

## The marine mammals of Grenada, W.I., and their conservation status

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*Summary.* – To document the Grenadian marine mammal fauna and its distribution in the eastern Caribbean, we conducted field and archival studies in that country. All records of sire-nians and cetaceans for Grenada were assembled and analyzed. The total number of confirmed marine mammal species for this part of the world is 11. The humpback whale (*Megaptera novaeangliae*) was the most commonly reported mysticete species while a variety of odontocetes seem to be equally frequent in those waters. The manatee (*Trichechus manatus*) has been extinct from those waters for at least 300 years. Comparison with the marine mammal fauna of adjacent regions (Venezuela, Trinidad, and St. Vincent and the Grenadines), leads us to believe that at least seven additional species of cetaceans may be present in Grenadian waters, probably as occasional visitors.

*Résumé.* – Pour documenter la faune de mammifères marins de Grenade et sa distribution dans les Caraïbes orientales, nous avons entrepris l'études des observations et archives pour la zone. Tous les enregistrements de Siréniens et de Cétacés pour la Grenade ont été assemblés et analysés. Onze espèces de mammifères marins sont confirmées pour cette région. Le jubarte (*Megaptera novaeangliae*) est l'espèce de Mysticète le plus régulièrement observée et plusieurs Odontocètes semblent également fréquents. Le Lamantin (*Trichechus manatus*) a disparu de ces eaux depuis au moins 300 ans. La comparaison avec la faune de mammifères marins des régions limitrophes (Vénézuëla, Trinidad, et St. Vincent et les Grenadines), nous incite à croire qu'au moins sept espèces supplémentaires de Cétacés peuvent être présentes dans les eaux de Grenade, en tant que visiteurs occasionnels.

**KEY WORDS:** Grenada (West Indies), Caribbean, marine mammals, distribution, conservation status.

### INTRODUCTION

The marine mammals inhabiting the Caribbean are poorly known (Jefferson and Lynn 1994; Romero *et al.* 2001). With the exception of a few whaling and taxonomic studies in the Windward Islands (i.e., Caldwell *et al.* 1971a; Price 1985), published work has been based on either sightings or strandings restricted to either a particular locality or a particular species. Thus, surveys have been limited in scope and duration. A recent compilation of cetacean accounts for the Caribbean (Romero *et al.* 2001) has shown that we are far from having a complete understanding of the faunal composition of marine mammals for this region. This lack of information has led many authors,

when reviewing the distributional records of a particular species, to predict their still unreported presence for the Caribbean (e.g. Caldwell *et al.* 1971a; Cuervo Díaz *et al.* 1986; Perrin and Gilpatrick 1994; Perrin and Hohn 1994; Perrin and Mead 1994; Perrin *et al.* 1994a, b; van Bree 1975, Romero *et al.* 2001).

One of the least known areas of the Caribbean, from the marine mammals viewpoint, are the waters of Grenada. The only attempt to list these mammals for that country was Groome (1970), who only mentioned as confirmed records the manatee (*Trichechus manatus*) and the humpback whale (*Megaptera novaeangliae*). He also mentioned that the short-finned pilot whale (*Globicephala macrorhynchus*) was found in the northern Grenadines and added six other species of cetaceans that «might be sighted at some distance from the coast, such as: Blue Whale or Sulphur Bottom, *Sibbaldus musculus* (*Balaenoptera musculus*); Finback Whale, *Balaenoptera physalus*; Atlantic Killer Whale, *Grampus orca* (*Orcinus orca*); False Killer Whale, *Pseudorca crassidens*; Common Dolphin, *Delphinus delphis* (probably *Delphinus capensis*) and the Atlantic Bottlenose Dolphin, *Tursiops truncatus*.» The only other study on the marine mammals of Grenada was by Romero and Hayford (2000) who described past and present utilization of those animals on that country.

Thus, the study of the marine mammal fauna of this area is important not only to establish its actual diversity, but also because recently Grenada has become an active member of the International Whaling Commission, and the possibility that they may stimulate marine mammals exploitation has been suggested (Romero and Hayford 2000).

