

Humpback whale activity near Cap Lopez, Gabon

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ABSTRACT

Two days of aerial transects were flown in mid-August 1998, just below the equator near Cap Lopez, Gabon. Two groups of humpback whales (*Meagaptera novaeangliae*) were sighted to the north of Cap Lopez and eighteen groups were sighted to the south. A large proportion of whales in the southern sector engaged in display behaviour. Similar observations were made during brief boat surveys on 14 August 1998 and 6–12 September 1999. Three surface-active groups were also observed, suggesting that humpback whales mate in the waters surrounding Cap Lopez. Three calves were observed during surveys. Historical whaling records and recent reports of whale sightings imply that humpback whale breeding grounds lie further north and west, in the Gulf of Guinea. Observations also suggest that humpback whales may feed at Cap Lopez and possibly at other points along the Gabonese coast. Common dolphins (*Delphinus delphis*) were abundant in the area and one other, unconfirmed, dolphin species was observed. Further research is needed to better establish the status of humpback whales and other cetaceans in the Gulf of Guinea.

KEYWORDS: BREEDING GROUNDS; SURVEY–AERIAL; CONSERVATION; ATLANTIC OCEAN; AFRICA; BEHAVIOUR – DISPLAY; POLLUTANTS; HUMPBACK WHALE; COMMON DOLPHIN

INTRODUCTION

The Gulf of Guinea (Fig. 1) may be the equatorial terminus for many humpback whales migrating from Antarctic Areas II and/or III¹ (Budker, 1952). A large number of humpback whales once utilised the Gulf, however, intense commercial exploitation during the 20th century radically depleted humpback whale numbers. Published records (Committee for Whaling Statistics, 1933; Budker, 1953; Budker and Roux, 1968) show that at least 15,000 humpbacks were taken in the Gulf during the 1900s. These published records undoubtedly underestimate the impact of whaling in the Gulf because much of the catch, particularly from factory ships, went undocumented (Budker, 1954; Tonnessen and Johnsen, 1982; Aguilar, 1985). In addition, many of the tens of thousands of whales captured off Angola and the western coast of South Africa (Committee for Whaling Statistics, 1933; Tønnessen and Johnsen, 1982) were probably migrating members of the same population that visited the Gulf of Guinea.

Several times during the century, overexploitation at the major whaling port in the Gulf (Cap Lopez, Gabon) caused the humpback catch to plummet. In 1937, whaling was abandoned for eleven years after the catch dropped to 298 whales (from 1,241 whales in 1935). Whaling was again abandoned in 1952 when the catch dropped to 264 after catches of over 1,000 in the three previous years. An attempt at a resumption of whaling in 1959 failed when only 160 whales were captured during a 59 day season (Budker and Roux, 1968). Similar patterns were observed at other whaling grounds in the Gulf, including the islands of São Tome (Budker, 1954) and Pagalu (Aguilar, 1985). An attempt to restart whaling at São Tome in 1951 was abandoned after the initial season yielded only 323 whales (Budker, 1954).

Little published information exists on the distribution and abundance of humpbacks in the Gulf since the cessation of whaling there in 1959, making this a priority area for

assessment and evaluation (e.g. see IWC, 1994). The purpose of this study was to begin the process of updating the status of humpback whales in the Gulf of Guinea. More specifically, it was to: (1) evaluate whether the area adjacent to Cap Lopez, Gabon is a humpback whale mating and/or calving area; and (2) derive a sense of the number of whales using the area.

STUDY SITE

Cap Lopez (0°37.5'S, 8°40'E) lies at the tip of the peninsula that creates la Baie du Cap Lopez, a large, shallow bay at the northern mouth of the Ogoue, the second largest river in Central Africa (Fig. 1a). Port Gentil, 8km to the south of Cap Lopez, is now Gabon's petroleum capital and second largest city. Onshore there is a refinery and facilities for storage of petroleum. In the Baie there are loading facilities for tankers and several active oil rigs. Offshore to the south and west of Cap Lopez there are a large number of active oil rigs.

