

Humpback whale (*Megaptera novaeangliae*) occurrence in the Mediterranean Sea

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ABSTRACT

Humpback whales were considered extremely rare in the Mediterranean Sea until recently. Only two confirmed records were known from a period of more than 100 years and both were from the western basin. However, nine new observations spread across both Mediterranean basins have been recorded since 1990. This increase in numbers and range during a relatively short period of time seems to be a new, growing trend, suggesting that the occurrence of humpback whales in the Mediterranean Sea is no longer accidental, but occasional. It coincides with the recovery of some stocks of the expanding North Atlantic population after their depletion during a long period of whaling. The true reason behind increased humpback whale entries in the Mediterranean Sea and their exact origin cannot be known until new occurrences are properly photo-identified and sampled genetically.

KEYWORDS: HUMPBACK WHALE; MEDITERRANEAN; EUROPE; DISTRIBUTION; RANGE

INTRODUCTION

The humpback whale (*Megaptera novaeangliae*) has always been considered an extremely rare species in the Mediterranean Sea (Aguilar, 1989; Notarbartolo di Sciarra and Demma, 1997). Aguilar (1989) concluded that only two documented and confirmed records existed for the Mediterranean Sea until 1989: a historical 'catch' near Toulon (southeastern France) in 1885 and a sighting reported in 1986. Since 1990, the number of humpback whale observations in the Mediterranean Sea has increased and the range of sighting locations has expanded to cover both basins of the Mediterranean Sea. This paper reports six recent unpublished records (five sightings and one stranding) including the first occurrence of humpback whales in the eastern Mediterranean basin, and discusses the possible reasons of increase in this species' occurrence in the Mediterranean Sea.

METHODS

In order to gather data on humpback whale occurrences in the Mediterranean Sea, a search of unpublished opportunistic sightings or strandings was made by contacting a large number of Mediterranean cetologists working in the field or involved in national stranding networks. Photographic documents were collected in the same way and analysis was performed in order to determine whether any of the humpback whales observed and photographed since 1998 were resighted in the observations made in the following years. Details of the trailing edges of the flukes, the right and left dorsal fin area, and the left pectoral fin pigmentation were used for comparisons with the available material from each sighting, since the ventral part of the flukes had been photographed in only one case. In that particular case, photo-identification comparisons were made with 5,341 and 2,998 individual whales from the North Atlantic Humpback Whale Catalogue (NAHWC), and the Years of the North Atlantic Humpback (Yonah) Catalogue, respectively.

RESULTS

From 1990 to 2004, six sightings and three entanglements of humpback whales have been recorded in the Mediterranean Sea (Table 1; Fig. 1). On 6 March 1990, a single humpback whale entered the small and shallow Bay of Aiguablava, Catalonia, Spain. It seemed to be a large individual and was recorded a few hundred meters from the shore (Aguilar, pers. comm.). On 2 October 1992, a young humpback whale was found dead, entangled in fishing nets in the Gulf of Gabès, Tunisia (Chakroun, 1994). One more humpback whale was found entangled in fishing nets in the following year, on 21 May 1993 off Cavalaire, France. This was a young female that measured 7m and weighed 2,600kg. Later in August of the same year, two humpback whales of similar size were filmed off Toulon (Sears pers. comm.). On 24 January 1998 a single humpback whale was observed inside the shallow Gulf of Oristano (west Sardinia, Italy). The whale was followed, while travelling at a distance of about 30-400m from the coast over depths of 5-22m. Its total length was estimated to be 7-8m.

An exceptional sighting of a single humpback whale was reported on 17 April 2001 in the Bay of Tolo, which is encompassed by the Argolikos Gulf, Myrtoon Sea, Greece. This was the first time that a humpback whale has been recorded in the eastern Mediterranean basin. The whale was sighted almost daily on a regular basis until 15 May 2001. Throughout its stay the whale remained 0.5-5km offshore, over depths that ranged from 30-140m. Feeding behaviour was observed repeatedly. One more humpback whale was sighted in Greece on 19 July 2002 in the strait between Lefkada and the Meganisi Islands, Ionian Sea. It was observed at 200 to less than 50m from the coast, over depths of less than 50m. No feeding behaviour was observed and underwater photos showed that the whale was emaciated. No resightings were reported from the area during the next few days. About two weeks later, on 4 August 2002, a humpback whale was sighted in the west Adriatic Sea, 3.5km off Senigallia, Italy (Affronte *et al.*, 2003). That whale was also

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Table 1

Documented records of humpback whales in the Mediterranean Sea. F: Female; M: Male.

