

# Humpback whale surveys off the Pacific coast of Panama during the 2007 austral winter season

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## ABSTRACT

Humpback whales have previously been reported off the Pacific coast of Central America during the austral winter season. Photo-identification studies have shown that these whales are primarily migrating from feeding areas off the Antarctic Peninsula and Chile (breeding stock G). In this study, surveys were conducted in 2007 in the Gulf of Chiriquí, western Panama (7°18'-8°18'N, 82°54'-81°36'W), with the objectives of collecting identification photographs, documenting the presence of mother/calf pairs and other group types, and recording song. A total of 18 surveys were conducted between 28 July and 2 October 2007, covering 2,100km. Humpback whales were detected on all surveys either visually or acoustically. Sixty-two sightings of 125 humpback whales were made, and identification photographs of 34 individuals were obtained. No matches were found between these and the 46 whales identified in previous years off Central America, which indicates that much of this population remains unsampled. Of 86 hydrophone deployments, song was heard 58 times (67%). Of the 62 sightings, 29 were groups containing calves (47%), 13 (21%) were single animals, and 14 (23%) were pairs. Based on the high number of calf sightings, western Panama appears to be an important nursery area for humpback whales migrating from the Southern Hemisphere.

## INTRODUCTION

Humpback whales have previously been reported off the Pacific coast of Central America during the austral winter season (Townsend 1935; Acevedo and Smultea 1995; Florez-Gonzalez *et al.* 1998; Rasmussen *et al.* 2007). Photo-identification results indicate that these whales are primarily migrating from feeding areas off the Antarctic Peninsula and Chile (IWC breeding stock G; Acevedo *et al.* 2007; Rasmussen *et al.* 2007). In this study, surveys were conducted during the austral winter of 2007 in the Gulf of Chiriquí, western Panama, with the objectives of collecting additional identification photographs, documenting the presence of mother calf pairs and other group types, and recording song. These surveys were part of an ongoing study since 2001 documenting humpback whales off Pacific Central America during the austral winter.

## METHODS

The Gulf of Chiriquí lies in the western part of Panama, and is bordered by the Azuero peninsula to the east, and the Burica peninsula to the west. (7°18'-8°18'N, 82°54'-81°36'W; Fig. 1) This gulf is characterized by generally shallow waters (<300m) and many island groups. Surveys were opportunistic in design, aimed at maximizing the number of whales to be sampled. Daily surveys were conducted from a 22-foot fiberglass boat with twin outboard engines. Data collected for every whale sighting included GPS location, behaviors, group composition, bottom depth, and sea surface temperature. Photo-identification techniques were used (Katona and Whitehead 1981) in which whales were approached slowly from behind, and the undersides of the tail flukes were photographed with a Nikon digital SLR camera in order to identify individuals. A hydrophone from Cetacean Research Technology (model SQ 26-08) was deployed regularly to determine acoustically if any humpback whales were present.

Identification photographs were compared with identifications previously obtained off Central America during the austral winter. Current comparisons being conducted also include catalogs of whales seen

off other wintering areas (Ecuador and Colombia) as well as feeding areas (Chile and Antarctica) for this stock.

## RESULTS

A total of 18 surveys were conducted between 28 July and 2 October 2007 covering 2,100km (Table 1). Survey coverage included most of the island groups in the Gulf of Chiriquí, including Islas Paridas, Islas Secas, Islas Ladrones, Islas Contreras, Coiba Island, as well as the mainland coast. (Fig. 1)

Humpback whales were either sighted or acoustically detected on all 18 survey days. Sixty-two sightings of 125 humpback whales were made, and 35 identification-quality photographs of 34 individuals were obtained. Of 86 hydrophone deployments, song was heard 58 times (67 %) (Table 1, Figs. 1 and 2).

None of the whales identified in 2007 had been identified off Panama in previous years, from a catalog of 46 individuals documented between 2001-2006. One whale was seen twice in 2007: Whale ID# 1066 was seen on 28 July with one other adult and on 3 August with a group of 8-10 adults.