METHODS

The primary method of investigation was aerial survey. Given inexperienced observers and rough sea surface conditions in the Cap Lopez area during the humpback season, a relatively low altitude (1,000ft, 304.8m) and a tight (2km) transect spacing were chosen to enhance the probability of detecting whales. Parallel transects were flown in a *Cessna* 182 at a speed of approximately 200km/h. Four observers (including the pilot) searched for whales. Each time a whale was sighted, latitude and longitude were noted using a global positioning system. Any whale detected within 100m of another whale was considered to be part of a 'group'. An attempt was made to count the number of individuals in each group sighted. Unfortunately, even when groups were circled repeatedly, obtaining an accurate count from the plane proved difficult. Therefore, the number of animals that could be unambiguously counted was taken as the recorded group size. This probably tended to underestimate true group size, particularly for larger groups.

¹ Area II: 60°W–0°W and Area III: 0°–70°E – see Donovan, 1991.

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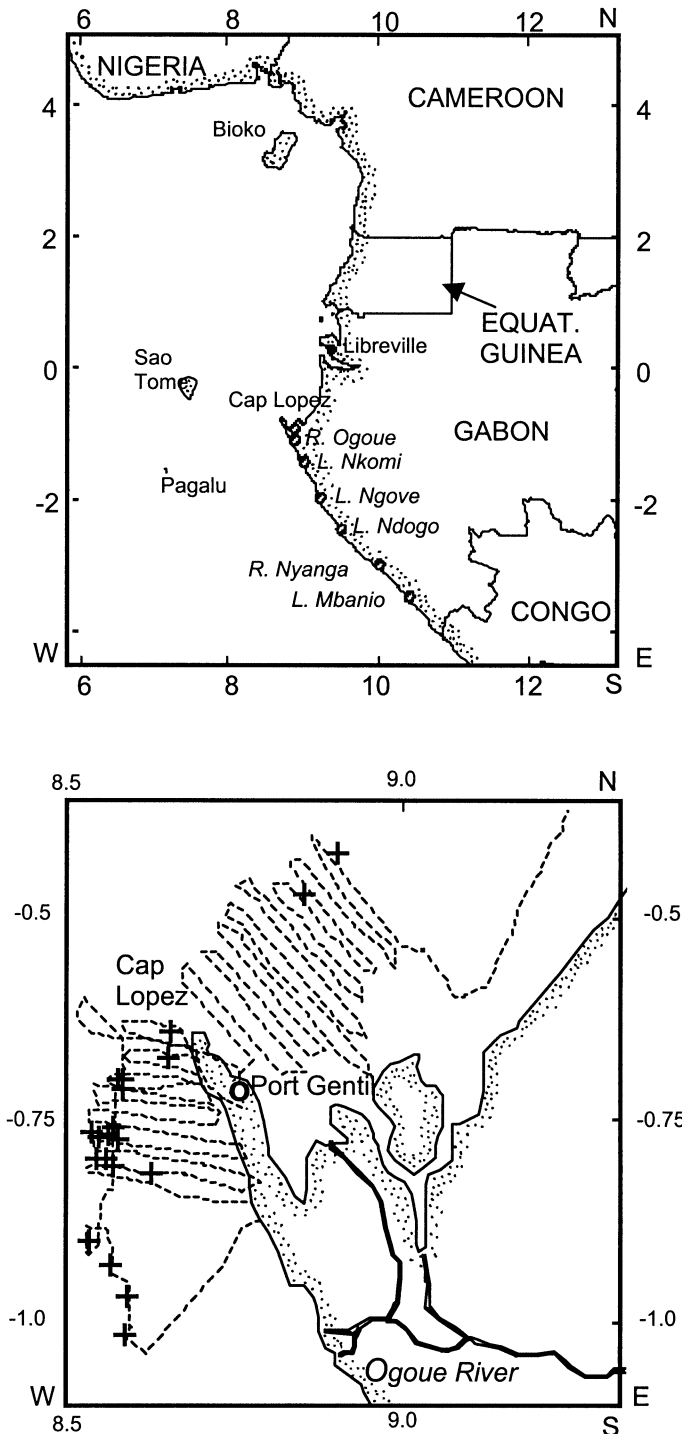


Fig. 1. Above, a map of the Gulf of Guinea. Mouths of major rivers ('R.') and lagoon systems ('L.') between Cap Lopez and the Congo border are shown. Below, a map of the study area. Crosses represent locations where groups of whales were sighted. The dotted line indicates the route taken by the survey aircraft.

