

KILLER WHALE (*ORCINUS ORCA*) OCCURRENCE OFF PERU, 1995 - 2003

Ignacio García-Godos¹

Records of the killer whale (*Orcinus orca*) in Peruvian waters are scarce and mostly anecdotal. Despite reports of many artisanal fishermen of occasional sightings of killer whales, these records have not been confirmed, resulting in a limited number of reliable reports of this species off Peru during the last century (e.g. Bini, 1951; Grimwood, 1969; Dahlheim *et al.*, 1982; Van Waerebeek *et al.*, 1988; Majluf and Reyes, 1989). To date, no records of strandings of killer whales are known for Peru. Due to the high concentration of its potential prey (cetaceans and pinnipeds) in the Peruvian waters (Majluf and Reyes, 1989) this species would be expected to be more common than previously recorded.

This note presents killer whale records off Peru taken during 23 pelagic surveys conducted by the Instituto del Mar del Perú (IMARPE), and compiles other available information.

Sighting data were collected during three kinds of surveys conducted by IMARPE between 1995 and 2003: 1) pelagic surveys for evaluating the Peruvian anchovy (*Engraulis ringens*) population, and other pelagic resources, covering the entire Peruvian Sea, from the coastline to 200n.m. offshore; 2) demersal surveys to evaluate the hake (*Merluccius gayi*) population off Northern Peru; and 3) oceanographic surveys to monitor ocean conditions covering the entire Peruvian sea out to 300n.m. offshore.

During these surveys one to and a maximum of three cetacean observers were allocated onboard two research vessels: *R.V. Humboldt* (with the observation deck at 15m above the sea level) and the *R.V. Olaya* (with the observation deck at 10m above the sea level). The number of observers varied according to the availability of funds. The data collection consisted of visual scanning along the track line during the daylight hours (06:00-18:00h.) using 10x50 binoculars. The coverage angle was 180° forward from ship to the horizon. Because surveying was conducted under a platform of opportunity scheme, ships did not leave the planned course to approach or follow a cetacean sighting, unless predatory behavior was observed. Sea surface temperature (SST) was recorded during sightings.

Other sightings recorded off Peru during two cetacean-oriented surveys conducted by the Southwest Fishery Science Center (SWFSC) in 1998 and 2000 (Kinzey *et al.*, 1999, 2001) are also included in this study, as well as a land-based record.

Killer whales were recorded on 13 occasions off Peru during the 23 surveys conducted by IMARPE, which accounted to a total search effort of 39060 nautical miles. Six sightings occurred in August and September and five

of them occurred during the 1997-98 El Niño. Only three records occurred over the continental shelf, which is relatively narrow in this area (Figure 1). The bulk of sightings were associated with warm waters, with SST over 20°C (mean=20.81°C, SD=1.83, range=16.95°C-23.89°C). Groups ranged between one and 10 individuals (mean=4.53, SD=2.99, n=13) and seven of them had one or two calves (Table 1). The total number of individuals observed was 59.

Two sightings showed killer whales displaying predatory or harassing behavior on dolphins, both recorded by the author. The first event occurred on 27 March 2001 (12°52'26"S, 77°53'38"W) and consisted of six killer whales, including an adult male possibly photographed off Mexico (M.Guerrero-Ruiz², pers.comm.), pursuing a pod of 15 pilot whales *Globicephala* sp. (probably *G. macrorhynchus* due to the tropical location of the sighting). The killer whales formed a circle around the pilot whales, in which every member of the pod entered to chase the group, provoking the stampede of the pilot whales. Successful hunting could not be recorded. The second event occurred on 20 February 2002 (6°00'00"S, 81°12'00"W), when a group of eight killer whales was sighted pursuing a herd of approximately 200 bottlenose dolphins (*Tursiops truncatus*). One of the bottlenose dolphins was captured, strongly stroked out of the water many times (Figure 2) and killed. South American sea lions (*Otaria flavescens*) were 800m close to the killer whales; however, they did not show evasive behavior. Jefferson *et al.* (1991) do not include bottlenose dolphins in their review of prey of killer whales around the world and Visser (1999) reports one event where at least one bottlenose dolphin would have been caught by a group of killer whales off New Zealand. Despite the considerable overlap in the distribution of both species, predatory interactions appear to be rare or difficult to witness. In respect to pilot whales, predatory interaction has been only reported for *G. melas* (Jefferson *et al.*, 1991), although the identification of the present record is uncertain.

