

Pontoporia blainvillei (Gervais and d'Orbigny, 1844)

English: Franciscana, La Plata dolphin

German: La-Plata-Delphin

Spanish: Franciscana

French: Dauphin de la Plata

Family Pontoporiidae

1. Description

The Franciscana is the only one of the four river dolphin species living in the marine environment and the sole member of its family. It is one of the smallest dolphins and has an extremely long and narrow beak and a bulky head. Its colour is brownish to dark grey above and lighter on the flanks and belly. Females are larger than males, ranging between 137-177 cm as opposed to 121-158 cm in males. Females weigh up to 53 kg and males reach 43 kg (Crespo, 2009).

2. Distribution

<http://www.iucnredlist.org/apps/redlist/details/17978/0/rangemap>

Geographic distribution of Pontoporia blainvillei on the east coast of South America (Reeves et al. , 2008; © IUCN).

The franciscana is restricted to coastal and estuarine central Atlantic waters of South America. The northern limit of the distribution is Itaúnas (18°25'S), Espírito Santo State, Brazil. In the south, the range extends to Golfo San Matías (41°10'S), in northern Patagonia, Argentina (Crespo, 2009).

The sighting of a single individual in Golfo Nuevo, Valdez Peninsula, is considered exceptional and this should not be considered the southern distribution limit for franciscana (Crespo, 2000).

Data on mtDNA, morphometrics, parasitology and population parameters all together provide evidence for splitting the species into four provisional “Franciscana Management Areas”: two inhabiting coastal waters of Brazil (FMA I - coastal waters of Espírito Santo and Rio de Janeiro states; FMA II - São Paulo, Paraná and Santa Catarina states); FMA III occurring in Rio Grande do Sul State (southern Brazil) and Uruguay, and FMA IV in coastal Argentine waters (Secchi et al., 2003a). This population fragmentation, together with the relatively low genetic variability, suggests that the franciscana dolphin is a potentially vulnerable species, which may require management efforts to ensure its preservation.

3. Population size

Abundance estimates for the franciscana in its natural environment are difficult to obtain due to the great difficulty in sighting it at sea. Current estimates are presented from north to south of the range:

In Babitonga Bay, on the northern coast of Santa Catarina State, southern Brazil, a total of 561 individuals were observed between 1996 and 2001 (Cremer and Simoes-Lopez, 2005). A subsequent estimate in the same area between 2000 and 2003 gave an estimated population size of only 50 animals. The difference was not explained but is likely due to methodological discrepancies between the two studies rather than population decline. Observed density was 0.32 individuals / km². Density estimates evaluated in the sub-areas where franciscanas occurred resulted in a density of 0.46 individuals / km² (Cremer and Simoes-Lopez, 2008).

A first abundance estimate for the coastal waters of Rio Grande do Sul State (southern Brazil) and Uruguay stems from 1996 data, resulting in an overall estimate of 42,078 franciscanas (95% CI: 33,047-53,542) (Secchi et al., 2001). However, this may be too optimistic: during the corresponding an aerial survey 34 franciscanas (in 29 groups) were recorded leading to a mean density estimate of 0.657 individuals/km² for the study area (435 km²) after applying a correction factor for submerged dolphins. This corresponds to an estimated abundance of 286 franciscanas (95% CI: 225 to 364) in the study area, which represents only 0.7 % of the distribution of the proposed population (Secchi et al., 2001).

Extrapolating the 1996 density to the area of the Rio Grande do Sul coast, however, from shoreline up to the 30m isobath (ca. 24,315 km²), the abundance would be around 15,975 animals (Secchi, 2010a). A subsequent abundance estimate for this region was provided based on a line transect aerial survey carried out in February 2004 (Danilewicz et al., 2009). The surveyed area was much larger than in 1996 and comprised 13,341 km² and at least 20 transect lines. The corrected density was 0.51 franciscanas/km², which gives an extrapolated abundance of 12,400 for the entire area of 24,315 km². The difference between the 1996 and 2004 estimates was not viewed as a population decline and is attributed to methodological reasons (Secchi, 2010a). However, declining stranding rates in Rio Grande do Sul in the face of substantially increasing fishing effort in the 1990's was attributed to a decline in franciscana abundance (Pinedo and Polacheck, 1999).