Furthermore, some proportion of groups that were either below the surface or on the surface but inconspicuous, were undoubtedly not detected. Because the sampling effort necessary to estimate either the true mean group size or the proportion of groups detected was not available, the whale counts given here represent minima.

Interviews conducted with local fishermen and boat pilots in 1997 suggested that whale activity reached an annual peak during the months of July and August. Therefore, transects were flown on two consecutive days in early August 1998.

On 11 August transects were flown to the north of Port Gentil, including most of the Baie du Cap Lopez and shallow waters that extend to the north. On 12 August transects were flown over the open ocean to the west and southwest of Cap Lopez. Ad hoc observations were also made on the trip from Libreville to the start of transects on 11 August, from the end of transects to Port Gentil on August 11 and from Port Gentil to Libreville on 12 August.

Observations were made from a small motorboat in 1997, 1998 and 1999. In 1997 and 1998 two different fibreglass boats were used, each approx. 8m in length. In 1999, a 13m aluminium boat was used. No systematic sampling plan was followed so thus these sightings data are not analysed in this paper. Whales were videotaped in 1998 and 1999. Recordings of singing whales were made in 1999, although the quality was poor due to ambient noise caused by the strong currents and winds. In 1999, biopsy samples were taken using a crossbow.

RESULTS

Distribution

Approximately 670km of aerial transects were flown (Fig. 1). The northern transect zone extended about 36km northeast of Cap Lopez and covered an area of approx. 890km². The southern transect zone extended 25km south of Cap Lopez and covered an area of about 570km².

Only two groups of whales were sighted during transects in the northern zone, both near its northern extreme. Both groups had two whales, one consisting of a cow and [a young] calf. Fourteen groups of humpback whales were sighted on transects in the southern zone. Summing the minimum group size estimates gives a minimum of 27 whales in the southern transect zone. During an excursion 25km to the south of the transect zone, an additional four groups of whales (six individuals) were sighted. No whales were seen on 11 August during the flight from Libreville to the northern transect zone, or on August 12 during the flight from Port Gentil to Libreville.

A total of eight days of boat survey were performed. In 1997, surveying took place on 20-21 September, almost entirely inside the Baie and no whales were seen. In 1998, a survey was carried out on 14 August to the west and south of Cap Lopez. Five groups of whales were observed, including one group comprising a mother and calf with three other whales, approximately 15km southwest of Cap Lopez. In 1999, surveys were carried out on 5, 6, 8, 10 and 12 September, both in the Baie and to the south and west of Cap Lopez. At least two groups of whales were seen on each day. A mother with a [young] calf was seen on 10 September, approx. 10km southwest of Cap Lopez.

Behaviour

Many common humpback whale behaviours were seen at high frequency in the southern sampling zone, including breaching, lob-tailing and flipper slapping. These have often been associated with mating (e.g. Tyack and Whitehead, 1983) but not exclusively. The high speed of the plane made it difficult to establish exactly how many individuals were engaged in each activity. However, their incidence was not confined to a single group or sub-region. Roughly ten different individuals were observed breaching at locations spread fairly evenly between Cap Lopez and the terminus of sampling 45km to the south. Likewise, two different individuals separated by 15km were observed in the midst of intense lob-tailing sessions. Flipper slapping was also widespread. One individual escorting the mother-calf pair

observed from the boat in 1998 alternated between flipper slapping and breaching for over an hour. Two 'surface-active' groups (one with at least four individuals and the other with at least five individuals) were observed from the aeroplane in 1998 during the formal transects. Another surface-active group of at least six individuals was observed from the boat in 1999, despite the relatively late date (8 September).