A land-based sighting occurred on 2-3 January 2003, when a single adult male approached a colony of South American fur seals (*Arctocephalus australis*) at Punta San Juan (15°22'S; 75°11'W). The whale reached the colony's beach repeatedly and caught four pups during the second day of sighting. Pups were strongly shaken and subsequently killed (M.Roca³, pers.comm.).

The occurrence of killer whales in Peruvian waters between 1995 and 2003 appears to be low. Kinzey *et al.* (1999, 2001) also recorded killer whales off Peru

¹Instituto del Mar del Perú (IMARPE), Area de Aves, Mamíferos y Tortugas Marinas. P.O.Box 22, Callao, Peru. E-mail: ag_godos@yahoo.com.

²Universidad Autónoma de Baja California Sur, Mexico. E-mail: megr@uabcs.mx.

³Milena Roca, Proyecto Punta San Juan, Lima, Peru. E-mail: milenaroca@hotmail.com.

along surveys conducted in 1998 and 2000 in the Eastern Tropical Pacific (Figure 1). Artisanal fishermen and marine tour operators also report killer whales in different locations of the Peruvian coast, but these records remain unconfirmed and are not included in the present work. Since 1995 the sightings of killer whales ($n=20$) are continuously done, indicating that this region may be part of their common distribution range. Nevertheless, the low occurrence of killer whales suggests this area may constitute foraging grounds for offshore groups. All predatory events involving killer whales in the Peruvian waters reported in the present work seem to indicate that they are dispersed top predators in the area, visiting the Peruvian Current ecosystem from adjacent waters. The

warm SST recorded during sightings suggests that killer whales occurring off Peru might belong to oceanic populations, probably from the Eastern Tropical Pacific, considering the usual cold SST of the Peruvian Current. To date, no recognized local populations in Peru have been recorded.

There are confirmed but scarcely documented records of killer whales preying on pinnipeds in Peru (Van Waerebeek *et al.*, 1988; Majluf and Reyes, 1988); however, records of predation on dolphins are new in these waters. Despite the lack of confirmed records of predation over cetaceans off Peru, Dufault and Whitehead (1995) reported a sighting of recently wounded sperm whales (*Physeter macrocephalus*) off central Peru in 1993, which were very likely attacked by killer whales.

Table 1. Killer whale (*Orcinus orca*) sightings off Peru, 1995 – 2003.

Nº	LATITUDE	LONGITUDE	DATE	GROUP SIZE	CALVES	SST (°C)	PLATFORM	OBSERVATIONS	SOURCE
1	04°59'00" S	82°57'00" W	28 April 1995	1	-	19.80	R.V.Humboldt		This work
2	14°19'00" S	77°23'00" W	15 September 1997	3	-	20.40	R.V.Humboldt		This work
3	12°45'32" S	78°10'43" W	22 September 1997	6	2	21.60	R.V.Humboldt		This work
4	06°22'28" S	83°00'46" W	05 October 1997	1	-	23.10	R.V.Humboldt		This work
5	13°31'00" S	76°39'18" W	21 August 1998	1	1	-	R.V.Olaya		This work
6	13°33'27" S	76°38'18" W	21 August 1998	3	1	-	R.V.Olaya		This work
7	16°03'46" S	83°24'29" W	13 November 1998	9	-	-	R.V.Endeavor		Kinzey <i>et al.</i> (1999)
8	11°00'40" S	80°48'01" W	23 November 1998	13	-	-	R.V.Endeavor		Kinzey <i>et al.</i> (1999)
9	11°17'18" S	81°15'06" W	23 November 1998	4	-	-	R.V.Endeavor		Kinzey <i>et al.</i> (1999)
10	06°59'27" S	80°04'37" W	27 November 1998	3	-	-	R.V.Endeavor		Kinzey <i>et al.</i> (1999)
11	17°53'30" S	75°36'06" W	23 May 1999	2	2	20.50	R.V.Humboldt		This work
12	17°53'54" S	75°23'30" W	23 May 1999	4	-	20.50	R.V.Humboldt		This work
13	12°22'49" S	82°25'44" W	23 October 2000	12	-	-	R.V.McArthur		Kinzey <i>et al.</i> (2001)
14	08°44'46" S	82°36'19" W	01 November 2000	4	-	-	R.V.McArthur		Kinzey <i>et al.</i> (2001)
15	12°52'26" S	77°53'38" W	27 March 2001	6	1	20.63	R.V.Olaya	Chasing <i>Globicephala</i> sp.	This work
16	17°02'24" S	72°45'37" W	09 October 2001	7	2	16.95	R.V.Humboldt		This work
17	06°00'00" S	81°12'00" W	20 February 2002	8	1	21.70	R.V.Olaya	Preying on <i>Tursiops truncatus</i>	This work
18	09°04'17" S	81°38'36" W	27 October 2002	7	-	19.80	R.V.Humboldt		This work
19	15°22'20" S	75°11'48" W	02-03 January 2003	1	-		Land based	Preying on <i>Arctocephalus australis</i>	M. Roca (<i>pers. comm.</i>)
20	18°19'21" S	70°56'42" W	28 February 2003	10	-	23.89	R.V.Olaya		This work