There are three indications that the marine mammal fauna of Grenada may be much more abundant and diverse than ever reported:

1. There are 19 species of cetaceans cited for the nearby islands of St. Vincent and the Grenadines (See Appendix 1)
2. There is a significant number of toponyms related to marine mammal species in Grenada and all its islands; they are: a) The Porpoises, a group of small islands located at 11° 58.50'N, 61° 45.75'W, about 1500 m S to SW of Prickly Point; b) Whale Bay, at 12° 17.21'N, 61° 34.25'W, on the Eastern part of Island of Caille, about 8200 m NE from Bedford; c) The Valley of the Whales at Point Salines, on Boss Reef, at 12° 0.57'N, 61° 48.20'W; d) La Baleine at 12° 30.25'N, 61° 24.00'W; S Petit Dominique, about 2200 m due NE from Point Saint Hillaire; e) Canouan Baleine at 12° 41.25'N, 61° 21.20'W; about 1000 m SW from Taffia Hill in Canouan; and, possibly, The Blow Hole at 12° 00'N, 61° 47.25'W, on SW Grenada.
3. There are two well-established whale-watching operations on that country.

On the basis of that, we decided to investigate the nature of the marine mammal fauna for that country. To that end, we combined information for three major sources: data from published or unpublished (archival) documents, accounts from reliable observers, and our own field observations. As a result, we have been able to increase the number of confirmed records from three to 11. We interpreted these records, where possible, to suggest the conservation status of these species.

## MATERIALS AND METHODS

### *Area of Coverage*

We include the territorial waters of the country of Grenada and all its islands as well as those islands of the southern Grenadines up to 12° 47.5'N. North to that parallel, lies the islands of Bequia and St. Vincent (Figs 1 and 2) where cetaceans have been much better studied (see citations in Appendix 1).



Fig. 1. – Map of the Caribbean region.

#### Data Compilation

The general methodology of this paper is based on the principles of research synthesis (Cooper and Hedges 1994). These are similar to those used by us previously in other areas of the Caribbean (Romero *et al.* 1997; Romero *et al.* 2001). We obtained information from three major sources:

1. Scientific and non-technical literature. These embraced whaling records. In reviewing published accounts, we included only those reports providing sufficient information, such as clear descriptions, drawings or photographs, to permit unambiguous species identification. We used traditional scholarly methods of tracing backwards through the literature until we arrive at the primary source for all published reports. In addition to searching the periodical literature (by computer and traditional printed abstract and index means), we examined modern and older books and investigate archival records (including photographic and video) of libraries, museums, and government files in order to locate the original records of marine mammals in the study area («fugitive literature» sensu Rosenthal 1994). Original sources were used wherever possible; secondary sources are noted in brackets (Appendix 1).

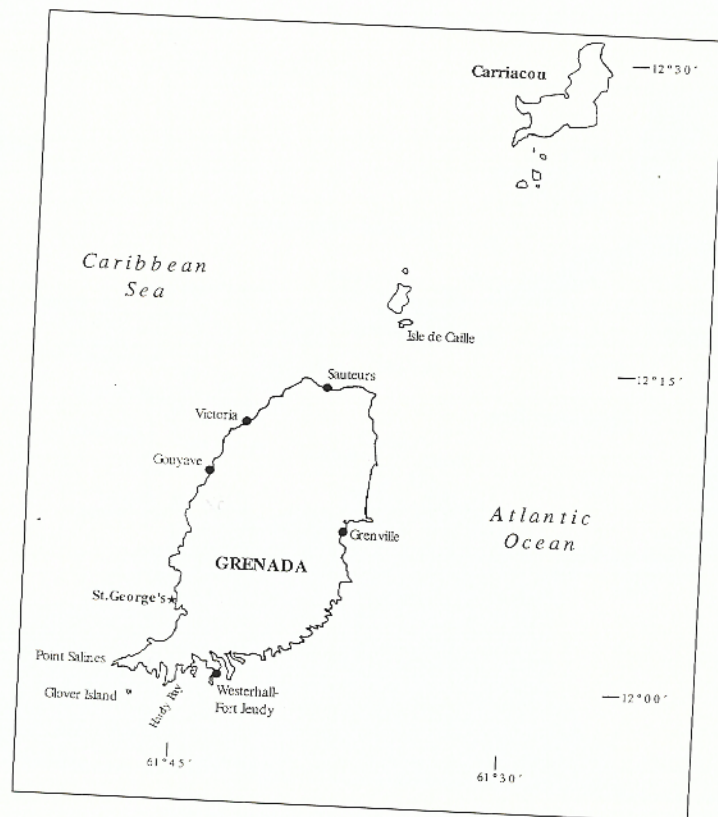


Fig. 2. - Map of Grenada showing the localities mentioned in the text.