The most recent abundance estimate conducted in Argentine waters stems from 2003-2004. A total of 101 Franciscanas were observed in 71 sightings. In northern areas density was estimated at 0.106 individual/km². Density was lower in southern areas and depths greater than the 30-m isobath (0.05/km²). A correction factor for submerged dolphins was applied to density and then extrapolated to the strip between the coastline and the 30-m isobath. From the number of animals observed and after extrapolation, abundance in the northern area was estimated at 8,279 (4,904–13,960) individuals, while in the southern area it was estimated at 5,896 (1,928–17,999) individuals (Crespo et al. 2009).

The assumed distributional areas significantly influence abundance estimates: while the 30 m and even the 50 m isobath is assumed to be the offshore limit for the distribution of the species (Crespo, 2009), in the North of Rio de Janeiro State, 90% of sightings were obtained within 5 nm from shore, in waters only up to 15 m deep (DiBeneditto and Ramos, 2001). Therefore, the Secchi (2010a) estimate that total abundance could be up to 42,000 franciscanas for the whole Rio Grande do Sul and Uruguay coastal waters, and the Crespo (2009) estimate of 15,000 in Argentina, both considering the 30-m isobath as the offshore limit, may be optimistic. The IWC Scientific Committee concluded, after reviewing the methods and limitations of franciscana surveys through 2003-2004, that it was not appropriate to consider them as providing minimum estimates of abundance (IWC 2005).

4. Biology and Behaviour

Habitat: The species shows a pronounced preference for relatively shallow, turbid waters (Pinedo *et al.*, 1989; Secchi and Ott, 2000), a coastal marine ecosystem characterized by continental runoffs with a high discharge of high-nutrient river flows (e.g. Lagoa dos Patos, Rio de la Plata) (Crespo, 2009). In the north of Rio de Janeiro State sightings were recorded in all seasons and 90% of them were obtained up to 5 nm (8 km) from shore, in waters up to 15 m deep (DiBeneditto and Ramos, 2001). Franciscana sightings from shore-based stations and vessels at Bahia Anegada, Argentina, near Rio Colorado were at a mean distance from shore of only 3.2 km (Bordino *et al.* 1999). A positive correlation between the surface water temperature and the presence of franciscana was observed. Tide and depth also influenced behaviour. The animals usually enter the channels during high tide. Other authors state that maximum depth of sightings was of 25 meters measured by nautical charts (Bordino *et al.* 1999) or even as deep as 50 m in Argentinean waters (Crespo, 2009).

Schooling: Herd size is small, ranging from 2 to 15 individuals (DiBeneditto and Ramos, 2001; Crespo, 2009). In Babitonga Bay, southern Brazil, up to 59.5% of the groups consisted of over four individuals and the average group size was seven (Cremer and Simoes-Lopez, 2005). In other areas, calves were recorded during spring and summer and only one calf was observed per group. In Argentina, the behaviour showed a seasonal pattern with co-operative feeding and travelling activities increasing during winter. Co-operative feeding increased during flood tide, while travelling decreased. The behavioural ecology of the franciscana appears similar to that of other coastal and river dolphins (Bordino *et al.* 1999 and Bordino, in Crespo, 2000).

Franciscana dolphins may travel in kin groups which might include, besides mothers with their calves or juvenile offspring, the fathers of the youngest group members. All four individuals from the presumed social group shared the same mitochondrial haplotype, suggesting that the social unit might be matrilineally structured (Valsecchi and Zanellatto, 2003).

Reproduction: In the North of Rio de Janeiro State, calving occurs throughout the year, with no seasonal pattern. Females attain sexual maturity at 3 years and 130.0 cm in length and males at 2 years and 115.0 cm (DiBeneditto and Ramos, 2001). In Babitonga Bay, southern Brazil, calves were present in 30.4% of the observations, during all seasons (Cremer and Simoes-Lopez, 2005). Danilewicz (in Crespo, 2000) presented reproduction data from the northern coast of Rio Grande do Sul based on 22 females and 9 males and reported that births in this region occur during October to January with a water temperature over 20°C. He suggested that mating occurs in January and February based on observations of ovaries with traces of recent ovulations. He found lactating females between October and January and that births coincide with the periods of higher abundances of main prey. All the individuals were sexually mature at the age of 3 years. No pregnant females were found nursing at the same time though the sample was small. Crespo (2002) estimates longevity at 15 y for males and 21 y for females.

