

Risso's Dolphins (*Grampus griseus*): impact of the Sri Lankan tuna gillnet fishery

R. Charles ANDERSON

Manta Marine Pvt Ltd, PO Box 2074, Malé, Republic of Maldives

anderson@dhivehinet.net.mv

ABSTRACT

Cetaceans were observed off the south coast of Sri Lanka in the month of April, every year over a seven year period, 2007-2013. During 48 days at sea a total of 290 cetacean sightings were recorded. Risso's dolphins (*Grampus griseus*) were only seen once, despite being reported as common around Sri Lanka in the early 1980s. Reviews of published records of cetacean sightings and bycatch landings around Sri Lanka both confirm declines in relative abundance of Risso's dolphins. They have been taken in large numbers by Sri Lankan fisheries, particularly tuna gillnet fisheries, and appear to have been almost extirpated locally.

INTRODUCTION

Risso's dolphin (*Grampus griseus*) is a widespread and relatively common cetacean. It occurs in all oceans, between at least 64°N and 46°S from inshore to oceanic waters, although it does have a preference for slope waters (Jefferson et al., 2013). In Sri Lanka, Risso's dolphin has been reported to be common (Alling, 1984; Leatherwood and Reeves, 1989; Ilangakoon, 2002). However, Sri Lanka does have important pelagic fisheries, and significant numbers of Risso's dolphins were reported as bycatch, mainly from the tuna gillnet fishery, during the 1980s and early 1990s (Alling, 1985; Joseph and Sideek, 1985; Leatherwood and Reeves, 1989; Dayaratne and Joseph, 1993; Ilangakoon, 1997 & 2001).

During 2007-13, whale watching was carried out off the southern coast of Sri Lanka. Observations of all cetaceans were recorded and suggest that Risso's dolphin is no longer common in Sri Lankan waters. The likely cause of its decline in abundance is unsustainable levels of mortality in local fisheries, particularly the tuna gillnet fishery.

METHODS

Whale watching was carried out from the fishing port of Mirissa (near the southern tip of Sri Lanka) on a 16m motorised vessel, for 2-14 days each April (and the last two days of March in 2009) over 7 years, 2007-13. The vessel had an average cruising speed of 7-8 knots (13-15 km/h) and a maximum speed of 11 knots (20 km/h). Two to four observers maintained a watch, from both the main deck (c0.5m above the waterline) and the roof of the wheelhouse (c3m). A total of 48 days of observation were completed, amounting to some 308h at sea.

RESULTS AND DISCUSSION

A total of 290 cetacean sightings were recorded, among which there was just one single sighting of Risso's dolphin. This was surprising since this species has in the past been reported to be common in Sri Lankan waters (Alling, 1984; Leatherwood and Reeves, 1989; Ilangakoon, 2002). A review of sighting surveys (Table 1, Fig. 1) and bycatch landings (Table 2, Fig. 2) strongly suggests a decline in the abundance of Risso's dolphins over the past three decades. (The moderately high sightings rate noted by De Vos *et al.* (2012) at the relatively late date of 2003 came from a remote area off the uninhabited southeast coast).

Sri Lanka is a major fishing nation. Studies in the 1980s and early 1990s demonstrated that large numbers of small cetaceans were being caught, both as bycatch in pelagic gillnets and as direct catch by harpoon (Alling, 1985; Ilangakoon, 1997; Ilangakoon *et al.*, 2000a&b; Leatherwood and Reeves, 1989; Prematunga *et al.*, 1985). There was some controversy over the exact numbers being landed annually, although it was clearly in the thousands. Leatherwood (1994) reworked earlier studies and conservatively estimated a catch of 8,042-11,821 dolphins per year during 1984-86. Dayaratne and Joseph (1993) estimated total annual landings of 5,181

dolphins during 1991-92. Although there has been no monitoring of cetacean landings since the mid-1990s, it is believed that some dolphin catching continues (Ilangakoon, 2012a; Reeves *et al.*, 2013), despite cetaceans being legally protected (Ilangakoon, 2012a).

Kruse *et al.* (1991) identified Sri Lankan Risso's dolphins as being particularly vulnerable to overexploitation. They reviewed available catch and biological data and concluded that 'the current take of Risso's dolphins in the Sri Lankan drift gillnet fishery is not sustainable.' It appears that they were right.

A recent global review (Jefferson *et al.*, 2013) confirmed that Risso's dolphins range widely across inshore to oceanic habitats but have a strong preference for continental slope and outer shelf waters. The continental shelf and slope of Sri Lanka is contiguous with that of India. It seems likely that Risso's dolphin abundance in Indian waters, which also has major gillnet fisheries, has also been reduced. Afsal *et al.* (2008) reported only 4 sightings of Risso's dolphins from a survey of Indian and adjacent seas (including Sri Lankan waters) conducted during 2003-07. That extensive survey included many sightings that were unidentified to species; excluding unidentified dolphins, Risso's dolphins accounted for just 2.1% of sightings. In contrast, the Maldives Islands (which though adjacent to Sri Lanka and south India are not connected to their continental shelf, and do not have gillnet fisheries) have a much higher relative abundance of Risso's dolphins, of the order of 11-14% of sightings (Anderson, 2005; Clark *et al.*, 2012; RCA, unpublished data, 2003-2013).