2. Unpublished sightings by reliable observers. These included photographs. Recognizing the problems of using sighting records for species identification (Evans 1980), we included only those by qualified observers reporting very distinctive species such as humpback whales (*Megaptera novaeangliae*), killer whales (*Orcinus orca*), and sperm whales (*Physeter macrocephalus*). The observers (cited in the acknowledgements section) were all trained observers in the whale-watching industry or fishers who usually supported their claims with photographs or credible descriptions.

3. Field studies. They were carried out in July and August 1999. We visited Grenada, Carriacou as well as the waters surrounding Union Island, Mayreau, and Canouan. We made four cruises: (1) on the ferry Osprey Express from St. George's in the island of Grenada to Hillsborough on the island of Carriacou on 23 July 1999; (2) on the 41-foot sailboat Chaika II from Hillsborough to south of Mustique (12° 47'N) back to Hillsborough on 24 and 25 July 1999; (3) on the ferry Osprey Express from Hillsborough to St. George's on 26 July 1999; and, (4) on the 42-foot catamaran Starwind III covering a semilunar strip between Grand Anse Bay and Gros Point (inner ellipse) to Quarantine Point and Crayfish Bay (outer ellipse) on 3 August 1999. Observations were recorded using two camcorders, SONY CCD-TRV99, one still photographic camera Nikon with a 70-210 mm lens on 400 ASA film. Geographic position was

determined using a Global Positioning System (GPS), Magellan NAV 1000 Plus. Depths and land-based references were calculated using the charts produced by the Defense Mapping Agency. Those charts were: 25480 (Saint Georges' Harbour); 25481 (Grenada); 25482 (Carriacou to Bequia). When referring to the depths at which sperm whales were observed (Table 1), we used those charts as references.

TABLE 1. – Field Observations of different individuals of *Physeter macrocephalus* on 28 July 1999.

Coordinates	Land reference (Distance in m)	Depth (m)	Duration (min : sec)	Number of Individuals
12° 09.35 N; 61° 50.81 W	11,600 NW of Grand Roy	3052	10:36	4
12° 09.53 N; 61° 49.74 W	12,000 NW of Grand Roy	3156	11:36	3
12° 09.55 N; 61° 49.57 W	10,000 NW of Grand Roy	3072	11:42	4
12° 09.55 N; 61° 49.57 W	10,000 NW of Grand Roy	3072	11:43	3
12° 09.55 N; 61° 49.57 W	10,000 NW of Grand Roy	3072	11:48	2
12° 09.87 N; 61° 48.81 W	9,500 W of Guayave	2638	11:51	3
12° 09.35 N; 61° 49.94 W	12,000 W of Guayave	3052	12:02	3
12° 09.35 N; 61° 49.94 W	12,000 W of Guayave	3052	12:04	1

#### *Taxonomic Arrangement*

We follow the most recent marine mammal species list and taxonomic order recognized by The Society for Marine Mammalogy (Rice 1998).

#### *Common or Vernacular Names*

English names follow standard nomenclature (Rice 1998). In Grenada and the southern Grenadines, English names applied to marine mammals are the same English names applied elsewhere. We found, for example, that the poster titled «Whales and Dolphins of the Caribbean» by Nathalie Ward, published by the Whale and Dolphin Conservation Society was widely used by whale-watching operators. We only encountered one local name applied to marine mammals and that was «papas,» a phonetic derivation of the English word «porpoise.» This name was applied irrespectively to any species of dolphins. Thus, marine mammals lack specific vernacular names in Grenada.

#### *Distribution*

Global and regional distribution information has been provided for reference purposes only.

#### *Conservation Status*

We report the conservation status for each species according to the World Conservation Union/World Conservation Monitoring Centre's (IUCN/WCMC) «Red List» (<http://www.wcmc.org.uk:80/species/animals/>). We also include information from the list of cetaceans in the appendices of the Convention on International Trade and Endangered Species of Wild Fauna and Flora (CITES) (<http://www.wcmc.org.uk/CITES/english/fauna.htm>). We noted past exploitation history, when applicable, for each species in Grenadian waters to infer its current local conservation status.