Food: Analyses of stomach contents indicate that franciscanas consume a wide variety of mainly bottom-dwelling fish species (Brownell, 1989). Sciaenid and engraulid fish comprise the main prey items. Squid and shrimp are also reported. Animals examined in Uruguay had eaten fish species common in coastal waters of the mouth of the La Plata River (Reyes, 1991). In the North of Rio de Janeiro State, Franciscana preferentially feed on the teleosts *Stellifer* sp., *Anchoa filifera*, *Pellona harroweri* and *Isopisthus parvipinnis*, measuring up to 10cm of length, and on the cephalopods *Loligo sanpaulensis* and *L. plei* (DiBeneditto and

Ramos, 2001). Diet preferences may vary regionally and between years, making franciscana a bioindicators of changes in fish stocks. In Brazilian and Uruguayan waters, a few species accounted for the majority of prey consumed. In Uruguay, the most important species (based on estimated biomass) were *C. striatus* during winter, spring, and summer, and *T. lepturus* during autumn. In Brazil, four sciaenids, *P. brasiliensis*, *C. striatus*, *M. ancylodon*, *M. jurnieri*, and the squid (*L. sanpaulensis*) accounted for 87.7% of the estimated biomass and 89.7% of the total individuals ingested; 76% of these were *C. striatus* (Brownell, 1989 and refs. therein).

5. Migration

Reyes (1991) stated that apart from the documented intrusion into the La Plata River in search of prey, there is no additional information on movements of this species.

In the North of Rio de Janeiro State, sightings were recorded in all seasons and incidental captures were recorded throughout the year (DiBeneditto and Ramos, 2001). Results of parasitological analyses suggest that *P. blainvillei* might be sedentary, at least in spring-early summer, hence showing separate stocks, despite the relative closeness between localities (Aznar et al. 1995). In Rio Grande do Sul, Southern Brazil, strandings occur year round, with peaks during spring, from September to December. However, this is the main period when the artisanal bottom-tending gillnet fisheries are active. However, in winter, franciscana were found at a significantly greater mean distance from shore than during summer (Pinedo and Polacheck, 1999). This may explain why franciscana groups along the Mar del Plata coast and in Bahia Anegada were sighted mostly in spring and summer (Bastida; Bordino and Iniguez, both in Crespo, 2000).

6. Threats

Incidental catch: Combination of information on bycatch from fleet monitoring programs and interviews along the species' range (Secchi, 2010b) resulted in an annual bycatch estimate of about 110 (min: 44; max: 176) franciscanas for FMA I; 279 (min: 63; max: 497) for FMA II; 1,245 (min: 562; max: 1,778) for FMA III and; 405 (min: 241; max: 567) for FMA IV (Ott *et al.*, 2002 and Secchi *et al.*, 2003b). Incidental mortality is largely related to fisheries targeting elasmobranchs and sciaenids (Crespo et al. 2007) and similar by-catch estimates are given in Crespo (2009). However, the highest estimates of abundance cannot sustain the lowest estimates of incidental catches (Crespo, 2002; 2009), showing that there is a mismatch. Unfortunately no recent by-catch estimates are available and data generally stem from dated reports, when population size might have been higher and/or fisheries efforts were higher. The estimated total mortality throughout the range could be in the order of 1,200-1,800 per year (Crespo, 2009) and Reeves et al. (2008) estimate that up to 2,900 animals could be incidentally caught in fisheries per year and that even this figure might be underestimated.

However, field data indicate that by-catch rates may be rather variable: in the north of Rio de Janeiro State, the annual catch per unit effort (CPUE) values varied from 0.2-1.8 dolphins per gillnet fishing effort (DiBeneditto and Ramos, 2001). Along the coasts of Uruguay, a decrease in mortality was observed since the 1970's. The highest value for the 1990's was 235 individuals in 1992-93, while during 1998, only 23 individuals were recorded. The suggested reason for the decline of the catch include the drop in fish stocks. At present, this fishery is not profitable. The fisheries using nets with larger mesh, the most harmful for franciscana

(32-34 and 20–22mm) have reduced their effort and nets with smaller mesh (12–14mm) are being used at present. Uruguayan legislation protecting the marine fauna including franciscana (Law 9481 and Decrees 26 1/78, 586/79 and 565/81) is being enforced (Praderi, in Crespo, 2000).