Date	Location	No of animals	Sex	Size	Type of record	Source of information
Nov. 1885	Toulon, SE France	1	?	6.8m	Catch in nets (found dead?)	Aguilar (1989)
14 Mar. 1986	Off Majorca, Catalonia, Spain	2	F? + calf?	?	Sighting	Aguilar (1989)
Mar. 1990	Bay of Aiguablava, Catalonia, Spain	1	?	Adult?	Sighting	Aguilar, pers. comm.
2 Oct. 1992	Gulf of Gabès, Tunisia	1	?	8m	Catch in nets (found dead)	Chakroun (1994)
21 May 1993	Off Cavalaire, SE France	1	F	7m	Catch in nets (found alive)	Bompar (2000)
Aug. 1993	Off Toulon, SE France	2	?	?	Sighting	Sears, pers. comm.
24 Jan. 1998	Gulf of Oristano, W Sardinia, Italy	1	?	7-8m	Sighting	This paper
17 Apr. 2001	Bay of Tolo, Myrtoon Sea, Greece	1	?	8-11m	Sighting	This paper
19 Jul. 2002	SW Lefkada Island, Ionian Sea, Greece	1	?	?	Sighting	This paper
4 Aug. 2002	Off Senigallia, Adriatic Sea, Italy	1	?	~9m	Sighting*	Affronte <i>et al.</i> (2003)
5 Apr. 2003**	North of Tartous, Syria	1	M	7.85m	Floating dead	Saad (2004)
17 Feb. 2004	SE Corfu Island, Ionian Sea, Greece	1	F	7.2m	Catch in nets (found dead)	This paper

*The sighting of 4 August 2002 could be a resighting of the whale observed on 19 July 2002 (see text for details). **This record became known at page proof stage and is not considered elsewhere in the paper. Saad, A. 2004. First record of a humpback whale stranding on the coast of Syria (Eastern Mediterranean). FINS Newsletter of ACCOBAMS 1(1):10. [Available from: www.accobams.org].