## RESULTS AND DISCUSSION

*Confirmed species*

The following species are now confirmed to inhabit or frequently visit Grenadian waters:

1. *Megaptera novaeangliae* humpback whale. This is a cosmopolitan species with mostly coastal with strong seasonal migrations (Rice 1998). It is fairly common in the Caribbean (Romero *et al.* 2001). It is by far the most common mysticete in Grenadian waters. It was heavily hunted from the nineteenth century until 1926. A whaling station was built on Glover Island, on the SW corner of Grenada in which this species was processed for oil and meat production (Romero and Hayford 2000). Numerous reports indicate that they can be observed in all waters around Grenada and Carriacou from December to April (Groome 1970; Stevick *et al.* 2000; Dario Sandrini, Kido Project, pers. comm.). Fishers at Hardy Bay also report this species to be occasionally seen during winter. This species is the only cetacean that has been heavily exploited in Grenadian waters by whalers. The closing of the whaling operations on this species in 1926 was due, by all accounts, to a drastic decrease in its population size around Grenada. Yet, this species is still exploited in the nearby island of Mustique and was heavily exploited in Trinidad during the nineteenth century (Romero *et al.* 2002). The Grenadian government has supported the reopening of commercial whaling before the International Whaling Commission and some local observers have pointed out the possibility of that country allowing whaling in its waters (Romero and Hayford 2000). It is classified as Vulnerable by the IUCN/WCMC and listed in Appendix I of CITES.

2. *Balaenoptera edeni* Bryde's whale. This species is found in tropical and subtropical waters of the world, being both pelagic and coastal (Cummings 1985). It is not uncommon through the Caribbean (Romero *et al.* 2001). There are whaling records of two individuals for Grenada for 1925, which were taken to Glover Island whaling station (Soot-Ryen 1961; Romero and Hayford 2000). It is classified as «Data Deficient» by the WCMC and is in Appendix I of CITES. Because this species seems not to have been heavily hunted anywhere, and certainly not in the North Atlantic and the Caribbean, the southeastern Caribbean population may be stable (Romero *et al.* 2001).

3. *Physeter macrocephalus* sperm whale. This is a cosmopolitan species found mostly in mesopelagic and deep seas (Rice 1998). It is fairly common in the deeper basins of the Caribbean (Romero *et al.* 2001) including Grenada where, there seems to be a resident population, at least in the eastern part of the island. We observed them in several occasions (Table 1). We also saw pictures of this species taken in the same area by the Starwind III whale-watching crew. Personnel of the Kido Project whale-watching operation also reported it for the western waters of Grenada. There is also an acoustic record obtained in 1972 (Taruski and Winn 1976). It is classified as Vulnerable by the IUCN/WCMC and listed in Appendix I of CITES.

4. *Tursiops truncatus* bottlenose dolphin. This species is cosmopolitan but mostly coastal (Wells and Scott 1999). It is fairly common in the Caribbean (Romero *et al.* 2001). We observed a pod of 15-20 individuals about 8,000 m NW of Rapid Point, Union Island (12° 39.19 N, 61° 29.91 W) on 24 July 1999 from 13:45 until 14:00. The depth at that location is approximately 730 m. We also saw pictures of this species taken on the eastern waters of Grenada by the Starwind III whale-watching crew. Personnel of the Kido Project whale-watching operation also reported it in the waters of Grenada. It is classified as «Data Deficient» by the WCMC and is in Appendix II of CITES.

5. *Stenella frontalis* Atlantic spotted dolphin. This species is found in tropical and warm-temperate Atlantic (Rice 1998). It is very common in the Caribbean (Romero *et al.* 2001). Personnel of the Kido Project whale-watching operation reported it in the waters of Grenada. It is classified as «Data Deficient» by the WCMC and is in Appendix II of CITES.

6. *Stenella longirostris* spinner dolphin. This species is found in tropical and subtropical seas of the world, being both coastal and pelagic (Perrin and Gilpatrick 1994), although coastal records are usually from locations with deep waters close to shore. It has been reported for many other Caribbean islands (Romero *et al.* 2001). We observed them twice. The first time was at 12° 31.27' N, 61° 79.59' W, about 1,500 m W of Anse La Roche, Carriacou, on 24 July 1999 from 10:24 AM until 10:57 AM at a depth of 31 m. The pod size was 50-100 individuals. Our second observation was on 26 July 1999 at 7:30 AM at 12° 17' N, 61° 38' W, on a depth of 880 m a group of 20-30 individuals. We also saw pictures of this species taken on the eastern waters of Grenada by the Starwind III whale-watching crew. Personnel of the Kido Project whale-watching operation also reported it in the waters of Grenada. It is classified as «Lower Risk» by the WCMC and is in Appendix II of CITES.