Group size

Humpback minimum (see 'Methods') group size on formal aerial transects showed a maximum of five, with a mean of 2.13. Excluding the large concentration of individuals described below, mean group size for both survey methods during 1998 was 2.17. Group size distributions are given in Fig. 2.

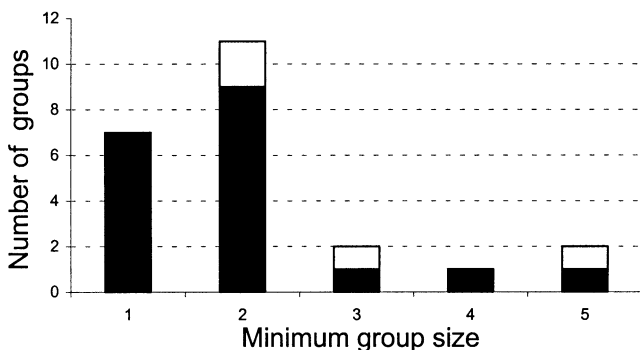


Fig. 2. Frequency histogram of minimum group sizes from 1998: black bars = aerial survey, white bars = boat survey. Not included is a large concentration of whales observed returning through transect zone after sampling.

Biopsy sampling

In 1999, eight biopsy samples were obtained and these will be analysed in due course.

Video identification

A preliminary inspection of videotapes taken in 1999 suggests that images of the tails of at least three whales are of sufficient quality for individual identification. A larger number of whales (perhaps ten) may prove to be identifiable from video images of dorsal fins.

Other species

Dolphins were seen on most days of survey during the three years. They were observed swimming with humpback whales twice during aerial survey on 12 August 1998. Dolphins in photographs taken during the 1997 boat survey have been identified (W. Perrin, pers. comm.) as common dolphins (*Delphinus delphis*). One of several groups of common dolphins observed in 1997 contained approximately 100 individuals. Similar dolphins were again sighted during boat survey in 1998, intermingled with a group of humpback whales. Groups of what again appeared to be common dolphins numbering in the twenties or thirties were seen repeatedly in 1999, with some groups much larger (i.e. 50-100). Many of the sightings were concentrated at the mouth of the Baie between Cap Lopez and the Buoy du Prince (Fig. 1b).

DISCUSSION

Humpback whales appear to be common around Cap Lopez. During the aerial surveys, 14 groups of whales were seen in the southern transect zone, which covered an area of 570km². The true concentration may have been higher as

almost all whales were detected along a single line running south-southwest from Cap Lopez (Fig. 1b), which lay just inside the margin of the continental shelf, which approaches to within about 2km of Cap Lopez.

The fact that a single flight through the area to the south of the transect zone produced an additional four groups of whales suggests that the zone of high whale activity extends substantially further south than the southern transect zone. These groups were distributed fairly evenly from north to south along the same line as the whales in the formal transect zone, and exhibited similar display behaviour (one breaching, one lobtailing) as the whales in the transect zone.

The true southern range may in fact be substantially further south. Our southern excursion reached a point about 45km south of Cap Lopez, offshore from the mouth of the Ogoue River. This is only about half way to the mouth of the Nkomi Lagoon at Fernan Vaz. Maps presented in Budker and Roux (1968) show that in August, the peak month of the 1959 whaling season, more than half of the catch was taken south of Fernan Vaz. Seven whales (4.3% of the catch) were caught some 200km south of Cap Lopez, near the mouth of the Ndogo Lagoon. In earlier years, whales were captured just offshore of Pointe St. Catherine, at the mouth of the Ngove Lagoon and near Mayumba, at the mouth of the Mbanio Lagoon (Budker, 1953). These observations suggest the possibility that the densities observed near Cap Lopez may be typical of the entire Gabonese coastal shelf south of Cap Lopez, or at least the areas near the six major river and lagoon systems that discharge their waters at fairly regular intervals on the coast (Fig. 1b).