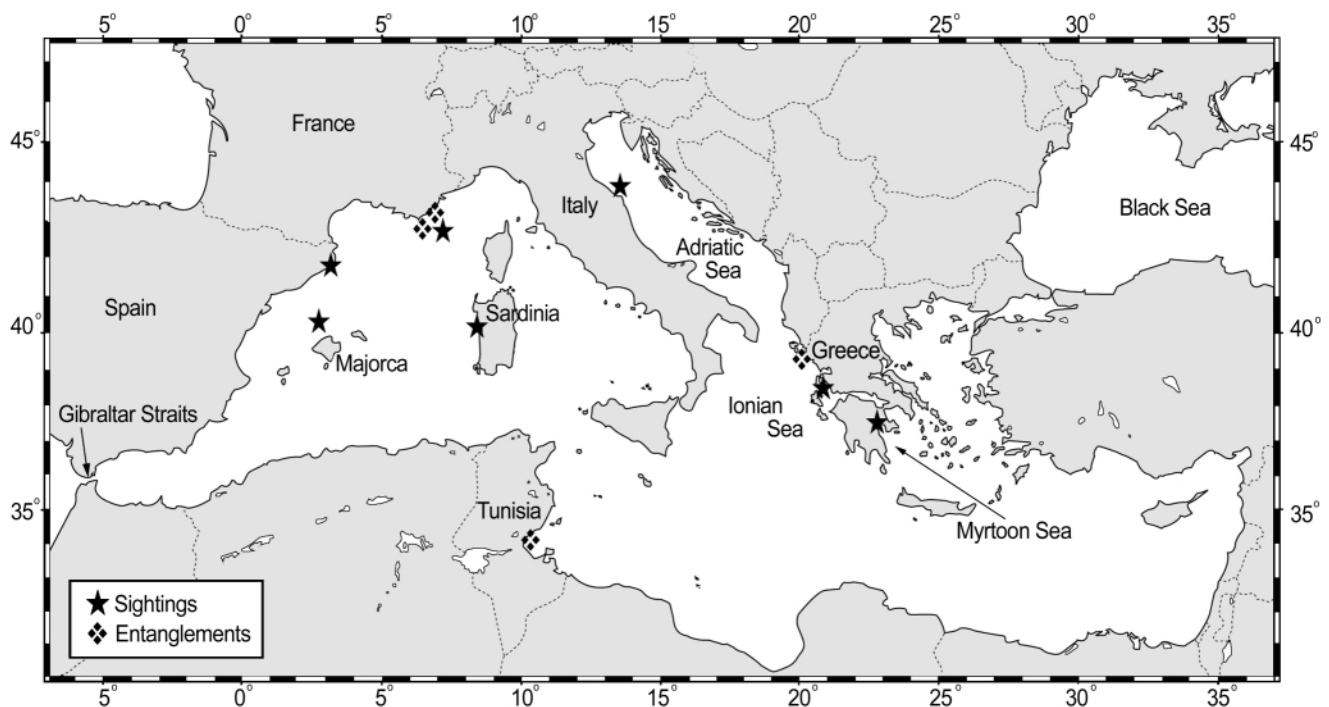


Fig. 1. Location of humpback whales recorded in the Mediterranean Sea.

emaciated to the point that its survival was doubtful. Its size was estimated to be about 9m. Finally, the carcass of a young female humpback whale was reported floating on 17 February 2004 in the Bay of Lefkimmi (SE Corfu Island, Ionian Sea), and eventually washed ashore two days later. The total length of this whale was 7.2m. Nets (probably pelagic driftnets) around its mouth and a rope that was found attached to its tailstock indicated entanglement and interaction with fisheries. Barnacles on its genital area suggested that this whale was slowly moving for many days before its death (Clapham, pers. comm.). Skin samples were collected for future DNA analysis and comparison.

The whale observed in the Bay of Tolo is the only one for which good photos of the ventral part of the flukes are available (Fig. 2). No matches were found with any humpback whale photo-identified in the North Atlantic, therefore the whale was added to the NAHWC catalogue as new entry #4923 (Seton, pers. comm.). These comparisons included the photo-identified whales (up to 2002) in the most neighbouring population unit to the Mediterranean Sea,

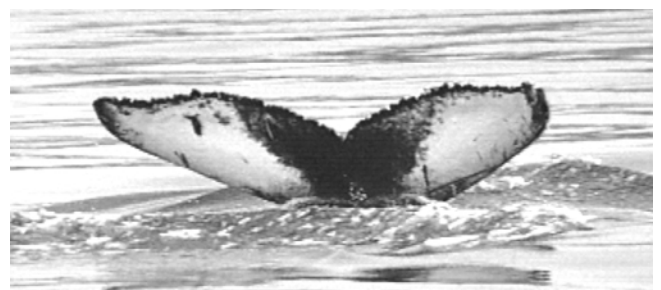


Fig. 2. Pigmentation pattern and trailing edge of the flukes of the humpback whale recorded in the Bay of Tolo (Argolikos Gulf, Myrtoon Sea, Greece) in 2000. This whale has been catalogued as a new entry (#4923) in the North Atlantic Humpback Whale Catalogue (NAHWC).

which winters around the Cape Verde Islands (Rice, 1998; Hazevoet and Wenzel, 2000). Attempts to match the most recent Mediterranean records (1998, 2001, 2002 and 2004) showed that all sightings made in different years concerned different individuals. Due to the poor quality of the available

photographs no definitive conclusions could be drawn regarding the comparison between the two whales observed in 2002. Nevertheless, taking into consideration the very similar black pigment patterns on the right pectoral fin, some similar scarring and pigmentation patterns on the right dorsal and head areas, the emaciated state of both whales, and the time and geographical distance between the two sightings, it seems likely that the whale observed in the east Ionian Sea on 19 July 2002 was the individual observed 16 days later in the north-west Adriatic Sea. The shorter trajectory (which is almost a straight line) linking these two sighting points is about 510 nautical miles and corresponds to an average speed of 1.33 knots for a whale travelling continuously with a north-west heading. This is an underestimate of the real speed, which seems reasonable for a whale exploring new areas or looking for its way back to the Atlantic. Migrating humpback whales swim at average speeds of 2.2 to 8.2 knots (Clapham and Mead, 1999).

