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A Note on the Status of the Dusky Dolphins (*Lagenorhynchus obscurus*) off Peru

Koen Van Waerebeek

Centro Peruano de Estudios Cetológicos (CEPEC), Casilla 1536, Lima-18, Peru and Institut Royal de Sciences Naturelles de Belgique, Brussels, Belgium

ABSTRACT

This paper briefly examines the cetacean catch composition by species in Peruvian fisheries between 1984 and 1993. Despite a number of difficulties in interpreting the data, there is a significant decline in the proportion of dusky dolphins recorded between 1985–90 (77.5%) and 1991–93 (52.8%). During the same period the proportion of long-beaked common dolphins increased from 6.7% to 31.8%. Possible reasons for this are discussed. One possibility is that this reflects a true decrease in the abundance of dusky dolphins in response to exploitation. It is argued that the precautionary principle requires that effective conservation measures are implemented as a matter of urgency. In addition, studies should be carried out to determine the true reason for the change in proportions.

KEYWORDS: SOUTH PACIFIC; INCIDENTAL CATCHES; FISHERIES; MANAGEMENT; DUSKY DOLPHINS; LONG-BEAKED COMMON DOLPHINS; BURMEISTER'S PORPOISE; BOTTLENOSE DOLPHINS

The Peruvian Centre for Cetacean Research (CEPEC) initiated the scientific monitoring of cetacean landings in central Peru in 1984 and since that time the dusky dolphin, *Lagenorhynchus obscurus*, has been the most heavily exploited small cetacean in Peruvian waters; in some ports it comprised 80–99% of total takes (Read *et al.*, 1988; Van Waerebeek and Reyes, 1990; 1994a). Other commonly landed species included Burmeister's porpoise, *Phocoena spinipinnis*, the long-beaked common dolphin, *Delphinus capensis* (nomenclature see Van Waerebeek *et al.*, 1994; Heyning and Perrin, 1994; IWC, 1995), and the bottlenose dolphin, *Tursiops truncatus*.

A craniometric study and analysis of body size demonstrated the existence of a discrete eastern South Pacific dusky dolphin stock (Van Waerebeek, 1992). Some cranial differences also suggested separation of dusky dolphins from central Peru and northern Chile but a greater sample size from Chile is required to confirm or refute this (Van Waerebeek, 1992; 1993). Repeated concern has been expressed that removal rates of dusky dolphins off western South America may not be sustainable (Read *et al.*, 1988; IWC, 1994; Van Waerebeek and Reyes, 1994b; Van Waerebeek *et al.*, 1994). However, in the absence of abundance estimates and reliable estimates of either direct (large-mesh, gillnet and harpoon fisheries) or incidental kills, the impact of such mortality has not been assessed for any Peruvian small cetacean species. As a response to the concern expressed, a ban on small cetacean takes was decreed by the Ministry of Fisheries in 1990 but this has been largely ignored and the annual total kill in Peru was estimated at between 15,000 and 20,000 animals for the period 1991–93 (Van Waerebeek *et al.*, 1994; Van Waerebeek and Reyes, 1994b).

In this note I examine the species composition of the cetacean catch off central Peru (from Huarmey (10°04'S) to Laguna Grande (13°55'S) in the Paracas National Reserve) over a long-term period in order to try and identify any possible shifts in relative abundance. The catch data are obtained from freshly landed animals and cranial remains collected in refuse dumps and beaches around ports. Most animals were killed in gillnets or by hand-held harpoons and were landed at Pucusana, Cerro Azul or Ancón, the ports most intensively monitored throughout the study period. The recorded catches by species are given in Table 1. Unfortunately, the datasets for southern and northern Peru are too small to allow similar comparisons.

During the 1991 sampling effort of the Ancón wharf, García-Godos (1993) noted more common dolphins and fewer dusky dolphins being landed than usual, a trend that seemed to consolidate itself in other ports and in subsequent years (see Table 1). To minimise possible effects caused by short-term fluctuations in ecological conditions, which may influence species composition, I have defined two broad sampling periods with 1991 as the dividing line: 1985–1990 ($N_1 = 6,308$) and 1991–1993 ($N_2 = 2,022$). Significance was verified by contingency tests ($\alpha = 0.05$) and 95% confidence intervals (CI) of sample proportions were calculated according to the normal approximation method.

The percentage of dusky dolphins decreased significantly ($chi^2 = 457$, df 1, $P < 0.0001$) from 77.5% (CI 76.5–78.5%) in 1985–90 to 52.8% (CI 50.6–55.0%) in 1991–93, while that of common dolphins increased ($chi^2 = 858$, df 1, $P < 0.0001$) from 6.7% (CI 5.5–7.9%) to 31.8% (CI 29.8–33.8%). The proportions of the other main species, the Burmeister's porpoise and bottlenose dolphin did not differ significantly between the two periods (respectively $chi^2 = 0.54$, df 1, $P = 0.46$ and $chi^2 = 3.76$, df 1, $P > 0.05$).

In the absence of information suggesting that either fishing practices or fishing grounds have changed significantly over the period, I believe it is most likely that the observed changes in the relative rates of dusky and long-beaked common dolphins reflect true shifts in their relative abundance off central Peru. Both species primarily feed on Peruvian anchovy, *Engraulis ringens* (McKinnon, 1988; Van Waerebeek and J.C. Reyes, unpublished data) and have a neritic distribution. They are often entangled side by side in gillnets, suggesting that they intermingle, as is claimed by local fishermen. Sightings of two mixed schools during a boat survey in April 1994 (Van Waerebeek, unpublished data) support this view.