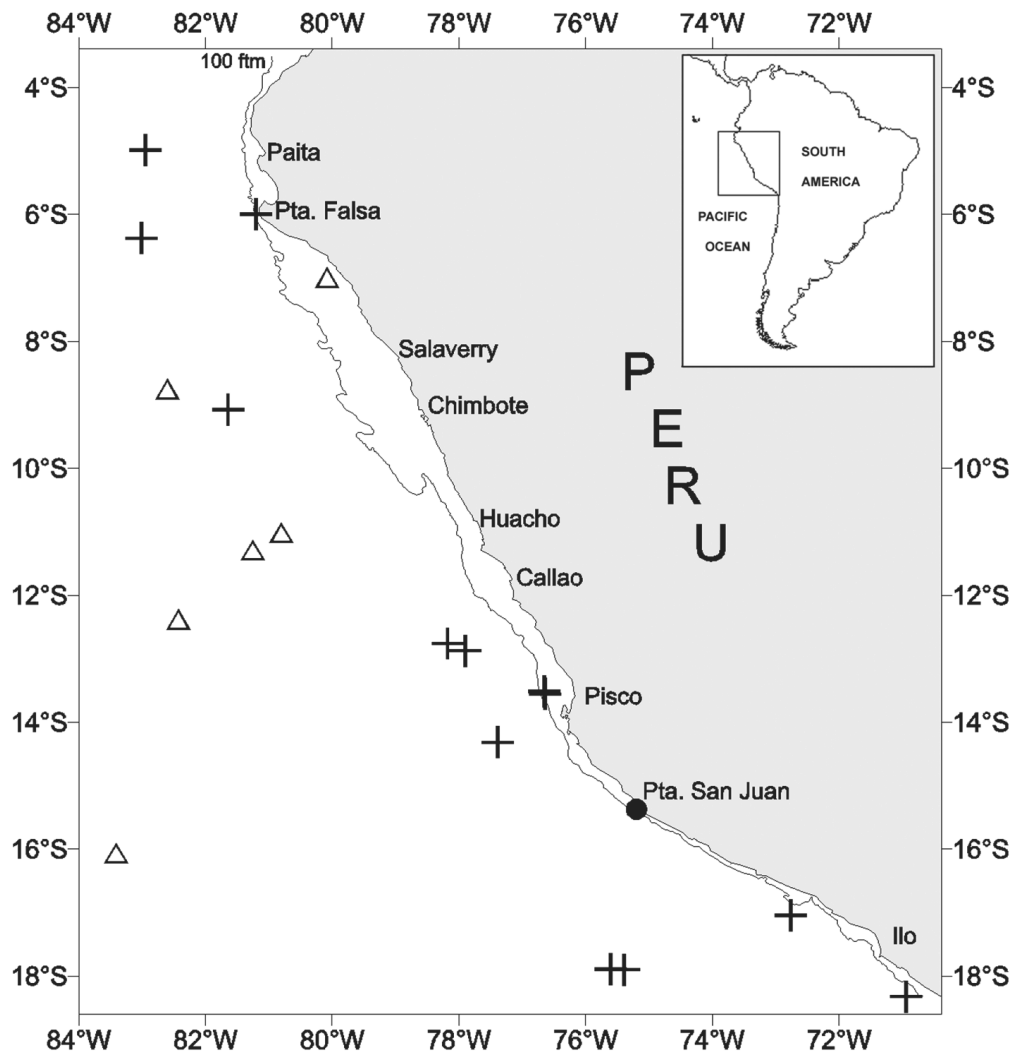


Figure 1. Killer whale sighting locations off Peru between 1995 and 2003 during surveys conducted by IMARPE (+) and the SWFSC (Δ). A land based record (\bullet) is also showed.



Figure 2. Killer whales attacking a bottlenose dolphin off Punta Falsa, northern Peru.

Acknowledgements

Many cetacean observers participated in the surveys. I specially thank Milena Arias-Schreiber, Elisa Goya, José Carlos Marquez and Luis Santillán for their participation in many aspects of data collection. Julio Reyes (Areas Costeras y Recursos Marinos – ACOREMA) and Mercedes Guerrero-Ruiz (Universidad Autónoma de Baja California Sur), reviewed earlier drafts of the paper. I thank the reviewers Luciano Dalla Rosa (University of British Columbia) and Ana Paula Di Benedetto (Universidade Estadual do Norte Fluminense) for their helpful comments to the manuscript. Nélio Barros reviewed the English. This research was fully funded by IMARPE.

References

- Bini, G. (1951) Osservazioni su alcuni mammiferi sulle coste del Chile e del Peru. *Bolletine di Pesca, Pisciculturi e Idrobiologia (Roma)* 27(6): 5-19.
- Dahlheim, M.E., Leatherwood, S. and Perrin, W.F. (1982) Distribution of killer whales in the warm temperate and tropical Eastern Pacific. *Reports of the International Whaling Commission* 32: 647-653.
- Dufault, S. and Whitehead, H. (1995) An encounter with recently wounded sperm whales (*Physeter macrocephalus*). *Marine Mammal Science* 11(4): 560-563.
- Grimwood, I.R. (1969) Notes on the distribution and status of some Peruvian mammals. 1968 *New York Zoological Society Special Publication* 21: 1-86.