DISCUSSION

Considering that only two records were known until 1989 for a period of more than a century, it was correct to believe that the humpback was an extremely rare species in the Mediterranean Sea (Aguilar, 1989). The data in this paper show an average of roughly one record every one and half years since 1990. These numbers clearly suggest that the occurrence of humpback whales in the Mediterranean Sea is no longer accidental, but occasional. It is comparable to that of the four other cetacean species (minke whale, *Balaenoptera acutorostrata*, killer whale, *Orcinus orca*, false killer whale, *Pseudorca crassidens* and rough-toothed dolphin *Steno bredanensis*) that are traditionally considered occasional visitors to the Mediterranean Sea (Notarbartolo di Sciara and Demma, 1997; Bompar, 2000; Notarbartolo di Sciara, 2002). There are relatively few records (from less than 10 to about 20) for all the above-mentioned species, which apparently have no resident population in the Mediterranean Sea (Notarbartolo di Sciara and Demma, 1997; Notarbartolo di Sciara, 2002). It is reasonable to assume that the latter is also the case for Mediterranean humpback whales, which should be still regarded as wanderers of the North Atlantic population (Aguilar, 1989). Various studies indicate a recovery of some stocks of this population after their severe depletion by commercial whaling (Clapham and Mead, 1999; Waring *et al.*, 1999; IWC, 2002; 2003). The historical presence of humpback whales off the European Atlantic coasts is well documented, although few records are available from the 20th century (see Aguilar, 1989), and the actual status and structure of the eastern North Atlantic stocks are unclear (Clapham and Mead, 1999). Animals from Iceland and Norway visit the West Indies for breeding (Stevick *et al.*, 1999; IWC, 2002), but genetic results have shown that some animals (at least from Iceland) do not breed in the West Indies (Valsecchi *et al.*, 1997). Some whales use the waters around the Cape Verde Islands as breeding and calving habitats, and a recent match provided direct evidence of a link with the feeding grounds off Iceland during the boreal summer (Hazevoet and Wenzel, 2000; Jann *et al.*, 2003). The available data and the lack of any photo-identification matching prevent any links being made between the humpback whales observed in the Mediterranean and any particular Atlantic stock. Surprisingly, the 11 Mediterranean records are spread quite homogeneously throughout the year in all seasons (Fig. 3), therefore no link with particular migration movements

towards feeding or breeding grounds can be established. Most of them concern young animals (Table 1) that may have entered the Mediterranean Sea either after an early separation from their mother, or during their first independent migration cycle (Clapham and Mead, 1999).

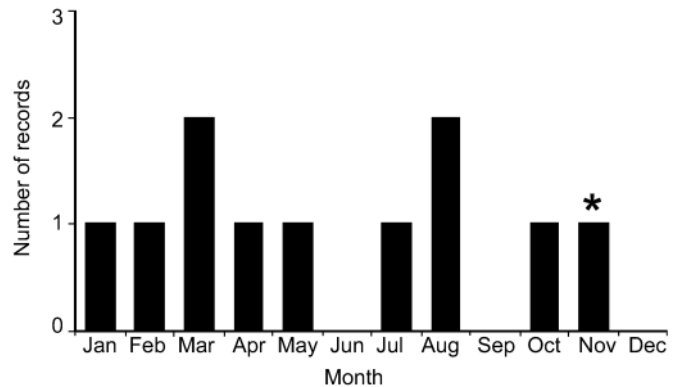


Fig. 3. Distribution of humpback whales recorded in the Mediterranean Sea by month. The asterisk indicates the historical record in 1885.

The sudden increase of observations since 1990 can be attributed to: (1) a real increase in humpback whale entries in the Mediterranean Sea; (2) an increased 'effort' in their recording; and (3) both (1) and (2) occurring simultaneously. There is no doubt that during the past decade, the number of scientists and laypersons who study, observe and record cetaceans has increased significantly in the region, as well as the circulation of information among them. Therefore, the rate of humpback whale entries in the Mediterranean might have always been the same, with their occurrence passing unnoticed previously. However, the humpback whale is an unmistakable species and the majority of Mediterranean records occurred very close to the coasts. Consequently, similarly conspicuous and exceptional events would have been known in the past, since the zoologists and naturalists of the 19th and early 20th centuries (like Gervais, Risso, Companyo and others) were very keen on reporting whale sightings or strandings in the northwestern Mediterranean Sea (Bompar, 2000). They had very motivated or even paid personnel *in situ*, because of their high interest in enriching museum collections. Despite the many records from other occasional Mediterranean species (Bompar, 2000), there is only one humpback whale record before 1986 (Aguilar, 1989). Similarly, the increased effort over the last few years did not result in an equivalent increase of the other occasional whale species.