Similarly relatively low catch values were recorded in the 1990's from Paraná, Brasil (Zanelatto, in Crespo, 2000). Monzón (in Crespo, 2000) comments that since 1991 there was no information on franciscana mortality in the area of Necochea (Buenos Aires Province). She noted a significant decrease in gillnet fishing effort from 50 vessels in the early 1990s to only one at present. Coastal fishing in small communities (for example Santa Teresita), however, results in the highest mortality values of the region.

A promising double blind experiment conducted in an artisanal gillnet fishery in Argentina shows the effectiveness of acoustic deterrents (pingers) at reducing by-catch. As opposed to 45 dolphins being caught in silent nets, only 7 were caught in the active pinger nets. However, sea-lions (*Otaria flavescens*) increasingly damaged the fish in active pinger nets over the course of the experiment suggesting the use of higher pinger frequencies to avoid a "dinner bell" (Bordino et al. 2002).

To conclude, several analyses indicate a high probability that the franciscana population is decreasing. Results indicate that current levels of entanglement mortality cannot be sustained and that protective measures are urgently needed (e.g. Kinas, 2002). About 3.5%–5.6% of the stock may be removed each year by the fishery, i.e. over the maximum 2% recommended by the International Whaling Commission which may not be sustainable. Higher densities in coastal areas make Franciscanas more vulnerable to coastal fishing camps, with increased mortality in recent years (Crespo et al. 2009).

Pollution: According to Brownell (1989) ratios of DDT to DDE in the blubber of franciscana were at least an order of magnitude higher than in small cetaceans from California. This indicates the use of pesticides, which entered the coastal marine ecosystems in southern Brazil and Uruguay. Wide ranges of organochlorine residues were more recently determined in the blubber of franciscana incidentally caught along Brazilian coastal waters (Kajiwara et al. 2004). Concentrations of DDTs and PCBs were the highest, followed by CHLs, TCPMOH, dieldrin, TCPMe, heptachlor epoxide, HCB, and HCHs. Unexpectedly, significant pollution of PCBs, DDTs, TCPMe, and TCPMOH were observed in cetaceans from Brazil, implying the occurrence of local sources comparable to those in the Northern Hemisphere, probably by high industrialization in Brazil (Kajiwara et al. 2004). A large proportion of the distributional range is subject to pollution from several sources, especially agricultural land use and heavy industries between Sao Paulo in Brazil and Bahía Blanca in Argentina (Crespo, 2002).

Habitat degradation: Heavy coastal traffic and pollution from industrial development represent potential threats for the habitat of the franciscana. Recent widespread deforestation and agricultural cultivation occur in many of the basins draining into the Rio de La Plata system, particularly in southeastern Brazil. Fish species of commercial value normally constitute the diet of franciscanas, so an increase in the fishing effort for these fish could reduce available food for the dolphins (Reyes, 1991 and references therein). The coastal zone frequented by the franciscana is also intensively used for boat traffic, tourism, and artisanal and industrial fishing operations (Crespo, 2002; 2009).

7. Remarks

Range states (Reeves et al. 2008) :

Argentina (Buenos Aires, Chubut, Rio Negro); Brazil (Espírito Santo, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, São Paulo); Uruguay

The Franciscana is included in Appendices I and II of CMS. The species is listed in Appendix II of CITES. The species is listed as "Vulnerable" by the IUCN (Reeves et al. 2008) based on a suspected 30% and ongoing decline over three generations which is feared to increase due to fishery expansion and lack of mitigating measures. The World Wide Fund for Nature (WWF) considers *Pontoporia blainvillei* as one of the most endangered small cetaceans world wide (WWF, 2009).

Participants in a CMS meeting held in 2000 (Crespo, 2000) considered it essential to prepare an integrated conservation plan which includes work with the pertinent authorities, fishing communities, public awareness, environmental education and legislation review. It was suggested that Argentina, Brazil and Uruguay consider the possibility of developing a **Memorandum of Understanding** for franciscana conservation within the framework of the CMS. Participants agreed to consider franciscana as the most endangered small cetacean in the South-western Atlantic. The endemism of franciscana and its restricted distributional area are important conditions for the species besides the high impact of human activities. Main concerns for franciscana conservation are the higher rates of incidental mortality in artisanal fisheries throughout the area of distribution as well as chlorinated hydrocarbon and heavy-metal spills as a result of the industrial and agricultural activities in the coastal zone.