The reduced abundance of Risso's dolphins around Sri Lanka, despite continued high relative abundance of Risso's Dolphins in the Maldives, suggests that the numbers crossing oceanic waters between these locations may be limited. In contrast, spinner dolphins remain relatively abundant in Sri Lankan waters, despite large numbers having been taken by local fisheries. This suggests that large numbers may be continually entering Sri Lankan waters from elsewhere in the Indian Ocean; they are certainly abundant in the Maldives (Anderson, 2005; Clark *et al.*, 2012; RCA, unpublished data, 2003-2013) and in the wider Indian Ocean (Ballance and Pitman, 1998).

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Table 1. Sightings of Risso's dolphins during surveys around Sri Lanka, 1983-2013

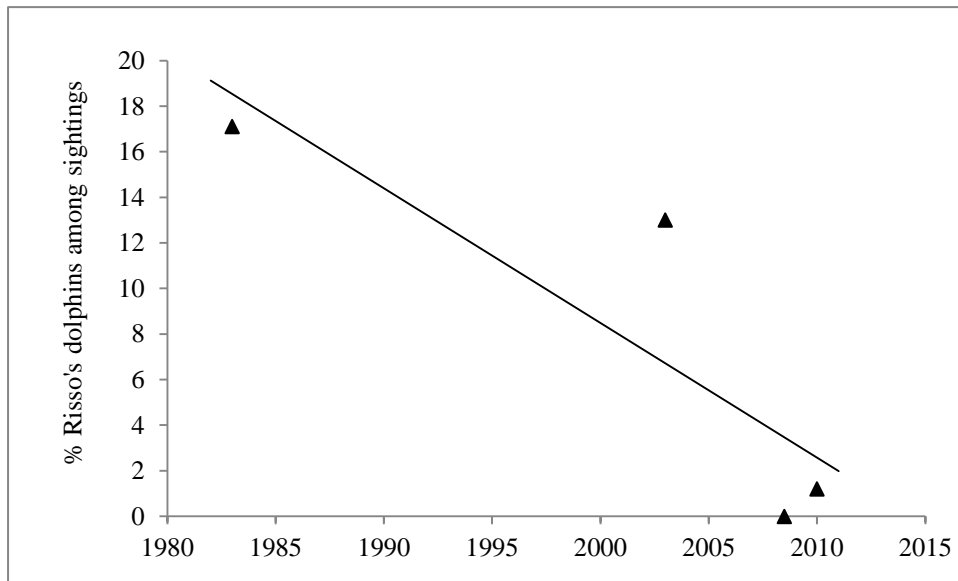
Date	Location	Risso's	No. sightings of Cetaceans	Small cets	% Risso's	Source
1983	NE coast	2	26	-	7.7%	Leatherwood et al. (1984)
1994	West coast	0	25	-	0	Ilangakoon et al. (2000a)
2003	Sri Lanka	6	76	-	7.9%	De Vos et al. (2012)
2004-05	NW coast	0	33	-	0%	Bröker & Ilangakoon (2008)
2003-07	Sri Lanka	1	86	-	1.2%	Afsal et al. (2008)
2008-09	South coast	0	69	-	0%	Ilangakoon (2012a)
2007-13	South coast	1	290	-	0.003%	This study
2011-13	NE coast	0	87	-	0%	RCA (unpubl. data)
1982-84	Sri Lanka	29	-	170*	17.1%	Alling (1986)
2003	Sri Lanka	6	-	46	13.0%	De Vos et al. (2012)
2008-09	South coast	0	-	48	0%	Ilangakoon (2012a)
2007-13	South coast	1	-	82	1.2%	This study

*Note: Alling (1986) reported on cetaceans excluding large whales seen during the *Tulip* expedition. Small cetacean data from other studies (where n>40) are presented for comparison.

Table 2. Landings of Risso's dolphins during catch surveys around Sri Lanka, 1983-1994

Date	Location	No Risso's	No cetaceans	% Risso's	Source
1982-3	W & NE coasts	10	63	15.9%	Alling (1985)
1984	Trincomalee	50	314	15.9%	Leatherwood & Reeves (1989)
1985	Trincomalee	53	323	16.4%	Leatherwood & Reeves (1989)
1986	Trincomalee	16	177	9.0%	Leatherwood & Reeves (1989)
1985	West coast	9	138	6.5%	Joseph & Sideek (1985)
1985-88	S & W coasts	20	366	5.5%	Ilangakoon (1997)
1991-92	Sri Lanka	123	2791	4.4%	Dayaratne & Joseph (1993)
1994	Negombo	22	263	8.4%	Ilangakoon (2001)
1994	Beruwela	31	325	9.5%	Ilangakoon (2001)

Note: Joseph and Sideek (1985) may have underestimated Risso's dolphin landings due to identification problems (Ilangakoon, 2001). Conversely, surveys in the 1990s may have overestimated Risso's catches in Sri Lankan waters because some vessels were fishing beyond the Sri Lankan EEZ by that time (Dayaratne and Joseph, 1993). If corrections were made for these possible biases the decline seen in Fig.2 would be steeper.

Fig. 1. Relative contribution of Risso's dolphin to small cetacean sightings in Sri Lanka, 1983-2013**Fig. 2.** Relative contribution of Risso's dolphin to cetacean landings in Sri Lanka, 1983-1994