The explanation for humpback whale entries in the Mediterranean can only be the subject of speculation. Aguilar (1989) proposed that, driven by the pursuit of food or by specific water temperature gradients, some individuals might follow the migration pattern of Atlantic fin whales (*Balaenoptera physalus*) towards the Ligurian Sea (northwestern Mediterranean). New data show that seasonal fin whale migration through the Gibraltar Straits is unlikely to occur (Notarbartolo di Sciara *et al.*, 2003). Nevertheless, temporal or permanent changes in the oceanographic conditions in the Gibraltar Strait and the entire Mediterranean Sea combined with the merely explorative nature of humpback whales could be the cause of the recent entries. Drastic changes in the physical characteristics of the Mediterranean waters may result from relatively small

evolutionary changes in heat and freshwater budgets across the sea surface (Béthoux and Gentili, 1999). Increase in water temperature and slight climate changes that are already known to occur (Béthoux *et al.*, 1998; Béthoux and Gentili, 1999) could progressively or even suddenly remove oceanographic barriers that prevented humpback whales from entering the Mediterranean Sea in the past. Another plausible explanation for recent humpback whale occurrence could be a spillover from an expanding North Atlantic population. Increased numbers of births may have resulted in an increase in the attempts of young individuals to explore new grounds. The distribution of humpback whale populations seems to be very dynamic, and there are reasons to believe that humpback whales have only 'recently' colonised or shifted to two of their largest actual breeding grounds in the world, in Hawaii (Herman, 1979) and the northern West Indies (Mattila *et al.*, 1994; Reeves *et al.*, 2001). Although the possibility of a new colonisation of the Mediterranean Sea by humpback whales cannot be rejected, there are not enough data to support such a scenario. However, if this were true, the apparently high number of entanglements in fishing nets might be a serious impediment for the colonisation.

Thousands of kilometres away from their usual feeding and breeding grounds, humpback whales have reached the western and eastern Mediterranean repeatedly during the last years. This seems to be a new, growing trend, rather than an old phenomenon that passed unnoticed during the previous decades. It is not known if these whales are able to find their way back to the Atlantic Ocean, or if they stay in the Mediterranean Sea and die sooner or later. It is important to increase the scientific effort, so that new humpback whale sightings are properly identified photographically and genetically. Only then will comparisons with the Atlantic stocks provide answers to the questions that arise each time a humpback whale is observed in the Mediterranean Sea.