The apparent association of whales with the outlets of major river and lagoon systems may be related to an observation made during the 1999 boat survey. On several occasions, solitary whales or pairs were seen diving on 2-4 minute dive cycles. They moved up and back through the same stretch of water repeatedly. On one occasion this occurred in shallow water (< 10m) on the southwest coast of the Baie du Cap Lopez. During the incident, large schools of small fish broke the surface within 50m of the boat (apparently chased by some predatory fish) while a lone humpback engaged in repetitive diving behaviour nearby (within 100m). This is suggestive of feeding behaviour. Several other observations of apparent feeding occurred along the distinct coastal-pelagic interface between the plume of warm water flowing from the Ogoue River and cold oceanic waters to the west. The position of this interface changes with the tides and the seasons, but is usually pushed inside the margin of the continental shelf by the strong Antarctic current that passes Cap Lopez. The observation of feeding was surprising because previous reports suggested that humpback feeding was rare in the area (e.g. Budker, 1953; Budker and Roux, 1968), although feeding has been reported in other tropical waters (e.g. Herman and Antinaja, 1977).

These observations of possible feeding are potentially relevant to the overall distribution of whales because the southern Gulf of Guinea provides a unique habitat. It both experiences an annual upwelling of cold, nutrient rich waters offshore (Budker and Roux, 1968) and contains vast expanses of mangroves onshore. In practice this is an ideal habitat for humpback prey species. For most of the year the mangroves provide a safe haven for small fish and crustacea which once each year leave the mangrove system and aggregate in large schools along the coastal-pelagic interface to feed on the annual pulse of superabundant phytoplankton produced by the upwelling (Budker and Roux, 1968). Larger

fish, local fishermen (particularly the growing commercial shrimp fishery) and, apparently, humpback whales and dolphins, exploit this fact by themselves concentrating along the interface.

It remains to be seen whether feeding by humpback whales in this region is merely rare and facultative or represents a fundamental aspect of humpback whale use of the waters around Cap Lopez. The latter alternative gains some support from the spatio-temporal pattern of humpback activity. R. Puerta (pers. comm.) reports that during the peak of the season (mid July-late August), large groups of whales are often observed to the west of the coastal-pelagic water interface, with acrobatic behaviour common as was observed on the 12 August aerial survey. However, Puerta reports that in September and early October large groups become much less common and acrobatic behaviour is rare. At this time, humpback whales are still present but tend to be found in ones or twos along the coastal-pelagic interface or in the Baie. One might also predict segregation based on age, sex and reproductive status, with individuals not involved in sexual competition or calf rearing (e.g. non-lactating females and immatures of both sexes) more likely to be engaged in feeding behaviour. Oil company pilots report that late in the season whales become much more clumped around each of the lagoon entrances on the southern coast (particularly Mayumba) and appear to be feeding.

Breeding activity

The behavioural observations made in this study suggest that the waters around Cap Lopez may be the site of humpback whale mating. The incidence of display behaviours such as breaching and lob-tailing appears high for a transient migratory zone (although there is no *a priori* reason why mating cannot occur along the migration route as has been observed in gray whales, for example – see Swartz, 1986). The observation of surface-active behaviour also points to mating activity. For example, on 12 August in the course of flying back through the southern transect zone, a concentration of at least 18 whales was in an area of less than 1km². These appeared to be whales that had been earlier observed in separate groups, but had subsequently converged. A large, core group of approximately ten individuals was engaged in surface-active behaviour, while individuals in several satellite groups breached as they converged on the core group. Large surface-active groups such as this are thought to be associated with mating (Tyack and Whitehead, 1983).

A further indication that this area may not be simply a migratory corridor is the fact that the Cap Lopez region appears to show a unimodal pattern of visitation (Budker and Collignon, 1952; Calzada and Aguilar, 1996) typical of humpback breeding areas (Dawbin, 1966; Findlay *et al.*, 1994). That is, the abundance of whales in the Gulf does not show separate peaks corresponding to the passing of whales on their northward migration to breeding grounds and southward migration back to the Antarctic. Rather, abundance shows one strong peak, which catch records (Budker and Roux, 1968) and conversations with local fisherman and pilots suggest starts in mid-July and extends throughout August. It might also be considered that, 'pretty often a pair of humpbacks (male and female) were caught at the same place and at the same time' (Budker and Roux, 1968).