7. *Delphinus capensis* long-beaked common dolphin. This species is found mostly from tropical and temperate oceans of the world, being both coastal and pelagic (Evans 1994). It has been reported from other parts of the Caribbean (Romero *et al.* 2001). We saw pictures of this species taken on the eastern waters of Grenada by the Starwind III whale-watching crew. Personnel of the Kido Project whale-watching operation also reported it in those waters. Because its taxonomy has been revised recently (it used to be considered *D. delphis*), there are no status listings for it. Given the large numbers of these animals taken in other parts of the Caribbean (Romero *et al.* 1997), we propose that it should be classified as «Vulnerable» by the WCMC and placed in the Appendix II of CITES.

8. *Pseudorca crassidens* false killer whale. This species is found in all tropical and temperate oceans of the world, mostly in deep water and offshore areas (Odell and McClune 1999). There are not that many records for the Caribbean (Romero *et al.* 2001). We saw pictures of this species taken on the western waters of Grenada by the Starwind III whale-watching crew. Personnel of the Kido Project whale-watching operation also reported it. It is not classified by the WCMC, but it is in Appendix II of CITES. We propose that it be classified as «Data Deficient» until we learn more about its population status.

9. *Orcinus orca* killer whale. This species is cosmopolitan but mostly coastal. It is the world's most widely distributed mammal (Dahlheim and Heyning 1999). It is not uncommon in the Caribbean (Romero *et al.* 2001). We saw pictures of this species taken on the eastern waters of Grenada by the Starwind III whale-watching crew. They say that they are seen only from December to March south to Glover Island. Personnel of the Kido Project whale watching operation also reported it in the waters of Grenada. It has also been seen off St. Georges' (Sutty, pers. comm.). Fishers at Hardy Bay reported to us an individual swimming in that area in 1996. It is classified as «Lower Risk: Conservation Dependant» by the WCMC and is in Appendix II of CITES.

10. *Globicephala macrorhynchus* short-finned pilot whale, blackfish. This species is found in pelagic waters of tropical and warm-temperate seas (Bernard and Reilly 1999). It is very common in the Caribbean (Romero *et al.* 2001). We saw pictures of this species taken on the eastern waters of Grenada by the Starwind III whale-watching crew. Personnel of the Kido Project whale-watching operation also reported it in the waters of Grenada and claim that there is a resident population in Grenadian waters.

We believe we saw two individuals at 12° 06.55 N; 61° 47.52 W; about 4,800 m NW of Moliniere Point at a depth of about 540 m on 28.7.99 at 12:25 pm. However, they dove before we could take any pictures or videos of them. This species was hunted until recently in the northern Grenadines and St. Vincent (Groome 1970). It is classified as «Lower Risk: Conservation Dependant» by the WCMC and is in Appendix II of CITES.

11. *Trichechus manatus* West Indian manatee. This species is found in the Gulf of Mexico, most of the Caribbean, and the Brazilian Amazon (Rice 1998). It is currently extinct in Grenada. There are remains dating to pre-Columbian times and historical reports from as late as seventeenth century about its presence around that island. These reports claim that due to superstition, the Caribs did not eat turtle but «like the Jews, they eschewed the flesh of pig, sea-cow, and of other animals which they considered unclean.» (Du Tertre 1667; Knight 1946). Later anthropological studies dispute this assertion and point out that, at best, taboo on eating manatee was practiced only during a limited period, after fasts (Rouse 1948). Apparently harpoons were used routinely for capturing these animals. This would be consistent with the archaeological evidence that links manatee bones with prehistoric remains suggesting customary use by the pre-Columbian inhabitants of the island (Bullen 1964; Wing and Wing 1995). We observed a piece of manatee's rib in the National Museum associated with archaeological remains collected for the island.

