

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

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## ABSTRACT

Thirty-one individual Antarctic blue whales were identified from photos collected during JARPA cruises in the Antarctic during 12 austral summer seasons between 1992/1993 and 2004/2005, in IWC Management Areas III, IV, V and VI. The contribution of 31 individuals to the Antarctic catalogue brings the number of photo-identified Antarctic blue whales up to 305 and notably increases the number of whales photo-identified in Area III to 165 and in Area V to 93. Comparisons of identification photographs were made within the JARPA collection and to the Antarctic Blue Whale Catalogue. No matches were found. The sighting histories of individual Antarctic blue whales from photo-ID provide data for mark-recapture analysis as well as information on the movement of individual blue whales within the Antarctic region.

KEYWORDS: ANTARCTIC, BLUE WHALE, PHOTO-ID

## INTRODUCTION

In recent years the population status of the endangered Antarctic blue whale (*Balaenoptera musculus intermedia*) has been a concern of the IWC Scientific Committee, which initiated an in-depth assessment of Southern Hemisphere blue whales in 2006 (IWC, 2006) and of the Southern Ocean Research Partnership (SORP), which established the Antarctic Blue Whale Project in 2009 (Bell, 2012). 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; 2012). In 2012 the Institute of Cetacean Research in Japan made available to the IWC 68 identification photographs of Antarctic blue whales collected during the Japanese Whale Research Program under Special Permit in the Antarctic (JARPA) cruises 1992/1993 to 2004/2005. The IWC Scientific Committee's SH subcommittee requested that blue whale photographs from JARPA cruises be compared to the Antarctic Blue Whale Catalogue (IWC, 2012). The addition of more samples to the collection of Antarctic blue whale identification photographs would be extremely useful. The JARPA cruises are a source of identification photos that would potentially provide data for mark-recapture analysis as well as information on the movement of individual blue whales within the Antarctic region.

The use of photo-identification data in a mark-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). Photo-ID data from the Antarctic Blue Whale Catalogue as well as the recent Antarctic blue whale voyage (Double *et al.*, 2103) will be used (Kelly *et al.*, 2012). Prior to the 2013 voyage the catalogue contained 227 identified individuals, representing 10% of the most recent population estimate of 2,280 (Branch, 2007). Forty-seven 'new' whales were photo-identified during the 2013 voyage (Olson *et al.*, 2013), bringing the total number of photo-identified Antarctic blue whales to 274.

This paper presents the results of the comparison of blue whale photographs collected during JARPA cruises in the Antarctic to the identification photographs of 274 Antarctic blue whales currently catalogued.

## METHODS

The identification photographs of 68 individual Antarctic blue whales collected during JARPA cruises were made available to the IWC and forwarded to the author. The photographs were obtained over the span of 12 cruises in Antarctic waters during the austral summers between 1992/1993 and 2004/2005 (no photographs from season 1998/1999) and from IWC Management Areas III East, IV, V and VI West. The photographs had been digitized in Japan prior to being forwarded to the IWC.

Before matching, the JARPA photographs were judged to meet minimum criteria of quality based on distance to the subject (whale), focus, angle and lighting.

The identification photos of the whales from the JARPA cruises were compared to one another and to the Antarctic Blue Whale Catalogue including the 47 newly identified whales from the 2013 Antarctic Blue Whale Voyage (Olson *et al.*, 2013). Methods used followed those outlined in Sears *et al.* (1990).

## RESULTS AND DISCUSSION

Photographs of 31 Antarctic blue whales represented by 13 left sides and 21 right sides met the quality criteria (Table 1). (Film images can lose resolution during the digitizing process and that likely occurred with some of the images.) No inter-matches within the JARPA collection of blue whale photos or between the JARPA collection and the Antarctic Blue Whale Catalogue, including the photos from the 2013 voyage, were found. The lack of matches between the JARPA collection and the Antarctic catalogue is consistent with the low inter-year re-sighting rate of photo-identified blue whales found to date, about 3% (Olson, 2012).

Table 1. Dates and sighting locations (IWC Management Area) for 31 Antarctic blue whales identified by photographs meeting quality criteria collected during JARPA.

Whale ID	Date	IWC Management Area
J001	14 Dec 1992	V
J002	14 Dec 1992	V
J008	13 Feb 1993	V
J015	26 Jan 1994	IV
J018	25 Feb 1994	IV
J019	1994/1995	V
J020	1994/1995	V
J022	1994/1995	V
J026	15 Dec 1995	III E
J027	7 Jan 1996	IV
J034	1 Dec 1999	III E
J035	1 Dec 1999	III E
J039	1 Dec 1999	III E
J040	1 Dec 1999	III E
J041	13 Dec 1999	III E
J044	19 Dec 1999	III E
J045	Dec 1999	III E
J048	21 Dec 1999	III E
J049	21 Dec 1999	III E
J053	22 Jan 2000	IV
J054	16 Feb 2000	IV

Whale ID	Date	IWC Management Area
J055	22 Feb 2000	IV
J056	22 Feb 2000	IV
J060	28 Jan 2002	IV
J061	25 Dec 2002	VI W
J062	16 Jan 2003	V
J063	4 Dec 2003	III E
J064	4 Dec 2003	III E
J065	12 Dec 2003	III E
J067	27 Feb 2004	IV
J068	14 Dec 2004	VI W

Thirty-one photo-identifications of Antarctic blue whales is a sizable contribution of individuals to the catalogue, bringing the total number of identified blue whales to 305. Of particular interest is the number of identified whales in Area V (the study area of the recent Antarctic blue whale voyage in 2013), now totalling 93, up from 36 whales<sup>1</sup> just a year ago (Olson, 2012). Likewise the heavily sampled Area III (see Ensor *et al.*, 2005, 2006, 2007), now with 165 photo-identified whales. Table 2 gives the distribution by Area of all photo-identified Antarctic blue whales to date.

Table 2. Number of identified Antarctic blue whales, by IWC Management Area. Note that five whales were seen in two different areas and are tallied in each of their two respective areas.

IWC Management Area	No. of identified Antarctic blue whales			
	Antarctic Blue Whale Catalogue 1991-2012	JARPA 1992-2004	2013 Blue Whale Voyage	Total
<b>I</b>	2	-	-	2
<b>II</b>	18	-	-	18
<b>III</b>	152	13	-	165
<b>IV</b>	15	9	-	24
<b>V</b>	36	7	50	93
<b>VI</b>	6	2	-	8

The sighting histories of individual Antarctic blue whales from the photo-identification catalogue provide data for estimating abundance using mark-recapture analysis (see Kelly *et al.*, 2012). The photo-ID data also provide information on the movement of individual blue whales within the Antarctic region (Olson, 2012; Olson *et al.*, 2013) and potentially on population structure. The continued collection and analysis of photographic data from the Antarctic will yield more information on this endangered population.

<sup>1</sup> 33 whales were photographed during SOWER in Area V but represent 32 unique individuals from the catalogue as one whale was also photographed in Area III; 3 whales photographed opportunistically by C. Garrigue in Area V off Dumont d'Urville.

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