



Convention on the Conservation of Migratory Species of Wild Animals

Secretariat provided by the United Nations Environment Programme



14th MEETING OF THE CMS SCIENTIFIC COUNCIL

Bonn, Germany, 14-17 March 2007

CMS/ScC14/Doc.6

Agenda item 6(a)

CONSERVATION STATUS OF THE ATLANTIC HUMPBACK DOLPHIN, A COMPROMISED FUTURE?

(Prepared by Dr. Koen Van Waerebeek and submitted by Dr. William Perrin)

Background

1. Of all cetaceans occurring in tropical and subtropical waters of West African, the Atlantic humpback dolphin is the only endemic species. It is also the cetacean that lives nearest to shore year-round, often just beyond the surf, and thus comes in closest contact with humans and their activities. It is also one of the species that displays the greatest wariness towards humans. If approached, it will flee even small boats, evidencing its great sensitivity to the lightest of disturbances. Recognizing this especially vulnerable situation, the species has since 1991 been assigned to CMS Appendix II. Since then coastal development and degradation has continued to increase region-wide (e.g. Khan and Mikkola, 2002) and pressure on the dolphin's habitat can only have risen. Moreover, despite improved search effort, sightings remain scarce. One of the aims of the CMS/UNEP-sponsored WAF CET-2 project, implemented in Senegal and The Gambia (and to a lesser degree in Guinea-Bissau), consisted of comprehensively evaluating the current status of the Atlantic humpback dolphin (Van Waerebeek *et al.*, 2003, 2004).

Distribution and populations

2. Intraspecific geographic variation in morphology and molecular genetics of *S. teuszii* has not been studied. However, for practical and conservation purposes Van Waerebeek *et al.* (2004) provisionally designated eight biogeographically defined management stocks, seven of which are known to be extant, comparable to the IWC management units for large whales where biological stock data are absent or deficient (Donovan, 1991). Documented habitats include: Dahkla Bay (Rio de Oro-Western Sahara), Banc d'Arguin (Mauritania), Saloum-Niumi (Senegal-The Gambia), Canal do Gêba-Bijagos Archipelago (Guinea-Bissau), southern Guinea, Gabon and Angola. An 8th, historical stock, the Cameroon Estuary (where the holotype was collected in 1892), remains hypothetical. Potential existence of a 9th management stock of the western Togo/Volta delta requires investigation. At least some of these are expected to have biological population status; notably, the three northernmost stocks seem relatively isolated, possibly a recent phenomenon following local extirpation of communities in between as the result of mounting human pressure. Some other stocks may coalesce into single biological populations with further knowledge. While a quasi-continuous distribution from Rio de Oro south to Angola

may have existed historically, indications of contemporary distribution gaps are emerging, presumably the result of sustained bycatches and creeping human encroachment on once desolated coasts. It has never been considered a common species.

Abundance

3. No abundance estimates for *S. teuszii* are available from any area, but density is certainly low compared with that of widely distributed, oceanic delphinids. The above-mentioned stocks are thought to amount to at most hundreds, not thousands, of animals. For example, the Banc d'Arguin stock, which arguably enjoys the best protection due to the size of the PNBA Marine Reserve, its remoteness and the fact that no engine-powered craft are allowed, was suggested not to exceed more than 100 individuals (Maigret, 1980). A more recent guess had put it 'at least at high hundreds'. However a recent 3-day survey covering 226nmiles on effort in excellent conditions made 11 sightings of common bottlenose dolphins but did not encounter Atlantic humpback dolphin (Van Waerebeek and Jiddou, 2006). This suggests that the species may have become, or has remained (Maigret, 1980) quite rare, even under optimal circumstances. A guesstimate of "not more than 100 animals" was also cited for the Saloum Delta population (Maigret, 1980) and based on own observations of the Saloum-Niumi stock since 1997, it appears highly unlikely that abundance could exceed the low hundreds. The Canal do Gêba and Bijagos Archipelago in Guinea-Bissau may host one of the healthiest extant stocks, perhaps several hundreds. Nothing can be said about the Guinea-Conakry and Angola stocks, except that they are extant. Groups seen off southern Angola were small, less than ten individuals, off Gabon three groups ranged from 6-35 individuals (Collins *et al.*, 2004). No meaningful guesses can be made for Cameroon, Togo, and intermediate areas, nor for any other West African country (Van Waerebeek *et al.*, 2004).