Table 1

Species composition of small cetaceans captured in coastal fisheries off central Peru from 1985-1993. Numbers are actually recorded individuals and are based on fresh (F) or cranial (C) specimens. They are not measures of total annual catches because sampling coverage was partial and unequal between both periods. Although more than 99% of *Delphinus* in Peru belong to *D. capensis*, a few *D. delphis* are also included in the statistics.

			L. obscurus		*Delphinus* spp.		*P. spinipinnis*		*T. truncatus*		Other species		Total	
Year	Locality	Type	N	%	N	%	N	%	N	%	N	%	N	Source
1984-85	Pucusana	C	35	41.7	5	6.0	18	21.4	21	25.0	5	6.0	84	Read *et al.* 1988; CEPEC files
1985	Pucusana	F	60	55.0	4	3.7	26	23.9	12	11.0	7	6.4	109	Read *et al.* 1988; CEPEC files
1985	Ancon	F	379	99.2	2	0.5	1	0.3	0	0.0	0	0.0	382	Read *et al.* 1988; CEPEC files
1985	Huacho	F,C	50	98.0	0	0.0	1	2.0	0	0.0	0	0.0	51	Read *et al.* 1988; CEPEC files
1985-86	San Andres	F,C	3	10.3	1	3.4	18	62.1	7	24.1	0	0.0	29	Read *et al.* 1988; CEPEC files
1986	Pucusana	F	455	87.8	4	0.8	20	3.9	33	6.4	6	1.2	518	Read *et al.* 1988; CEPEC files
1986	Cerro Azul	F	192	81.4	0	0.0	40	16.9	1	0.4	3	1.3	236	Read *et al.* 1988; CEPEC files
1987	Pucusana	F	623	64.5	230	23.8	77	8.0	29	3.0	7	0.7	966	Van Waerebeek and Reyes, 1990
1987	Cerro Azul	F	6	54.5	1	9.1	3	27.3	1	9.1	0	0.0	11	CEPEC files, unpublished
1988	Pucusana	F	1,224	75.3	110	6.8	272	16.7	13	0.8	6	0.4	1,625	Van Waerebeek and Reyes, 1994a
1988	Cerro Azul	F	51	92.7	3	5.5	1	1.8	0	0.0	0	0.0	55	Van Waerebeek and Reyes, 1994a
1989	Pucusana	F	1,060	82.6	21	1.6	175	13.6	23	1.8	5	0.4	1,284	Van Waerebeek and Reyes, 1994a
1990	Pucusana	F	750	78.3	44	4.6	139	14.5	21	2.2	4	0.4	958	Van Waerebeek *et al.* 1994
1984-90	Central Peru	F,C	4,888	77.5	425	6.7	791	12.5	161	2.6	43	0.7	6,308	
1991	Ancon	F	358	58.9	168	27.6	82	13.5	0	0.0	0	0.0	608	Garcia-Godos, 1993; Van Waerebeek *et al.* 1994
1992	Ancon	F	102	44.2	113	48.9	11	4.8	5	2.2	0	0.0	231	Van Waerebeek *et al.* 1994
1992	Cerro Azul	F	117	51.3	89	39.0	15	6.6	7	3.1	0	0.0	228	Van Waerebeek *et al.* 1994
1992	S. Andres, Laguna Grande	F,C	12	11.4	35	33.3	40	38.1	17	6.2	1	1.0	105	Tenicela, 1993; Van Waerebeek *et al.* 1994
1992	Pucusana	F	34	57.6	17	28.8	5	8.5	3	5.1	0	0.0	59	Van Waerebeek *et al.* 1994
1992-93	Chancay	F,C	46	52.3	31	35.2	8	9.1	3	3.4	0	0.0	88	Van Waerebeek *et al.* 1994
1992-93	Huarmey, Supe, Huacho	F,C	4	23.5	12	70.6	0	0.0	1	5.9	0	0.0	17	Van Waerebeek *et al.* 1994
1993	Cerro Azul	F	395	57.6	177	25.8	80	11.7	32	4.7	2	0.3	686	Van Waerebeek *et al.* 1994
1991-93	Central Peru	F,C	1,068	52.8	642	31.8	241	11.9	68	3.4	3	0.1	2,022	

One possible explanation for the change is that a partial niche vacuum created by high removal rates of dusky dolphins by coastal fisheries is being filled by an ecologically close species such as the long-beaked common dolphin; the roughly 25% relative reduction in landings of the former species is compensated by a 25% relative increase of the latter. Of course, in the absence of detailed knowledge of the natural history, distribution and abundance of these species, any number of ecological factors might be invoked to explain the observed changes. For example it may be a natural cyclic phenomenon whereby common dolphins move inshore, probably from the north or offshore. In this case a restoration of the 'normal' *Lagenorhynchus/Delphinus* proportion should ultimately be expected. Alternatively, it could be due to a combination of both a natural and a fisheries-caused ecological disturbance. Continued monitoring and an extension of the research programme to include a greater area will be needed to find out.

Despite the uncertainty, I believe that in accordance with the precautionary principle, it is important that effective conservation measures are implemented and that existing legislation is enforced as a matter of urgency (Van Waerebeek and Reyes, 1994b; Van Waerebeek *et al.*, 1994). In that sense I applaud the ministerial resolution of 5 August 1994 (No. 321–94-PE) which reiterates the prohibition of small cetacean exploitation in Peruvian waters, if this means that enforcement will be given new impetus.

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