Open questions related to the franciscana which were identified in 1991 and 2000 and still apply today are: 1) area-dependent rate of incidental mortality in fishing activities and 2) unknown population/stock status and size (Reyes, 1991; Crespo 2000).

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8. Sources

- Aznar FJ, Raga JA, Corcuera J, Monzon F (1995) Helminths as biological tags for franciscana (*Pontoporia blainvillei*) (Cetacea, Pontoporiidae) in Argentinian and Uruguayan waters. *Mammalia* 59: 427-435.
- Bordino P, Thompson G, Iniguez M (1999) Ecology and behaviour of the franciscana (*Pontoporia blainvillei*) in Bahia Anegada, Argentina. *J Cet Res Manag* 1: 213-222.
- Bordino P, Kraus S, Albareda D, Fazio A, Palmiero A, Mendez M, Botta S (2002) Reducing incidental mortality of Franciscana dolphin *Pontoporia blainvillei* with acoustic warning devices attached to fishing nets. *Mar Mam Sci* 18: 833-842.
- Brownell RL (1989) Franciscana – *Pontoporia blainvillei* (Gervais and d'Orbigny, 1844). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 4: River Dolphins and the Larger Toothed Whales. Academic Press, London, pp. 45-68.
- Cremer MJ, Simoes-Lopes PC (2005) The occurrence of *Pontoporia blainvillei* (Gervais & d'Orbigny) (Cetacea, Pontoporiidae) in an estuarine area in southern Brazil. *Rev Bras Zool* 22: 717-723.
- Cremer MJ, Simoes-Lopes PC (2008) Distribution, abundance and density estimates of franciscanas, *Pontoporia blainvillei* (Cetacea: Pontoporiidae), in Babitonga bay, southern Brazil. *Rev Bras Zool* 25: 397-402.