Captures

4. The majority of specimens archived in collections are derived from dolphins taken either incidentally or directly in small-scale coastal fisheries. However, the true extent of fisheries-related mortality in range states is thought to be considerably higher than these few opportunistic findings suggest, considering that capture reporting is next to nonexistent. Based on specimens recovered and well-documented steep increases in artisanal fishing effort (e.g., Khan and Nikkola, 2002), incidental mortality from net entanglements may be one of the most important threats to the species' survival and one of the hardest to address. The species lives in an area of high human population growth and protein food deficit, so there is potential for fisheries for human consumption (Klinowska, 1991). Their nearshore habits make them readily accessible targets.

Habitat deterioration

5. The Atlantic humpback dolphin is a very shy species. All possible forms of coastal development with accompanying disturbance and degradation known to occur in West Africa (see Khan and Mikkola, 2002) will directly or indirectly affect the species. These include, but are not limited to, over-exploitation of mangroves, coastal construction (harbours, residences, refineries, shipyards), aquaculture, oil and gas exploration and extraction (drilling), accidental spills, increased shipping, tourism, and effluents (domestic, agricultural, chemical). Vast fisheries effort,

both artisanal and industrial, exploiting neritic fish stocks (e.g. Deme, 1996) is thought to cause a significant impact. Reduced foraging success may hamper recovery from high bycatch mortality.

Conclusion

6. IUCN's Cetacean Specialist Group appropriately tagged *S. teuszii* as a high priority for research and conservation because of its restricted range, narrow ecological niche, generally low abundance, and continuing threats (Reeves *et al.*, 2003). Most of what we know about the Atlantic humpback dolphin is sketchy, uncertain or unconfirmed except regarding the trend of the status of its habitat. For the foreseeable future, accelerated development of West Africa's coastal areas and concomitant progressive deterioration as a viable biotope for a human-averse cetacean is not only certain, it is also tragically inevitable in a region with strong human demographic growth. Ecologically challenged by its high evolutionary adaptation to a very narrow niche of warm, shallow inshore waters, this dolphin species will have nowhere to turn. For the Atlantic humpback dolphin to have a genuine chance to survive the 21st century it will need all possible protective measures including, to start with, the maximum achievable legal protection.

References

- Collins, T., Ngouesso, S. and Rosenbaum, H.C. 2004. A note on recent surveys for Atlantic humpback dolphins, *Sousa teuszii* (Kükenthal, 1892) in the coastal waters of Gabon. Paper SC/56/SM23 presented to 56th IWC Annual Meeting. 6pp. (unpublished).
- Deme, M. (1996). Small pelagic fisheries of Senegal: Management options and policy constraints. In S. M. Evans, C. J. Vanderpuye, & A. K. Armah (Eds.), *The coastal zone of Africa: Problems and management*. Clevedon, Sunderland, UK: Panshaw Press. 246 pp.
- Khan, A. S. & Mikkola, H. J. (2002). *Sustainable ocean development: An initiative for the management and protection of the marine and coastal resources of the Economic Community of West African States (ECOWAS) Subregion*. Banjul, The Gambia: New Type Press. 80 pp.
- Klinowska, M. (1991). *Dolphins, porpoises and whales of the world: The IUCN red data book*. Gland, Switzerland and Cambridge, UK: IUCN. 429 pp.
- Maigret, J. (1980). Données nouvelles sur l'écologie du *Sousa teuszii* (Cetacea, Delphinidae) de la côte Ouest Africaine. *Bulletin de l'IFAN, l'IFAN 42A(2)*, 619-633.
- Reeves, R. R., Smith, B. D., Crespo, E. A., & Notarbartolo di Sciara, G. (Comp.). (2003). *Dolphins, whales and porpoises: 2002-2010 conservation action plan for the world's cetaceans* (pp. 1-139). Gland, Switzerland and Cambridge, UK: IUCN/SSC Cetacean Specialist Group, IUCN.
- Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Jallow, A.O., Ndiaye, E., Samba Ould Bilal, A.O. and Bamy, I. L. 2004. Distribution, status and biology of the Atlantic humpback dolphin *Sousa teuszii* (Kükenthal, 1892). *Aquatic Mammals* 30(1): 56-83.
- Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Jallow, A.O., Ndiaye, E., Samba Ould Bilal, A.O. & Bamy, I. L. 2003. Conservation of Cetaceans in The Gambia and Senegal 1999-2001, and Status of the Atlantic humpback dolphin. WAF CET-2 Report. UNEP/CMS, Bonn, Germany. 55 pp.
- Van Waerebeek, K. and Jiddou, A. 2006. Deuxième formation sur l'identification des mammifères aquatiques de l'Afrique de l'Ouest et campagne de prospection des Cétacés dans les eaux du Cap Blanc et du PNBA. Rapport à la Fondation Internationale du Banc d'Arguin. 13pp. (unpublished). [in French].