Almost half of the sightings contained calves (47%). Besides calves, singles and adult pairs were most frequently observed. No competitive groups were observed (Table 2.)

## DISCUSSION

Humpback whales were sighted consistently during these surveys, and were detected every day either visually or acoustically. Most sightings occurred near island groups, and effort between these islands in open water showed fewer sightings (Fig. 1) Song was often detected in more open water (Fig. 2), although this could be a result of the ability of the acoustic signal to travel. All sightings with calves occurred either near island groups, rocky outcrops, or near the mainland. Mother/calf pairs are known to seek shallower waters (Whitehead and Moore 1982; Smultea 1994; Felix and Haase 1997; Craig 2000; Martins et al 2001; Ersts and Rosenbaum 2003).

The high rate of mother/calf pairs in this study (47%) is notable. Other studies on wintering areas show calf sighting rates between 8% and 27% (Mattila and Clapham 1989; Mattila *et al.* 1989; Mattila *et al.* 1994; Hauser et al 2000; Garrigue et al 2001; Zerbini *et al.* 2004.) It is possible that the Gulf of Chiriquí constitutes a particularly significant nursery area for mothers with calves of at least a part of stock G. Future studies and comparisons with other wintering areas for this stock (Ecuador, Colombia, the Gulf of Panama and Costa Rica) will help determine if Panama has a higher rate of calf sightings.

Our low resight rate of individuals from previous years indicates that this population remains largely unsampled or that there is low site fidelity to this region. Although this study was not designed to estimate population size, it is clear by the number of whales detected daily, as well as by the low interannual and intra-annual resight rates, that this area is used by a significant number of humpback whales.

Comparisons with nearby wintering areas will clarify the degree of site fidelity and interchange occurring within this region. Although one resighting has been previously documented between Colombia and Panama (Florez-Gonzalez *et al.* 1998), the degree of interchange between Panama and other winter regions remains unclear.

## ACKNOWLEDGEMENTS

Michael Klein, Linda Klein, Jim Matlock, George Ravenscroft, and the staff at Islas Secas provided logistical support. Daniel Palacios assisted in the field, as well as provided helpful comments on the manuscript.