- Crespo EA (2000) Overview and recommendations. In: Report of the third workshop for coordinated research and conservation of the franciscana dolphin (*Pontoporia blainvillei*) in the southwestern Atlantic. UNEP/CMS Secretariat, Bonn, German,. pp. 1-11.
- Crespo EA (2002) Franciscana – *Pontoporia blainvillei*. In: Encyclopedia of marine mammals (Perrin WF, Würsig B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 482-487.
- Crespo EA (2009) Franciscana – *Pontoporia blainvillei*. In: Encyclopedia of marine mammals, 2nd Ed. (Perrin WF, Würsig B, Thewissen JGM, eds.) Academic Press, Amsterdam, pp. 466-469.
- Crespo EA, Dans SL, Koen Alonso M, Pedraza SN (2007) Interactions between marine mammals and fisheries. The Argentine Sea and its fisheries resources. Vol. 5. The marine ecosystem. pp. 151-169.
- Crespo EA, Pedraza SN, Grandi MF, Dans SL, Garaffo EV (2009) Abundance and distribution of endangered Franciscana dolphins in Argentine waters and conservation implications. Mar Mamm Sci 26:17-35
- Danilewicz D, Secchi ER, Ott PH, Moreno IB, Bassoi M, Borges-Martins M (2009). Habitat use patterns of franciscana dolphins (*Pontoporia blainvillei*) off southern Brazil in relation to water depth. Journal of the Marine Biological Association of the United Kingdom 89:943-949
- Di Benedetto APM, Ramos RMA (2001) Biology and conservation of the franciscana (*Pontoporia blainvillei*) in the North of Rio de Janeiro State, Brazil. J Cetacean Res Manage 3: 185-192.
- IWC (2005) International Whaling Commission: Annex L. Report of the Sub-Committee on Small Cetaceans. J Cetacean Res Manage 7: 307-326.
- Kajiwara N, Matsuoka S, Iwata H, Tanabe S, Rosas FCW, Fillman G, Readman JW (2004) Contamination by Persistent Organochlorines in Cetaceans Incidentally Caught Along Brazilian Coastal Waters. Arch Environ Contam Toxicol 46: 124-134.
- Kinan PG (2002) The impact of incidental kills by gill nets on the Franciscana dolphin (*Pontoporia blainvillei*) in southern Brazil. Bull Mar Sci 70: 409-421.
- Ott PH, Secchi ER, Moreno IB, Danilewicz D, Crespo EA, Bordino P, Ramos R, Di Benedetto AP, Bertozzi C, Bastida R, Zanelatto R, Perez JE, Kinan PG (2002) Report of the Working Group on Fishery Interactions. Pages 55-64 in Secchi, E.R. (ed.). Special Issue on the Biology and Conservation of Franciscana. The Latin American Journal of Aquatic Mammals, (special issue 1):1-192.
- Pinedo MC, Polacheck T (1999) Trends in franciscana (*Pontoporia blainvillei*) stranding rates in Rio Grande do Sul, southern Brazil (1979-1998). J Cet Res Manag 1: 179-189.
- Pinedo MC, Praderi R, Brownell R Jr (1989) Review of the biology and status of the franciscana *Pontoporia blainvillei*. In 'Biology and Conservation of the River Dolphins'. (Eds W.F.Perrin, R.L.Brownell, Z. Kaiya and L. Jiankang.) pp. 46-51. (Occasional Papers. IUCN SSC 3: Gland.).
- Reeves RR, Dalebout ML, Jefferson TA, Karczmarski L, Laidre K, O'Corry-Crowe G., Rojas-Bracho L, Secchi ER, Slooten E, Smith BD, Wang JY, Zerbini AN, Zhou K (2008) *Pontoporia blainvillei*. In: IUCN 2009. IUCN Red List of Threatened Species. Version 2009.2. <www.iucnredlist.org>.
- Reyes JC (1991) The conservation of small cetaceans: a review. Report prepared for the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals. UNEP/CMS Secretariat, Bonn.
- Secchi ER (2010a) Life History and Ecology of Franciscana, *Pontoporia blainvillei* (Cetacea, Pontoporiidae)(in revision). In: Ruiz-Garcia M, Shostell JM (Eds.) Biology, evolution and conservation of river dolphins within South America and Asia. Wildlife Protection, destruction and extinction series. Nova Publishers, New York.
- Secchi ER (2010b) Review on the Threats and Conservation Status of Franciscana, *Pontoporia blainvillei* (Cetacea, Pontoporiidae) (in revision). In: Ruiz-Garcia M, Shostell JM (Eds.) Biology, evolution and conservation of river dolphins within South America and Asia. Wildlife Protection, destruction and extinction series. Nova Publishers, New York.
- Secchi ER, Ott PH (2000). A profundidade como um fator determinante da distribuição de toninhas, *Pontoporia blainvillei*, conforme indicado pelos índices de CPUE. In 'Report of the Third Workshop for Coordinated Research and Conservation of the Franciscana Dolphin (*Pontoporia blainvillei*) in the Southwestern Atlantic'. (Eds UNEP/CMS.) p. 55-57. (UNEP/CMS: Bonn.)
- Secchi ER, Ott PH, Crespo EA, Kinan PG, Pedraza SN, Bordino P (2001) A first estimate of franciscana (*Pontoporia blainvillei*) abundance off southern Brazil. J Cetacean Res Manage 3: 95-100.

- Secchi ER, Danilewicz D, Ott PH (2003a) Applying the phylogeographic concept to identify franciscana dolphin stocks: implications to meet management objectives. J Cetacean Res Manage 5: 61-68.
- Secchi, E.R., Ott, P.H. and Danilewicz, D.S. (2003b). Effects of fishing by-catch and conservation status of the franciscana dolphin, *Pontoporia blainvillei*. Pages 174-191 in Gales, N., Hindell, M. and Kirkwood, R. (Eds) Marine Mammals: Fisheries, Tourism and Management Issues. CSIRO Publishing. Collingwood. Australia.
- Valsecchi E, Zanellatto RC (2003) Molecular analysis of the social and population structure of the franciscana (*Pontoporia blainvillei*): conservation implications. J Cetacean Res Manag 5: 69-75.
- WWF (2009) Small cetaceans, the forgotten whales. (Elliott W, Sohl H, Bugener V). Whaling Report. Indd 34

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UNEP/CMS Secretariat, Bonn, Germany.

http://www.cms.int/reports/small_cetaceans/index.htm

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