**DRAFT PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF
THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF
WILD ANIMALS**

A. PROPOSAL: Include the Atlantic humpback dolphin *Sousa teuszii* (Kükenthal 1892) on CMS Appendix I.

B. PROPONENT: [preferably a known range state].

C. SUPPORTING STATEMENT

1. Taxon

1.1 Classis	Mammalia
1.2 Ordo	Cetacea
1.3 Familia	Delphinidae
1.4 Genus, species	<i>Sousa teuszii</i> (Kükenthal 1892)
1.5 Common names	E: Atlantic Humpback Dolphin F: Dauphin à bosse Atlantique DE: Kamerun-Flußdelphin SP: Delfín jorobado del Atlantico POR: Golfinho-corcundo-do-Atlântico

2. Biological data

2.1 Distribution (current and historical)

The Atlantic humpback dolphin is a small delphinid regionally endemic to the tropical and subtropical eastern Atlantic nearshore waters of West Africa (Culik, 2002; Jefferson *et al.*). Its status was recently and comprehensively reviewed as part of the CMS/UNEP Wafcet-2 project (Van Waerebeek *et al.*, 2003, 2004). *S. teuszii* was described in 1892 from a carcass found in Cameroon. Second and third specimens were collected respectively in 1925 and 1943 in Senegal. Next it was sighted south of Conakry, Guinea, in 1953. Over the next half-century it was encountered in Dakhla Bay (Rio de Oro/Western Sahara), Banc d'Arguin (Mauritania), Siné-Saloum delta (Senegal), Niimi National Park (The Gambia), Canal do Gêba-Bijagos (Guinea-Bissau), southern Guinea, Gabon Estuary and finally in southern Angola, but it has never been considered a common species (Beaubrun, 1990; Robineau and Vely, 1998; Van Waerebeek *et al.*, 2003; Collins *et al.*, 2004).

Some authors have argued for a largely discontinuous distribution (Maigret, 1980; Ross *et al.*, 1994; Van Waerebeek *et al.*, 2000), while others indicated a more or less continuous coastal range from Dakhla Bay or Senegal to Cameroon (Dupuy, 1983; Klinowska, 1991; Rice, 1998; Jefferson *et al.*, 1993) which is possible but theoretical. The information on the presence or absence of Atlantic humpback dolphins is incomplete due to a paucity of field survey effort. While a quasi-continuous distribution may have existed historically, indications of contemporary distribution gaps are emerging, presumably the result of sustained bycatches and creeping human encroachment on once desolated coasts.