The coastal shelf of Gabon extending to the south into the Republic of Congo provides the warm, shallow waters that are typical of humpback whale calving and calf rearing areas worldwide (e.g. Hawaii, Herman and Antinaja, 1977; Silver

Bank, Whitehead and Moore, 1982; Virgin Bank, Mattila and Clapham, 1989; Mozambique, Findlay *et al.*, 1994; Baie de Antongil, Rosenbaum *et al.*, 1997). The waters in the lee of Cap Lopez seem particularly suited for calf rearing. However, whether or not Cap Lopez is a calving and/or nursery area remains unclear. Three calves were seen in the area (one during the aerial survey and two from the boat), but survey effort was insufficient to draw any firm conclusions.

What is clear is that Cap Lopez is certainly not the terminus of all humpback migration in the Gulf of Guinea. Whalers operated at several points to the north and west including on the coast 67km north of Cap Lopez (Tonnessen and Johnsen, 1982), near Libreville and off of Cameroon (Budker, 1953) and on the islands of São Tome (Budker and Roux, 1968), Bioko (referred to by Tonnessen and Johnsen, 1982 as Fernando Poo) and Pagalu (Aguilar, 1985). Humpback whales have been seen 35km north of Port Gentil and some are occasionally observed from shore at Point Denis, near Libreville (C. Mbina, pers. comm.; R. Oslisly, pers. comm.). They are also observed regularly from shore in Equatorial Guinea (R. Ensono, pers. comm.), with frequent observations of calves (F. Stennmans, pers. comm.). In addition, local fisherman report that large groups are common south and west of the island of Corisco. These are all potential humpback breeding areas and it seems likely that most, if not all, of the whales bound for these other sites would be funnelled through Cap Lopez. It also seems plausible that humpback whales (particularly males) might move between areas. Given a recorded rate of 4-6 n.miles per hour (Dawbin, 1966), Pagalu, São Tome and Equatorial Guinea are within two days swim of Cap Lopez. More effort needs to be invested in establishing: (1) where Gulf of Guinea calving grounds are; (2) how large the population using each area is; and (3) what the relationships between the animals seen in the Gulf of Guinea populations and those seen in the Antarctic are. Photo-identification studies would be particularly valuable in this regard (e.g. Hammond *et al.*, 1990).

Conservation concerns

The Gulf of Guinea, particularly the region around Cap Lopez, supports a rich cetacean fauna. In addition to humpback whales and the dolphin species already noted, historic records suggest that (in decreasing frequency) sei and Bryde's (*Balaenoptera borealis* and *B. edeni*), sperm (*Physeter macrocephalus*), fin (*Balaenoptera physalus*) and southern right whales (*Eubalaena australis*) were captured by whalers based at Cap Lopez (Budker, 1952; Budker and Collignon, 1952). Pilot whales (*Globicephala macrohynchus*?) are also reported to frequent the area (J. Rouzaud, pers. comm.).

In the short term, several factors may threaten these whales. A growing commercial shrimp fishery operates in and around the Baie du Cap Lopez which may pose an entanglement risk to whales and dolphins. Commercial fishing is effectively unregulated and overfishing may directly or indirectly deplete cetacean food species. The large amount of boat traffic associated with the petroleum industry and the industry itself may also pose problems via collision, noise pollution and chemical pollution. Lack of data limits our ability to evaluate how much of a threat, if any, these factors represent to cetaceans in the area. Obtaining the data necessary to identify and monitor threats will require a concerted effort and considerable resources. Neither the Gabonese Government nor local non-governmental organisations have the means or the

expertise to monitor threats to cetaceans. Their support is vital should management responses be required. Cetacean conservation must be seen in the context of the coastal marine ecosystem and potential coastal development in the area.