#### *Expected species*

There are 83 species of cetaceans in the world and four species of living sirenian (Rice 1998). In this paper we confirm the presence of 10 species of cetaceans and one sirenian for Grenadian waters, although the manatee is currently extinct and has been so for at least 300 years (Romero and Hayford 2000). However, ours is the first systematic effort made to survey the marine mammal fauna in this area. Thus, we believe that other species, especially occasional visitors, will be recorded once more long-term studies are carried out. Based on faunal accounts of the adjacent areas (Venezuela for continental waters, and St. Vincent and the Grenadines, and Trinidad and Tobago for insular waters), we can predict the presence of other marine mammal species for the waters of Grenada (Appendix 1). We believe that 12 additional species of cetaceans will be added to this list based on their distribution in adjacent waters and on other locality reports, although most would be occasional visitors or strays rather than residents. The reasoning behind these predictions are listed, species by species, below.

1. *Balaenoptera borealis* sei whale. This species is cosmopolitan and pelagic and is found mostly in temperate and oceanic waters (Gambell 1985). There are few records for this species in the Caribbean, where it is considered rare (Notarbartolo di Sciara 1983). Leatherwood and Reeves (1983) have even questioned its presence in those waters. The few confirmed records for the Caribbean have been summarized in Romero *et al.* (2001). During our fieldwork we heard from professional whale-watchers' reports of sei whale sightings on the lee side of Grenada. However, this species is easily confused with *B. edeni*, thus yielding fewer confirmed records than might otherwise be the case. If confirmed, these records would reflect the worldwide distribution of this species and, thus, it could be considered as an occasional visitor rather than a resident of Grenadian waters. Sei whales were heavily hunted in the past and although there are no precise figures, the general consensus is that the global population is low.



2. *Steno bredanensis* rough-toothed dolphin. This species is found in tropical and warm-temperate seas of the world and is mostly pelagic (Miyazaki and Perrin 1994). There are numerous records for the Caribbean (Romero *et al.* 2001).

3. *Grampus griseus* Risso's dolphin. This species has a circumglobal distribution in tropical and temperate seas, generally over waters deeper than 1,000 m (Klinowska 1991; Kruse *et al.* 1999). Although there are few records from the Caribbean, it has been reported for St. Vincent and the Grenadines (Caldwell *et al.* 1971a; Caldwell and Caldwell 1975; Gricks 1994) (for other Caribbean records see Romero *et al.* 2001).

4. *Stenella attenuata* pantropical spotted dolphin. It is mostly a pantropical species found in coastal and pelagic waters (Perrin and Hohn 1994). In the Atlantic it is primarily found at high seas and oceanic islands. It has been reported for several Caribbean locations including the nearby St. Vincent and the Grenadines (Perrin *et al.* 1987; Gricks 1994; Romero *et al.* 2001), reason by which we include it as a potential visitor of Grenadian waters. The confusing taxonomy of the *Stenella*-species complex, clarified relatively recently (Perrin *et al.* 1987), highlights the difficulty of reliable identification that has contributed to difficulty in assessing its Caribbean distribution.

5. *Stenella clymene* clymene dolphin. It is a tropical and subtropical Atlantic species, found in both pelagic and coastal waters (Jefferson *et al.* 1993; Perrin and Mead 1994). Although there is a paucity of records for this species worldwide, perhaps because its specific status was not recognized until 1981, it may be found in Grenadian waters, given that there are records St. Vincent, Curaçao, and Venezuela (Perrin *et al.* 1981; Watkins and Moore 1982; Romero *et al.* 2001).

6. *Stenella coeruleoalba* striped dolphin. It can be found in tropical and temperate seas of the world in coastal and but occasionally pelagic waters (Perrin *et al.* 1994d). It has been reported for St. Vincent (Gricks 1994) and elsewhere in the Caribbean (Romero *et al.* 2001).

7. *Feresa attenuata* pygmy killer whale. This is a species of circumglobal tropical and subtropical distribution, being mostly coastal (Ross and Leatherwood 1994). This is not a common species for the Caribbean (Romero *et al.* 2001) and if ever found in Grenadian waters, it is quite possible that it is an infrequent visitor of those waters.

8. *Ziphius cavirostris* Cuvier's beaked whale. This is a cosmopolitan species except for polar waters, being mostly pelagic (Heyning 1989). This is a rarely observed species known mostly from strandings. Its strandings are the most numerous of all the beaked whales (Heyning 1989). The reports for Caribbean locations are numerous and widespread (Romero *et al.* 2001) including St. Vincent (Caldwell *et al.* 1971b; Caldwell and Caldwell 1975; Gricks 1994).