2.2 Population (estimates and trends)

Population identity

Intraspecific geographic variation in morphology and molecular genetics of *S. teuszii* has not been studied. The samples required for biological population assessments are currently lacking. However, for practical and conservation purposes Van Waerebeek *et al.* (2004) provisionally designated eight management stocks, comparable to the biogeographically defined IWC management units for large whales where biological stock data are absent or deficient (Donovan, 1991). In the definition of the seven confirmed extant stocks, guidance was taken from sightings and specimens clustered around a documented habitat, i.e. from north to south, Dahkla Bay, Banc d'Arguin, Saloum-Niumi, Canal do Gêba-Bijagos, South Guinea, Gabon and Angola. The species holotype was collected from near the port of Douala, Cameroon. The species was never again reported from this country, thus an 8th stock remains hypothetical. Potential existence of a 9th management stock, western Togo/Volta delta, requires investigation. Although no firm claims of biological population status can be made here for any of these management stocks, at least some are expected to acquire such status with further research. Notably, the three northernmost stocks (Dahkla Bay, Banc d'Arguin, Saloum-Niumi) are thought to be relatively restricted in terms of gene flow, possibly a recent phenomenon following local extinctions of communities in-between as the result of mounting human pressure. Some other stocks may coalesce into single biological populations.

Abundance

No abundance estimates for *S. teuszii* are available from any area, but density is certainly low compared with that of widely distributed, oceanic delphinids. The above-mentioned stocks are thought to amount to at most hundreds, not thousands, of animals. Some estimation of relative density can be gained as follows. The northernmost community, Dahkla Bay, is smallest by any definition. In four sightings, the aggregated total number observed was 28 dolphins, and some of these may have been resightings (Notarbartolo di Sciara *et al.*, 1998). The Banc d'Arguin stock was suggested not to exceed more than 100 individuals (Maigret, 1980). A more recent guess puts it 'at least at high hundreds' (Alex Aguilar, pers. comm., cited in Van Waerebeek *et al.*, 2004). However a 2006 survey of PNBA waters sighted many (11 sightings) common bottlenose dolphins *Tursiops truncatus* but did not encounter a single Atlantic humpback dolphin in 226nmiles (27h 59min) of survey effort (Van Waerebeek and Jiddou, 2006), which suggests that humpback dolphins may have become, or have remained (Maigret, 1980) quite rare. A guesstimate of "not more than 100 animals" was also cited for the Saloum Delta population by Maigret (1980), while Mitchell (1975a) stated that for coastal waters of southern Senegal "it is rather common" (p. 910). Based on observations of the Saloum-Niumi stock since 1997, it appears highly unlikely that abundance could exceed the low hundreds. From Spaans (1990) and Powell *et al.* (1996), and more recent sightings, it follows that at least until 1998 the species was not uncommon in the waters of Canal do Gêba and Bijagos Archipelago in Guinea-Bissau; and that may be one of the healthiest extant stocks. Nothing can be said about the Guinea-Conakry and Angola stocks, except that recent records have confirmed their existence, but groups seen off southern Angola were small, less than ten individuals. Off Gabon three groups ranged from 6-35 individuals (Collins *et al.*, 2004). No meaningful guesses can be made for Cameroon, Togo, nor for any other West African country.

Fisheries monitoring in western Ghana (Debrah, 2000; Van Waerebeek and Ofori-Danson, 1999; Ofori-Danson *et al.*, unpublished data) documented hundreds of landed delphinids taken in coastal fisheries, none *S. teuszii*. Atlantic humpback dolphins, if not entirely absent, must be very

rare west of Tema, central Ghana. The void may extend west several hundreds of kilometers into Ivory Coast, for there are no reports from there. The absence may be due to local extirpation after decades of high levels of bycatches, if not directed harvest.

In the absence of scientific abundance estimates, unknown recruitment, population structure, and trends, combined with a lack of understanding of local threats, adherence to the precautionary principle seems advised.

2.3 Habitat (short description and trends)

No offshore sightings have been reported. Atlantic humpback dolphins inhabit predominantly tropical coastal and estuarine habitat with soft-sediment bottoms. In the Saloum Delta and Niimi National Park it is seen nearshore within 100-200 m from the beach. Also, off southern Angola and in Gabon, animals were sighted within a short distance from shore. A young individual was taken alive in a beach-seine near Joal in 1955 (Van Waerebeek *et al.*, 2003, 2004; Collins *et al.*, 2004).

