORDS: ANTARCTIC, BLUE WHALE, PHOTO-ID

INTRODUCTION

The population status of the endangered Antarctic blue whale (*Balaenoptera musculus intermedia*) is a subject of interest of the IWC Scientific Committee, which initiated an in-depth assessment of Southern Hemisphere blue whales in 2006 (IWC, 2006). In support of the assessment, in 2007 a photo-identification catalogue of Antarctic blue whales was created based on the photographs collected during 20 years of circumpolar IWC IDCR/SOWER research cruises (Olson, 2010). The photo-ID data from this catalogue has produced information on whale movement, within season sighting rates, and preliminary abundance estimates (Olson, 2012; Olson and Kinzey, 2014). The status of blue whales in the Antarctic is also of concern to the Southern Ocean Research Partnership (SORP), which in 2009 established the Antarctic Blue Whale Project (Bell, 2012). The use of photo-identification data in a capture-recapture analysis for the production of a contemporary estimate of abundance of Antarctic blue whales is a key component of the Antarctic Blue Whale Project (Bell, 2012).

Since the establishment of the Antarctic Blue Whale Catalogue in 2007 the number of photo-identified blue whales has been increasing, with photographs collected during the 2013 Antarctic Blue Whale Voyage (Double *et al.*, 2013; Olson *et al.*, 2013a), opportunistic photographs contributed by scientists working on other projects in the Antarctic (Olson, 2012), and photographs made available to the IWC collected during JARPA surveys (Olson *et al.*, 2013b). The total number of photo-identified Antarctic blue whales combining all these sources is 305.

In 2013 the Institute of Cetacean Research in Japan made available to the IWC 413 photographs of Antarctic blue whales collected 2005/2006 to 2012/2013 during the Japanese Whale Research Program II under Special Permit in the Antarctic (JARPA II). The IWC Scientific Committee's SH subcommittee requested that blue whale photographs from JARPA II surveys be compared to the Antarctic Blue Whale Catalogue (IWC, 2013). The addition of more samples to the collection of Antarctic blue whale identification photographs would be immensely useful. The JARPA II surveys are a source of identification photos that would potentially provide data for capture-recapture analysis as well as information on the movement of individual blue whales within the Antarctic region.

This paper presents the results of the comparison of blue whale photographs collected during JARPA II surveys in the Antarctic to the photographs of 305 Antarctic blue whales currently identified.

METHODS

A selection of 416 Antarctic blue whale photographs obtained during JARPA II surveys were made available to the IWC and forwarded to the lead author. The photographs were collected during seven surveys in Antarctic waters during austral summers spanning 2005/2006 through 2012/2013. A review of field methods is given in Matsuoka and Pastene (2009). The surveys were conducted in IWC Management Areas IIIIE, IV and V. Specific location data did not accompany the photographs and so are not presented at this time.

Before matching, the JARPA II photographs were judged to meet minimum criteria of quality based on distance to the subject (whale), focus, angle and lighting. Only photos containing a whale's dorsal fin were used because the fin was necessary for comparison to the identification photos in the other photo collections.

The identification photos of the whales from the JARPA II surveys were compared to photographs obtained from four other sources: IDCR/SOWER surveys, opportunistic photos, the Antarctic Blue Whale Voyage 2013, and JARPA surveys (Table 1). Methods for comparison followed those outlined in Sears *et al.* (1990) and Gendron and Ugalde de la Cruz (2012).

Table 1. Photograph collections of individual Antarctic blue whales to which JARPA II photographs were compared.

Photo collection	Years	Number of individual whales ¹	Number of left side photos	Number of right side photos
IDCR/SOWER surveys	1990/1991-2008/2009	219	183	171
Opportunistic photos	2009/2010-2011/2012	8	5	4
ABWV	2013	47	36	41
JARPA	1992/1993-2004/2005	31	13	21
TOTAL		305	237	237

¹Whales re-sighted in multiple years are tallied only in the photo collection where they were first identified.

RESULTS AND DISCUSSION

Photographs from JARPA II of 52 individual Antarctic blue whales represented by 32 left side photographs and 28 right side photographs met the minimum quality criteria (Table 2).

Table 2. Number of individual Antarctic blue whales identified in photographs collected during JARPA II surveys.

Year	Number of individual whales	Number of left side photos	Number of right side photos
2005/2006	10	7	6
2007/2008	17	9	9
2008/2009	10	5	7
2009/2010	7	4	5
2011/2012	3	3	0
2012/2013	5	4	1
TOTAL	52	32	28

Photographs of 3 of the 52 whales matched to whales photographed either previously or subsequently, with time intervals of 2 years (for 1 whale) and 7 years (for 2 whales; Table 3). Similar to findings by Matsuoka and Pastene (2009), there were no matches between whales photographed during JARPA and JARPA II.

Table 3. Photo-identified Antarctic blue whales from JARPA II matched to photographs in previous or subsequent years.

Whale ID	Date first sighting	Date re-sighting
#0607	20 Jan 2006	15 Dec 2007 (JARPA II)
#1313	1 Feb 2006 (JARPA II)	14 Feb 2013
#1322	24 Feb 2006 (JARPA II)	14 Feb 2013

The addition of 49 newly photo-identified Antarctic blue whales brings the total number of identified whales in the Antarctic to 354. Including the three re-sighted whales from the present analysis, there are now a total of 13 whales that have been re-sighted inter-annually. The sighting histories of photo-identified Antarctic blue whales provide data for estimating abundance using capture-recapture analysis (Kelly *et al.*, 2012; Olson and Kinzey, 2014) and these data will be useful for future estimates. The photo-ID data also provide information on the movement of individual blue whales within the Antarctic region (Olson, 2012; Olson *et al.*, 2013a) and potentially on population structure (e.g. Branch *et al.*, 2007). The continued collection and analysis of photographic data from the Antarctic will yield more information on this endangered population.

ACKNOWLEDGEMENTS

We thank Bob Brownell, who was instrumental in facilitating this project, Greg Donovan and the IWC. The Marine Mammal Centre, Australia, and Claire Garrigue, Nicolas Gasco, Russ Manning and Stephanie Martin provided photographs and data. Thank you also to the many field biologists, researchers, ship captains and crews for collecting photographs. Funding for this work was allocated to the author (PAO) at the meeting of the Scientific Committee in 2013.

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