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REFERENCES

- Affronte, M., Stanzani, L.A. and Stanzani, G. 2003. First record of a humpback whale, *Megaptera novaeangliae* (Borowski, 1781) in the Adriatic Sea. *Annals for Istrian and Mediterranean Studies* 13(1):51-4.
- Aguilar, A. 1989. A record of two humpback whales, *Megaptera novaeangliae*, in the western Mediterranean Sea. *Mar. Mammal Sci.* 5(3):306-9.
- Béthoux, J.P. and Gentili, B. 1999. Functioning of the Mediterranean Sea: past and present changes related to freshwater input and climate changes. *J. Mar. Systems* 20:33-47.
- Béthoux, J.P., Gentili, B. and Tailliez, D. 1998. Warming and freshwater budget change in the Mediterranean since the 1940s their possible relation to the greenhouse effect. *Geophys. Res. Lett.* 25(7):1023-6.
- Bompar, J.M. 2000. *Les Cétacés de Méditerranée*. Édusud, La Calade, Aix-en-Provence, France. 188pp. [In French].
- Chakroun, F. 1994. Status of cetaceans in Tunisian marine waters. *Eur. Res. Cetaceans* [Abstracts] 8:107. Proceedings of the Eighth Annual Conference of the European Cetacean Society, Montpellier, France, 2-5 March 1994.
- Clapham, P.J. and Mead, J.G. 1999. *Megaptera novaeangliae*. *Mamm. Species* 604:1-9.
- Hazevoet, C.J. and Wenzel, F.W. 2000. Whales and dolphins (Mammalia, Cetacea) of the Cape Verde Islands, with special reference to the humpback whale (*Megaptera novaeangliae*) (Borowski, 1781). *Contrib. Zool.* 69(3):197-211.
- Herman, L.M. 1979. Humpback whales in Hawaiian waters: a study in historical ecology. *Pac. Sci.* 33(1):1-15.
- International Whaling Commission. 2002. Report of the Scientific Committee. Annex H. Report of the Sub-Committee on the Comprehensive Assessment of North Atlantic Humpback Whales. *J. Cetacean Res. Manage. (Suppl.)* 4:230-60.
- International Whaling Commission. 2003. Report of the Scientific Committee. Annex H. Report of the Sub-Committee on the Comprehensive Assessment of humpback whales. *J. Cetacean Res. Manage. (Suppl.)* 5:293-323.
- Jann, B., Allen, J., Carrillo, M., Hanquet, S., Katona, S.K., Martin, A.R., Reeves, R.R., Seton, R., Stevick, P.T. and Wenzel, F.W. 2003. Migration of a humpback whale (*Megaptera novaeangliae*) between the Cape Verde Islands and Iceland. *J. Cetacean Res. Manage.* 5(2):125-29.
- Mattila, D.K., Clapham, P.J., Vásquez, O. and Bowman, R.S. 1994. Occurrence, population composition, and habitat use of humpback whales in Samana Bay, Dominican Republic. *Can. J. Zool.* 72(11):1898-907.
- Notarbartolo di Sciarra, G. 2002. Cetacean species occurring in the Mediterranean and Black Seas. pp. 6-26. In: G. Notarbartolo di Sciarra (ed.) *Cetaceans of the Mediterranean and Black Seas: State of Knowledge and Conservation Strategies*. Document ACCOBAMS/MOP/Inf.6 presented to the first meeting of the ACCOBAMS partners, February 2002, Monaco. 219pp. [Available from the Permanent Secretariat of ACCOBAMS].
- Notarbartolo di Sciarra, G. and Demma, M. 1997. *Guida dei Mammiferi Marini del Mediterraneo*. 2nd Edn. Franco Muzzio Editore, Padova, Italy. 264pp. [In Italian].
- Notarbartolo di Sciarra, G., Zanardelli, M., Jahoda, M., Panigada, S. and Airoidi, S. 2003. The fin whale, *Balaenoptera physalus* (L., 1758) in the Mediterranean Sea. *Mammal Rev.* 33(2):105-50.
- Reeves, R.R., Swartz, S.L., Wetmore, S.E. and Clapham, P.J. 2001. Historical occurrence and distribution of humpback whales in the eastern and southern Caribbean Sea, based on data from American whaling logbooks. *J. Cetacean Res. Manage.* 3(2):117-29.
- Rice, D.W. 1998. *Marine Mammals of the World. Systematics and Distribution*. Special Publication No. 4. The Society for Marine Mammalogy, Allen Press Inc., Lawrence, Kansas. v-ix+231pp.
- Stevick, P.T., Øien, N. and Mattila, D.K. 1999. Migratory destinations of humpback whales from Norwegian and adjacent waters: evidence for stock identity. *J. Cetacean Res. Manage.* 1(2):147-52.
- Valsecchi, E., Palsbøll, P., Hale, P., Glockner-Ferrari, D., Ferrari, M., Clapham, P., Larsen, F., Mattila, D., Sears, R., Sigurjónsson, J., Brown, M., Corkeron, P. and Amos, W. 1997. Microsatellite genetic distances between oceanic populations of the humpback whale (*Megaptera novaeangliae*). *Mol. Biol. Evol.* 14:355-62.
- Waring, G.T., Palka, D.L., Clapham, P.J., Swartz, S., Rossman, M.C., Cole, T.V.N., Hansen, L.J., Bisack, K.D., Mullin, K.D., Wells, R.S., Odell, D.K. and Barros, N.B. 1999. US Atlantic and Gulf of Mexico marine mammal stock assessments, 1999. NOAA Technical Memorandum NMFS-NE-153, National Marine Fisheries Service, US Department of Commerce, Woods Hole. 196pp. [Available from: <http://www.nmfs.gov>].