Tolerance for variable salinity levels seems high and includes both the brackish water of large estuaries and highly saline waters such as found in the Saloum Delta during the dry season (Van Waerebeek *et al.*, 2000). Although *S. teuszii* has repeatedly been suggested to also occupy riverine habitat (Dupuy, 1983; Jefferson *et al.*, 1993; Klinowska, 1991; Powell *et al.*, 1996), there is no evidence for that. There are no positive records from the fresh water biotope, beyond seawater intrusion of rising tides in estuaries. This is a relevant difference with *Sousa chinensis*, for instance, which does occasionally occur in riverine habitat.

Claims of sightings of *S. teuszii* in the Niger, Senegal, and Casamance Rivers (Klinowska, 1991) are unsupported. Interestingly, common bottlenose dolphins are confirmed to penetrate considerably upstream with rising tide in the Casamance and Gambia Rivers and may have been mistaken for Atlantic humpback dolphins (Van Waerebeek *et al.*, 2003, 2004).

2.4 Migrations (kinds of movement, distance, proportion of the population migrating)

Populations or communities that straddle two nations almost certainly move between them with high frequency. For instance, cross-border movements between Senegal's Saloum Delta and The Gambia's Niimi National Park were observed on several instances, and the Saloum-Niimi is considered a single stock (Van Waerebeek *et al.*, 2004). Some movements between Saloum-Niimi and the Bijagos Archipelago (Guinea-Bissau) are also expected, considering the relatively limited distance (*ca.* 280 km) and very suitable coastal habitat in-between.

Unpublished and published observations from October through March (Cadenat, 1959), a sighting in April (Cadenat, 1959), and a capture off Joal in August point to a year-round presence in Saloum-Niimi (Maigret, 1977).

Maigret (1980) suggested a possible seasonal movement between Banc d'Arguin (Mauritania) and the Saloum Delta (Senegal). However, there is no evidence of seasonality in occurrence in either area, nor any observations that would point to regular long-distance seasonal movements between the suggested 'home ranges'. Perhaps more probable would be that some season-dependent movements occur around one particular stock's core area.

3 Threat data

3.1 Direct threat to the population (factors, intensity)

Bycatches

The majority of specimens archived in collections are derived from dolphins taken either incidentally or directly in small-scale coastal fisheries. The only specimen record from Rio de Oro/Western Sahara was a carcass found entangled in an octopus line in 1996. Imragen fishermen of Mauritania were photographed in 1967 cutting up an animal reported 'stranded' (Busnel, 1973). However, being fresh it was most probably a dolphin by-caught in nets. Another animal killed in a gillnet at Ile Arguin in 1995 was eaten by local fishermen. At least five individuals from Senegal have come from bycatches in shark gill nets in the period 1955-1956 (Cadenat 1956a, 1957; Cadenat and Paraiso, 1957).

In November 1996, three carcasses of *S. teuszii* were found together on uninhabited (sacred) Sangomar Island with nylon rope knotted around the tailstocks of two animals. They were abandoned on the island presumably for animist-religious reasons (Van Waerebeek *et al.*, 1997). The only known specimens from Guinea-Bissau and Guinea died in a fishing trap in 1989 (Sequeira and Reiner, 1992) and an unidentified fishing device in 2003, respectively (Van Waerebeek *et al.*, 2004).

Importantly, the true extent of fisheries-related mortality in all range states is expected to be considerably higher than these few opportunistic findings suggest, as reporting is next to nonexistent. Based on specimens recovered and well-documented steep increases in artisanal fishing effort (e.g., Khan and Nikkola, 2002), incidental mortality may be the most important threat to the species' survival and one of the hardest to address (Van Waerebeek, 2003).

Directed catches

The species lives in an area of high human population growth and protein food deficit, so there is potential for fisheries for human consumption (Klinowska, 1991). The nearshore habits of Atlantic humpback dolphins make them readily accessible targets. Specific accounts of directed takes are scarce but they are believed to occur with some regularity. A female taken alive in a beach seine near Joal in 1955 was not returned (Cadenat, 1956a). The fishers communities of Joal, Fadiouth, M'Bour and some others along Senegal's Petite Côte, have long been known to harpoon dolphins until at least 1996 (Cadenat, 1947, 1956b; Van Waerebeek *et al.*, 1997), including humpback dolphins of the Saloum-Niumi population. The illegality of the practice induces fishermen to hide all evidence, which they do efficiently, so estimates of numbers taken are elusive. Butcher remains are either discarded at sea, used as bait, or buried on the beach (Van Waerebeek *et al.*, 1997, 2000).