9. *Kogia breviceps* pygmy sperm whale. This is another cosmopolitan species (except for polar waters), mostly neritic and also pelagic (Caldwell and Caldwell 1989). It has been reported for St. Vincent (Caldwell and Caldwell 1975, 1989) and elsewhere in the Caribbean (Romero *et al.* 2001).

10. *Kogia simus* dwarf sperm whale. This is a pelagic species found in tropical and warm-temperate oceans of the world (Caldwell and Caldwell 1989). Although even more rare than *K. breviceps*, we expect it to be present in Grenadian waters since it has been reported for the nearby island St. Vincent (Caldwell and Caldwell 1975; Caldwell *et al.* 1973). There are other reports for the Caribbean (Romero *et al.* 2001).

11. *Lagenodelphis hosei* Fraser's dolphin. This is an uncommon pantropical mostly pelagic species (Perrin *et al.* 1994c). Most reports are from the high seas, particularly around oceanic islands, with relatively few from strandings. It has been reported for St. Vincent (Caldwell *et al.* 1976; Gricks 1994) and the Grenadines (Gricks 1994) as well as elsewhere in the Caribbean (Romero *et al.* 2001).

12. *Peponocephala electra* melon-headed whale. This is a pantropical and pansub-tropical pelagic species (Perryman *et al.* 1994). It has been reported for St. Vincent (Caldwell *et al.* 1976; Watkins *et al.* 1997) and elsewhere in the Caribbean (Romero *et al.* 2001). We have unconfirmed reports of this species for Grenada (Dario Sandrini, Kido Project, pers. comm, Suttly pers. comm.).

13. *Mesoplodon densirostris* Blainville's beaked whale. It is found in tropical and warm-temperate seas of the world. It is mostly pelagic. It has the widest global distribution of all the *Mesoplodon* species (Mead 1989). It has been reported for several localities in the Caribbean (Romero *et al.* 2001).

14. *Mesoplodon europaeus* Gervais' beaked whale. It is found in tropical and warm-temperate waters of the Atlantic, much more frequently in the western than in the eastern Atlantic (Mead 1989). Its presence in Trinidad (Fraser 1955; Gricks 1994) and other Caribbean islands (Romero *et al.* 2001) makes it likely that it also frequents Grenadian waters.

## CONCLUSIONS

This study shows that when using research synthesis methodology, a wealth of information can be generated. By combining studies of published and archival material, interviews with local experts, and our own field observations, the marine mammal diversity for a particular area in the Caribbean can increase dramatically (from 3 to 11). Our comparative studies with adjacent regions show that we were able to confirm the presence of the most likely species for that area that were expected to be found because of both their abundance and easy identification through sightings. Most of the other species that we might expect to find for those waters are either not very common in general or difficult to identify via sightings alone.

This area has been largely ignored in these kinds of studies. We propose that further, long term research should be conducted in this and other islands in order to determine the presence and/or abundance of these and other species. We further propose the use of sound recordings to recognize some of the species difficult to identify by sightings alone.

These kinds of studies are important for the Caribbean basin not only from the distributional and faunal listing viewpoints, but also from the management viewpoint since: (a) some Caribbean nations have signaled their intention to either resume or support whaling and (b) because of the increased interest of whale watching operations in those islands which may disturb the behavior of these species (Romero and Hayford 2000).

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APPENDIX 1. – Geographical comparison of species records for four countries in the southeastern Caribbean. An asterisk (\*) following the reference means that the evidence is not conclusive.