- Jefferson, T.A., Stacey, P.A. and Baird, R.W. (1991) A review of killer whale interactions with other marine mammals: predation to co-existence. *Mammal Reviews* 12(4): 151-180.
- Kinzey, D., Gerrodette, T., Barlow, J., Dizon, A., Perryman, W., Olson, P. and Von Sauner, A. (1999) Marine mammal data collected during a survey in the Eastern Tropical Pacific Ocean aboard the NOAA ships *McArthur* and *David Starr Jordan* and the UNOLS ship *Endeavor*, July 31 – December 9, 1998. NOAA Technical Memorandum NMFS. NOAA-TM.NMFS-SWFSC-283.
- Kinzey, D., Gerrodette, T., Dizon, A., Perryman, W., Olson, P. and Rankin, S. (2001) Marine mammal data collected during a survey in the Eastern Tropical Pacific Ocean aboard the NOAA ships *McArthur* and *David Starr Jordan*, July 28 – December 9, 2000. NOAA Technical Memorandum NMFS. NOAA-TM.NMFS-SWFSC-303.
- Majluf, P. and Reyes, J.C. (1989) The marine mammals of Peru: a review. Pages 344-363 in Pauly, D., Muck, P., Mendo, J. and Tsukayama, I. (Eds) *The Peruvian upwelling ecosystem: Dynamics and interactions*. IMARPE, GTZ, ICCLARM. Callao, Eschborn and Manila.
- Van Waerebeek, K., Reyes, J.C. and Luscombe, B.A. (1988) Revisión de la distribución de pequeños cetáceos frente a Perú. Pages 345-351 in Salzwedel, H. and Landa, A. (Eds) *Recursos y dinámica del ecosistema de afloramiento peruano*. Boletín IMARPE, special issue. Callao.
- Visser, I.N. (1999) A summary of interactions between orca (*Orcinus orca*) and other cetaceans in New Zealand waters. *New Zealand Natural Sciences* 24: 101-112.

Received 16 June 2004. Accepted 17 November 2004.