3.2 Habitat destruction (quality of changes, quantity of loss)

The Atlantic humpback dolphin is a shy species; when approached by boat it will flee. All possible forms of coastal development with accompanying disturbance and degradation known to occur in West Africa (see Khan and Mikkola, 2002) will directly or indirectly affect the species. These include, but are not limited to, over-exploitation of mangroves, coastal construction (harbours, residences, refineries, shipyards), aquaculture, oil and gas exploration and extraction (drilling), accidental spills, increased shipping, tourism, and effluents (domestic, agricultural, chemical). Huge fisheries effort exploiting neritic fish stocks, both artisanal and industrial (e.g. Armah *et al.*, 1996; Deme, 1996; Khan and Mikkola, 2002), including on both known prey

species of *S. teuszii*, are thought to cause a major impact. Reduced foraging success may hamper recovery from high bycatch mortality.

3.3 Indirect threat (e.g. reduction of breeding success by pesticide contamination)

No dedicated research has been initiated and therefore no specific information is available on such indirect threats, but, as indicated above, the exclusive nearshore habits of Atlantic humpback dolphin would give it the dubious distinction of being West Africa's cetacean most likely to receive the most severe impact.

3.4 Threat connected especially with migrations

There are no known threats different from the ones outlined above.

3.5 National and international utilization

4 **Protection status and needs**

4.1 National protection status

No specific legislation seems to exist that protects Atlantic humpback dolphin. However, all small cetaceans are formally protected by national legislation in Senegal, The Gambia, Mauritania, Ghana, Benin and Togo, and presumably in several more range states. Nonetheless, in practice, bycatches of small cetaceans in fisheries, even if systematic and predictable, or even somehow directed or assisted (e.g. live-caught animals not being returned), are not being monitored.

4.2 International protection status

Recognizing its vulnerable situation, the Atlantic humpback dolphin has since 1991 been assigned to CMS Appendix II. Since then coastal degradation has vastly increased region-wide (e.g. Khan and Mikkola, 2002) and pressure on this species can only have risen. Despite much increased search effort, sightings remain scarce. CITES in recognition of its vulnerable situation bans all international commercial trade (Appendix I). IUCN considers the species 'Data Deficient'. For the species to survive, *S. teuszii* will need the maximum possible legal and other protection, considering its low abundance, threatened habitat, suspected fragmentation of distribution range, unknown natural history and low prospects for efficient monitoring of stock status.

4.3 Additional protection needs

Cetaceans should be added to the template of reporting forms used to gather national statistics on landings of marine biological resources. It is recommended that fisheries observers receive some basic training as to improve the quality of reporting. Although most fishermen will hide cetacean bycatches for fear of sanctions, some bycatches are openly landed and could be documented. Considering the poor state of knowledge on this species, even isolated cases may provide useful information.

5. **Range States of Atlantic humpback dolphin**

Confirmed range states:

Mauritania, Senegal, The Gambia, Guinea-Bissau, Guinea, Cameroon, Gabon and Angola.
(Western Sahara)

Possible range states: Ghana and Togo

6. Comments from Range States

7. Additional remarks

While distribution historically may have been quasi-continuous over the species' range, indications of contemporary distribution gaps are emerging. Precise documentation of present-day distribution and baseline abundance data need to be obtained. To start with, for several coastal nations, simple information on whether or not they are range states should be gotten. Other research priorities include assessment of the levels of gene-flow between the eight defined management stocks, the collection of carcasses and biological samples and the study of behavioural ecology. The IUCN CSG (Cetacean Specialist Group) appropriately tagged *S. teuszii* as a high priority for research and conservation because of its restricted range, narrow ecological niche, generally low abundance, and continuing threats (Reeves *et al.*, 2003).