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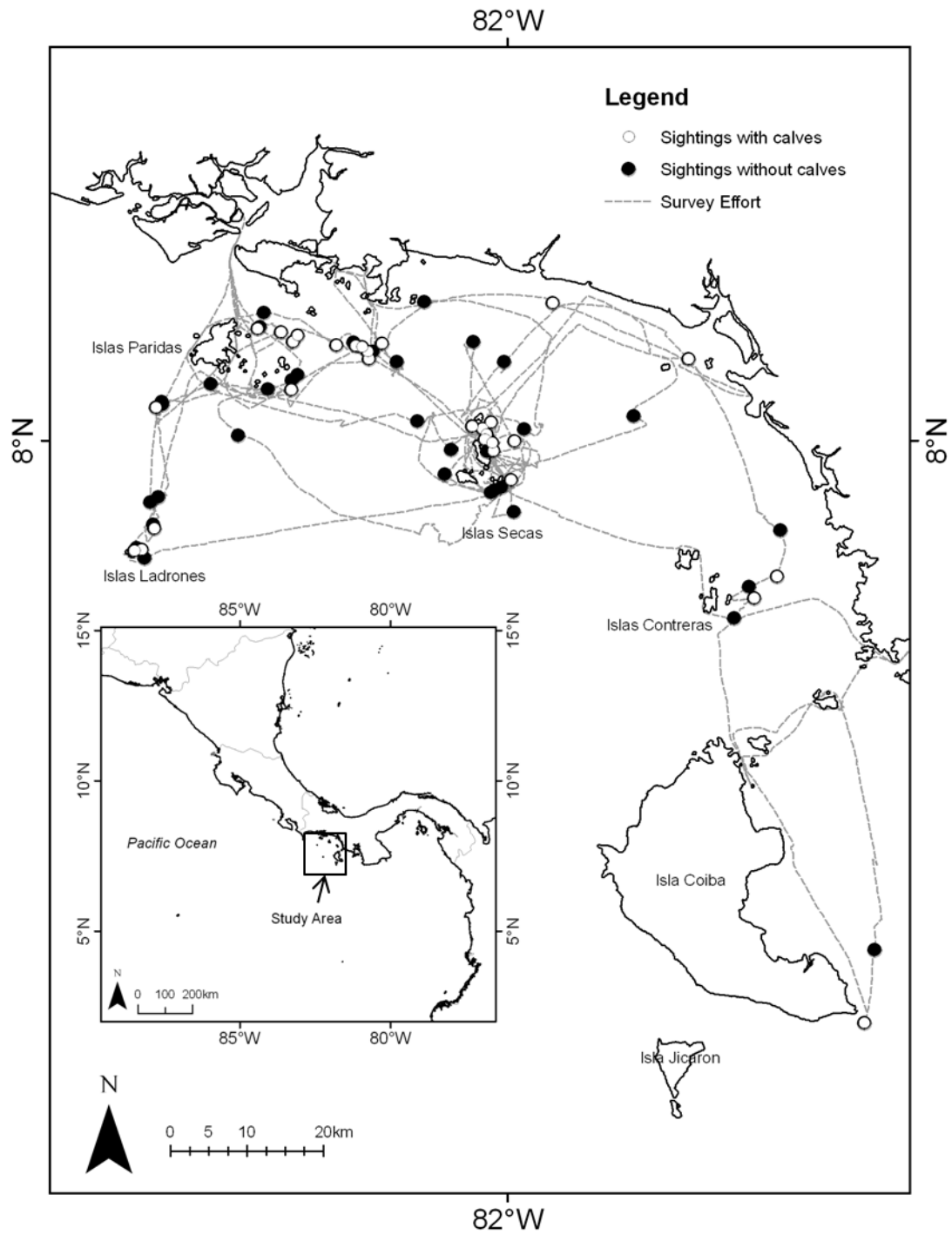


Figure 1. Survey effort and sightings in the Gulf of Chiriquí between July and October, 2007.