Species	Venezuela	Trinidad and Tobago	Grenada	St. Vincent and the Grenadines
<i>T. manatus</i>	O'Shea <i>et al.</i> 1988	Alkins 1979	Groome 1970	
<i>B. borealis</i>	Romero <i>et al.</i> 2001			
<i>B. edeni</i>	Romero <i>et al.</i> 2001	Romero unpubl.	Soot-Ryen 1961	
<i>B. physalus</i>	Romero <i>et al.</i> 2001			
<i>M. novaeangliae</i>	Romero <i>et al.</i> 2001	Mitchell and Reeves 1983	Groome 1970 This paper	Lindeman 1880; Clark 1887; Brown 1945 [cited in Caldwell <i>et al.</i> 1971a]; Fenger 1958; Mitchell 1965; Adams 1971; Caldwell <i>et al.</i> 1971a; Price 1985
<i>P. macrocephalus</i>	Romero <i>et al.</i> 2001		This paper	Townsend 1935; Brown 1945 [cited in Caldwell <i>et al.</i> 1971a]; Fenger 1958; Rathjen and Sullivan 1970; Wood <i>et al.</i> 1970; Caldwell <i>et al.</i> 1971a; Caldwell and Caldwell 1975; Watkins and Moore 1982 Caldwell and Caldwell 1975, 1989 Caldwell and Caldwell, 1975; Caldwell <i>et al.</i> 1973 Caldwell <i>et al.</i> 1971a; Caldwell and Caldwell 1975; Gricks 1994
<i>K. breviceps</i>				Caldwell <i>et al.</i> 1971a; Caldwell and Caldwell 1975; Gricks 1994
<i>K. simus</i>				Caldwell <i>et al.</i> 1971a; Caldwell and Caldwell 1975; Gricks 1994
<i>S. bredanensis</i>	Romero <i>et al.</i> 2001			Caldwell <i>et al.</i> 1971a; Caldwell and Caldwell 1975; Gricks 1994
<i>S. fluviatilis</i>	Romero <i>et al.</i> 2001	van Bree 1975		Caldwell <i>et al.</i> 1971a; Caldwell and Caldwell 1975; Gricks 1994
<i>G. griseus</i>	Romero <i>et al.</i> 2001			Caldwell <i>et al.</i> 1971a; Caldwell and Caldwell 1975
<i>T. truncatus</i>	Romero <i>et al.</i> 2001	van Bree 1975	This paper	Caldwell <i>et al.</i> 1971a; Caldwell and Caldwell 1975
<i>S. frontalis</i>	Romero <i>et al.</i> 2001	Mitchell 1970	This paper	Caldwell <i>et al.</i> 1971a Perrin <i>et al.</i> 1987, Gricks 1994
<i>S. attenuata</i>	Romero <i>et al.</i> 2001			
<i>S. longirostris</i>	Romero <i>et al.</i> 2001		This paper	Caldwell <i>et al.</i> 1971a; Gricks 1994
<i>S. clymene</i>	Romero <i>et al.</i> 2001			Perrin <i>et al.</i> 1981; Watkins and Moore 1982
<i>S. coeruleoalba</i>	Romero <i>et al.</i> 2001			Gricks 1994



<i>D. capensis</i>	Romero <i>et al.</i> 2001		This paper	Erdman 1970 (*); van Bree 1975 (*); Watkins and Moore 1982 (*); Caldwell <i>et al.</i> 1976; Gricks 1994;
<i>L. hosei</i>				Caldwell <i>et al.</i> 1976; Watkins <i>et al.</i> 1997
<i>P. electra</i>				Caldwell and Caldwell 1971a; Caldwell <i>et al.</i> 1971a; Gricks 1994
<i>F. attenuata</i>	Romero <i>et al.</i> 2001		Caldwell <i>et al.</i> 1976	Caldwell <i>et al.</i> 1971a; Caldwell and Caldwell 1975; Gricks 1994
<i>P. crassidens</i>	Romero <i>et al.</i> 2001	Bruyns, 1969 (Tobago)	This paper	Caldwell <i>et al.</i> 1971a; Caldwell and Caldwell 1975; Gricks 1994
<i>O. orca</i>	Romero <i>et al.</i> 2001	Romero <i>et al.</i> 2000a	This paper	Caldwell <i>et al.</i> 1971a; Caldwell and Caldwell 1975; Gricks 1994
<i>G. macrorhynchus</i>	Romero <i>et al.</i> 2001	Romero, unpubl. Romero, unpubl.	This paper	Brown 1945, 1947 [cited in Caldwell <i>et al.</i> 1971a]; Hickling 1950 [cited in Caldwell <i>et al.</i> 1971a]; Fenger 1958; Morice 1958; Caldwell and Erdman 1963; Caldwell and Caldwell 1971b; Caldwell <i>et al.</i> 1971a; van Bree 1975; Rathjen and Sullivan 1976; Watkins and Moore 1982; Price 1985; Mignucci-Giannoni 1996
<i>M. europaeus</i>		Fraser 1955; Gricks 1994		
<i>Z. cavirostris</i>	Romero <i>et al.</i> 2001			Caldwell <i>et al.</i> 1971b; Caldwell and Caldwell 1975; Gricks 1994