8. References

- Armah, A. K., Darpaah, G. A., & Wiafe, G. (1996). Managing the coast of Ghana: Problems and options. In S. M. Evans, C. J. Vanderpuye, & A. K. Armah (Eds.), *The coastal zone of Africa: Problems and management*. Penshaw Press. 246 pp.
- Beaubrun, P. Ch. (1990). Un cétacé nouveau pour les côtes sud-marocaines: *Sousa teuszii* (Kükenthal, 1892). *Mammalia*, 54(1), 162-164.
- Busnel, R. G. (1973). Symbiotic relationship between man and dolphins. Transl. *New York Academic Sciences Series*, 35(2), 112-131.
- Cadenat, J. (1947). Observations de cétacés au Sénégal. *Notes Africaines*, 34, 20-23.
- Cadenat, J. (1956). Un delphinidae encore mal connu de la côte occidentale d'Afrique: *Sotalia teuszii* Kükenthal 1892. *Bulletin de l'IFAN*, IFAN 18A, 555-566.
- Cadenat, J. (1956b). A propos de cachalot. *Notes Africaines*, 71, 82-91.
- Cadenat, J. (1957). Observations de cétacés, siréniens, chéloniens et sauriens en 1955-1956. *Bulletin de l'IFAN*, l'IFAN 19A(4), 1358-1369.
- Cadenat, J. (1959). Rapport sur les petits cétacés Ouest-Africains. Résultats des recherches entreprises sur ces animaux jusqu'au mois de mars 1959. *Bulletin de l'IFAN*, l'IFAN 21A(4), 1367-1409.
- Cadenat, J., & Paraiso, F. (1957). Nouvelle observation de *Sotalia teuszii* (Cétacé, Delphinidé) sur les côtes du Sénégal. *Bulletin de l'IFAN*, 19A, 324-332.
- Collins, T., Nguouessono, S. and Rosenbaum, H.C. 2004. A note on recent surveys for Atlantic humpback dolphins, *Sousa teuszii* (Kükenthal, 1892) in the coastal waters of Gabon. Paper SC/56/SM23 presented to 56th IWC Annual Meeting. 6pp. (unpublished).
- Culik, B. 2003. Review on small cetaceans: distribution, behaviour, migration and threats. Compiled for CMS/UNEP. (available from CMS website).
- Debrah, J. S. (2000). *Taxonomy, exploitation and conservation of dolphins in the marine waters of Ghana*. Master of Philosophy thesis, Department of Oceanography and Fisheries, University of Ghana. 86 pp.
- Deme, M. (1996). Small pelagic fisheries of Senegal: Management options and policy constraints. In S. M. Evans, C. J. Vanderpuye, & A. K. Armah (Eds.), *The coastal zone of Africa: Problems and management*. Clevedon, Sunderland, UK: Panshaw Press. 246 pp.
- Donovan, G. (1991). A review of IWC stock boundaries. *Reports of the International Whaling Commission*, 13 (Special Issue), 39-68.
- Dupuy, A. R. (1983). Données complémentaires concernant le statut des mammifères marins du Sénégal. *Bulletin de l'IFAN*, l'IFAN 45A(3-4), 380-391.
- Jefferson, T. A., Curry, B. E., Leatherwood, S., & Powell, J. A. (1997). Dolphins and porpoises of West Africa: A review of records (Cetacea: Delphinidae, Phocoenidae). *Mammalia*, 61, 87-108.