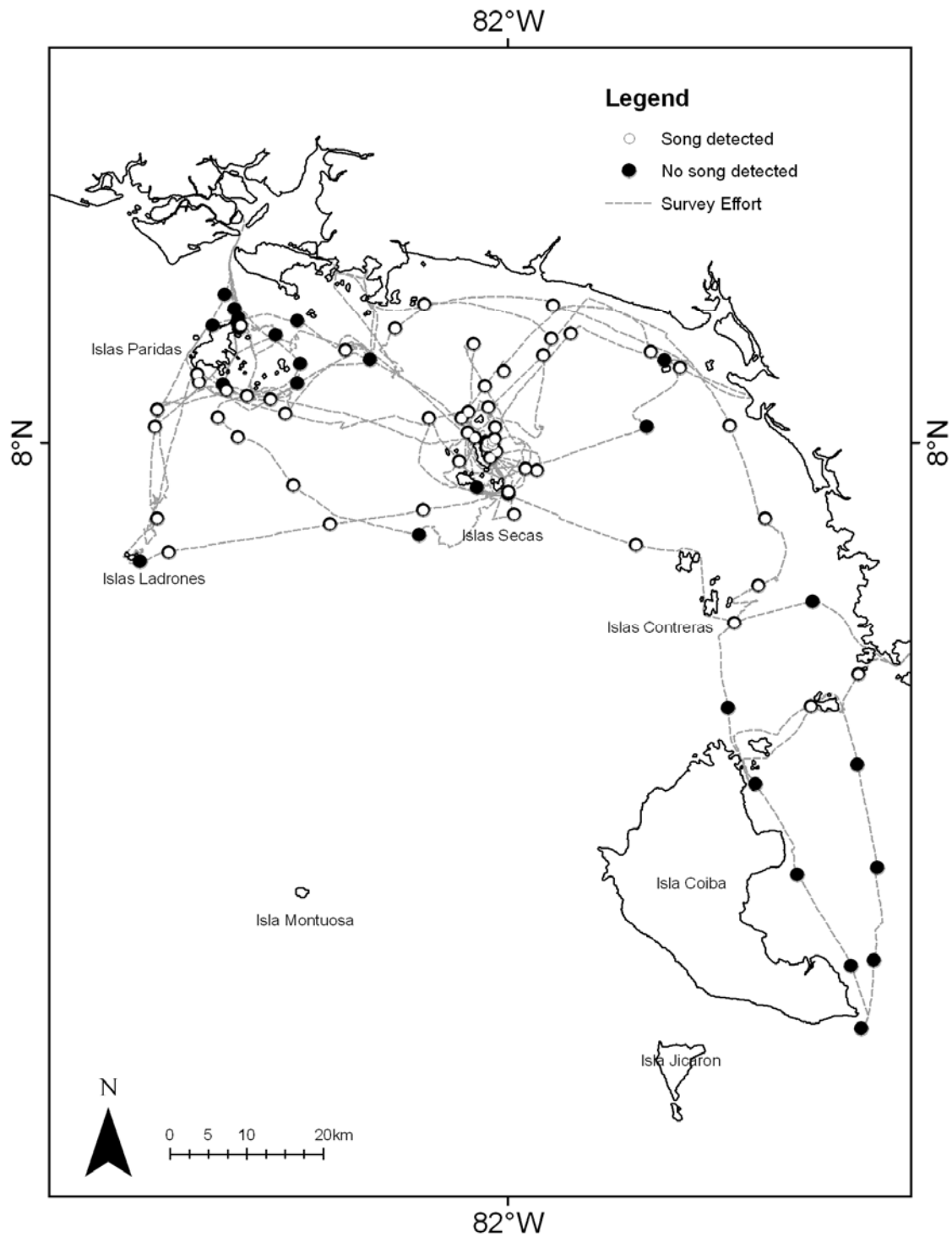


Figure 2. Hydrophone deployments in the Gulf of Chiriquí between July and October 2007, with acoustic detections of humpback whales indicated.

Table 1. Survey effort, including dates, kilometers surveyed, number of humpback whale sightings, number of individual humpback whales seen, number of photo identifications collected, total hydrophone deployments, and deployments where song was heard for

Date	Kilometers Surveyed	Humpback Whale Sightings	Total Whales	Number of photo-id's	Hydrophone Deployments	Acoustic detections
28-Jul	130	4	12	5	3	1
29-Jul	176	5	8	4	5	4
1-Aug	137	6	10	0	6	2
2-Aug	127	3	4	4	7	6
3-Aug	144	2	11	7	5	3
10-Aug	115	6	12	3	4	3
11-Aug	146	0	0	0	6	4
12-Aug	123	2	4	0	7	0
13-Aug	153	6	11	2	7	6
14-Aug	94	3	8	4	5	4
15-Aug	120	7	12	1	7	6
16-Aug	96	5	9	0	3	1
24-Aug	67	3	5	0	3	1
25-Aug	41	1	2	1	1	1
26-Aug	120	4	8	2	3	3
30-Sep	122	1	1	0	6	5
1-Oct	31	2	3	0	2	2
2-Oct	161	2	5	2	6	5
Totals	2104	62	125	35	86	57

Table 2. Group Types encountered during surveys, including total number seen, and percentage of all sightings.

Group Type	Total	Percentage
Singles	13	21%
Pairs	14	23%
Mother/calf, and mother/calf/escort	29	47%
Groups larger than 2	2	3%
Competitive Groups	0	0%
Undetermined	4	6%
Total	62	