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REFERENCES

- Aguilar, A. 1985. Aboriginal whaling off Pagalu (Equatorial Guinea). *Rep. int. Whal. Commn* 35:385-6.
- Budker, P. 1952. Quelques considérations sur la campagne baleinière 1951 au Cap Lopez (Gabon). *Mammalia* 14(4):154-8. [In French].
- Budker, P. 1953. Les campagnes baleinières 1949-1952 au Gabon. (Note préliminaire). *Mammalia* 17(3):129-48. [In French with English summary].
- Budker, P. 1954. Whaling in French oversea territories. *Norsk Hvalfangsttid.* 43(6):320-6. [In Norwegian and English].
- Budker, P. and Collignon, J. 1952. Trois campagnes baleinières au Gabon (1949-1950-1951). *Bull. Inst. Étud. Centrafr.* 3:75-100. [In French].
- Budker, P. and Roux, C. 1968. The 1959 summer whaling season at Cape Lopez (Gabon). *Norsk Hvalfangsttid.* 6:141-5. N.
- Calzada, N. and Aguilar, A. 1996. Flipper development in the Mediterranean striped dolphin (*Stenella coeruleoalba*). *Anat. Rec.* 245:708-14.
- Committee for Whaling Statistics. 1933. *International Whaling Statistics* Vol. IV, Oslo.
- Dawbin, W.H. 1966. The seasonal migratory cycle of humpback whales. pp. 145-70. In: K.S. Norris (ed.) *Whales, Dolphins, and Porpoises*. University of California Press, Berkeley and Los Angeles. xv+789pp.
- Donovan, G.P. 1991. A review of IWC stock boundaries. *Rep. int. Whal. Commn* (special issue) 13:39-68.
- Findlay, K.P., Best, P.B., Peddemors, V.M. and Gove, D. 1994. The distribution and abundance of humpback whales on their southern and central Mozambique winter grounds. *Rep. int. Whal. Commn* 44:311-20.
- Hammond, P.S., Mizroch, S.A. and Donovan, G.P. (eds.). 1990. *Rep. int. Whal. Commn.* (special issue 12). *Individual Recognition of Cetaceans: Use of Photo-Identification and Other Techniques to Estimate Population Parameters*. International Whaling Commission, Cambridge, UK. [vi]+440pp.
- Herman, L.M. and Antinaja, R.C. 1977. Humpback whales in the Hawaiian breeding waters: population and pod characteristics. *Sci. Rep. Whales Res. Inst., Tokyo* 29:59-85.
- International Whaling Commission. 1994. Report of the Scientific Committee, Annex E. Report of the Sub-Committee on Southern Hemisphere Baleen Whales, Appendix 3. Report of the Working Group on Humpback Whale Stock Identification. *Rep. int. Whal. Commn* 44:105-6.
- Mattila, D.K. and Clapham, P.J. 1989. Humpback whales, *Megaptera novaeangliae*, and other cetaceans on Virgin Bank and in the northern Leeward Islands, 1985 and 1986. *Can. J. Zool.* 67(9):2201-11.
- Rosenbaum, H.C., Walsh, P.D., Razafindrakoto, Y., Vely, M. and DeSalle, R. 1997. First description of a humpback whale breeding ground in Baie d'Antongil, Madagascar. *Conserv. Biol.* 11:312-4.
- Swartz, S.L. 1986. Gray whale migratory, social and breeding behavior. *Rep. int. Whal. Commn* (special issue) 8:207-29.
- Tønnessen, J.N. and Johnsen, A.O. 1982. *The History of Modern Whaling*. C. Hurst & Co., London. i-xx+798pp.
- Tyack, P. and Whitehead, H. 1983. Male competition in large groups of wintering humpback whales. *Behaviour* 83:132-54.
- Whitehead, H. and Moore, M.J. 1982. Distribution and movements of West Indian humpback whales in winter. *Can. J. Zool.* 60:2203-11.