- Jefferson, T. A., Leatherwood, S., & Webber, M. A. (1993). *Marine mammals of the world: FAO species identification guide*. Rome: FAO. 320 pp.
- Khan, A. S. & Mikkola, H. J. (2002). *Sustainable ocean development: An initiative for the management and protection of the marine and coastal resources of the Economic Community of West African States (ECOWAS) Subregion*. Banjul, The Gambia: New Type Press. 80 pp.
- Klinowska, M. (1991). *Dolphins, porpoises and whales of the world: The IUCN red data book*. Gland, Switzerland and Cambridge, UK: IUCN. 429 pp.
- Maigret, J. (1977). Les mammifères du Sénégal II, Les mammifères marins. *Bulletin AASNS*, 57, 13-30.
- Maigret, J. (1980). Données nouvelles sur l'écologie du *Sousa teuszii* (Cetacea, Delphinidae) de la côte Ouest Africaine. *Bulletin de l'IFAN, l'IFAN 42A(2)*, 619-633.
- Mitchell, E. M. (Ed.). (1975). Report of the Meeting on Smaller Cetaceans, Montreal, April 1-11, 1974. *Journal Fisheries Research Board Canada*, 32(7), 889-983.
- Notarbartolo di Sciara, G., Politi, E., Bayed, A., Beaubrun, P-Ch., & Knowlton, A. (1998). A winter cetacean survey off southern Morocco, with a special emphasis on right whales. *Reports of the International Whaling Commission*, 48, 547-550.
- Powell, J. A., Jefferson, T. A., Curry, B. E., Leatherwood, S., & Pankhurst, S. (1996). *Marine mammals of West and Central Africa: A report on distribution and status*. Report to UNEP, Nairobi, Kenya. (Unpublished).
- Reeves, R. R., Smith, B. D., Crespo, E. A., & Notarbartolo di Sciara, G. (Comp.). (2003). *Dolphins, whales and porpoises: 2002-2010 conservation action plan for the world's cetaceans* (pp. 1-139). Gland, Switzerland and Cambridge, UK: IUCN/SSC Cetacean Specialist Group, IUCN.
- Rice, D. W. (1998). *Marine mammals of the world: Systematics and distribution* (Special Publication 4). San Francisco: The Society for Marine Mammalogy. 231 pp.
- Ross, G. J. B., Heinsohn, G. E., & Cockcroft, V. G. (1994). Humpback dolphins *Sousa chinensis* (Osbeck 1765), *S. plumbea* (G. Cuvier, 1829), *S. teuszii* (Kükenthal, 1892). In S. H. Ridgeway and R. Harrison (Eds.), *Handbook of marine mammals, Vol. 5*. San Diego: Academic Press.
- Sequeira, M., & Reiner, F. (1992). First record of an Atlantic humpback dolphin, *Sousa teuszii* Kükenthal, 1892 (Cetacea; Delphinidae) in Guinea-Bissau. *Mammalia*, 56(2), 311-313.
- Spaans, B. (1990). Dolphins in the coastal area of Guinée Bissau. *Lutra*, 33, 126-133.
- Van Waerebeek, K., Diallo, M., Djiba, A., Ndiaye, P. and Ndiaye, E. 1997. Cetacean research in Senegal 1995-97, an overview. Paper SC/49/SM10, Annual Meeting of the International Whaling Commission, Bournemouth, UK. [obtainable from the IWC Secretariat].
- Van Waerebeek, K. and Ofori-Danson, P.K. 1999. A first checklist of cetaceans of Ghana, Gulf of Guinea, and a shore-based survey of interactions with coastal fisheries. Paper SC/51/SM35, 51st Annual Meeting of the IWC Scientific Committee, May 1999, Grenada. 9pp [obtainable from the IWC Secretariat].
- Van Waerebeek, K., Ndiaye E., Djiba, A., Diallo, M., Murphy, P., Jallow, A., Camara, A., Ndiaye, P. and Tous, P. 2000. A survey of the conservation status of cetaceans in Senegal, The Gambia and Guinea-Bissau. WAF CET-1 Report. UNEP/CMS Secretariat, Bonn, Germany. 80pp.
- Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Jallow, A.O., Ndiaye, E., Samba Ould Bilal, A.O. & Bamy, I. L. 2003. Conservation of Cetaceans in The Gambia and Senegal 1999-2001, and Status of the Atlantic humpback dolphin. WAF CET-2 Report. UNEP/CMS, Bonn, Germany. 55 pp.
- Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Jallow, A.O., Ndiaye, E., Samba Ould Bilal, A.O. and Bamy, I. L. 2004. Distribution, status and biology of the Atlantic humpback dolphin *Sousa teuszii* (Kükenthal, 1892). *Aquatic Mammals* 30(1): 56-83.
- Van Waerebeek, K. and Jiddou, A. 2006. Deuxième formation sur l'identification des mammifères aquatiques de l'Afrique de l'Ouest et campagne de prospection des Cétacés dans les eaux du Cap Blanc et du PNBA. Rapport à la Fondation Internationale du Banc d'Arguin. 13pp. (unpublished). [in French].