

Opportunistic sightings of small cetaceans off the leeward shore of the Commonwealth of Dominica

SHANE GERO AND HAL WHITEHEAD

Biology Department, Dalhousie University, Halifax, Nova Scotia, Canada
Contact email: sgero@dal.ca

ABSTRACT

While large scale surveys would provide more accurate data on distribution and abundance, the pooling of opportunistic sightings data from a multitude of projects provides a relatively economical way of achieving a large data set over a multinational area such as the Caribbean Sea. Here, we provide details of the opportunistic small cetacean sightings made in the national waters of the Commonwealth of Dominica during two field seasons of research focused on sperm whale social behaviour, in the hopes that it can be used as a small part of a growing body of data from around the Caribbean. A total of 84 small cetacean sightings over the 74 days of effort off the coast of Dominica included the following species: Atlantic spotted dolphin (*Stenella frontalis*), pantropical spotted dolphin (*Stenella attenuata*), Fraser's dolphin (*Lagenodelphis hosei*), rough-toothed dolphin (*Steno bredanensis*), striped dolphin (*Stenella coeruleoalba*), common bottlenose dolphin (*Tursiops truncatus*), short-finned pilot whale (*Globicephala macrorhynchus*), melon-headed whale (*Peponocephala electra*), pygmy killer whale (*Feresa attenuata*), and Cuvier's beaked whale (*Ziphius cavirostris*). It is important that all research activity in the Caribbean report their opportunistic sightings of small cetaceans; so that a better overall picture can be produced through a synthesis of these sparse data sets. The establishment of a collaborative searchable database for the Caribbean region is recommended.

INTRODUCTION

At least 26 cetacean species have been listed as members of the fauna of the Caribbean Sea (Debrot and Barros, 1994; Debrot *et al.*, 1998; Mignucci-Giannoni, 1998). Much of our knowledge of the presence, distribution, and abundance of these animals stems from strandings, opportunistic sightings during research with other goals, commercial/military vessels with observers on board, or from catches from directed fisheries (Erdman, 1970; Caldwell *et al.*, 1971; Erdman *et al.*, 1973; Caldwell and Caldwell, 1975; van Bree, 1975; Caldwell *et al.*, 1976; Taruski and Winn, 1976; Watkins and Moore, 1982; Watkins *et al.*, 1997; Cardona-Maldonado and Mignucci-Giannoni, 1999; Rosario-delestre *et al.*, 1999). Most of these studies focused on a single species or family, or within a particular island's or country's waters. Although, in more recent years, some inter-island survey data has become available (Jefferson and Lynn, 1994; Roden and Mullin, 2000; Mignucci-Giannoni *et al.*, 2003; Swartz *et al.*, 2003). Compared to the Gulf of Mexico, relatively less work has been completed in the Caribbean Sea. As such, the cetacean inhabitants of the Caribbean Sea remain understudied and poorly known.

While large scale surveys provide more accurate data on distribution and abundance, the pooling of opportunistic sightings data from a multitude of projects provides a relatively economical way of achieving a large data set over a multinational area such as the Caribbean Sea. Here, we provide details of the opportunistic small cetacean sightings made in the national waters of the Commonwealth of Dominica during two field seasons of research focused on sperm whale social behaviour, in the hopes that it can be used as a small part of a growing body of data from around the Caribbean.

METHODS

The data presented here was collected opportunistically over two separate field seasons completed off the leeward shore of the Commonwealth of Dominica in an area that covered approximately 2000km² along the entire west coast of the island, in waters sheltered from trade winds. In the first (January 14 – April 12, 2005; 58 days effort; Figure 1), sightings were collected opportunistically from a small (10-12m) auxiliary sailing vessel whose primary goal was to locate and follow groups of sperm whales. During daylight hours animals were spotted by observers on deck, often from a crow's nest located at

approximately 9 meters above sea level; while overnight there was only one person on deck whose primary goal was to maintain acoustic contact with the sperm whales. The second, and shorter field season (January 17 – February 11, 2006; 18 days effort), was completed from onboard a motorized catamaran operated as a local whale watch out of the Anchorage Hotel and Dive Centre (Andrew Armour, owner and operator, andarmour@hotmail.com). During the 2006 field season, we were limited to observations made during 2-4 hour whale watch excursions. Whale watch effort was biased towards the southern half of the island by the nature of leaving from the hotel located a few miles south of Roseau, the capital city located at the southern end of the island.

The date, species, as well as, minimum (maximum number of individuals seen at the surface at the same time), best (estimate of most likely group size) and maximum (highest estimate of likely group size) group size estimates were recorded for each opportunistic encounter with small cetaceans. GPS location and wind speed on the Beaufort scale was also recorded when available. GPS position or wind speed was often not available during the 2006 season as one of the whale watch vessels was not equipped with a GPS unit or an anemometer.

RESULTS

A total of 84 small cetacean sightings of 10 different species over the 74 days of effort off the coast of Dominica spread over two years are presented in Table 1.

Atlantic Spotted Dolphin, *Stenella frontalis*: Sighted only once, these animals approached the boat to ride the bow wave for a few minutes in the early morning before leaving sight.

Pantropical Spotted Dolphins, *Stenella attenuata*: By far the most sighted species (29 sightings on 24 days), these animals were seen in small and large groups (4 to 150 individuals) often several times a day. A mix of mature animals, juveniles, and mother-calf pairs were observed throughout the days of effort.

Fraser's Dolphins, *Lagenodelphis hosei*: Fraser's Dolphins were the second most commonly sighted species of dolphin (7 sightings). Often seen in groups of 20 animals or more, these animals were observed alone or in mixed groups with pantropical spotted dolphins on two occasions (sighting #35 and #36), mixed with short-finned pilot whales on one (sighting #32), and mixing with sperm whales at the surface (sighting #34).

Rough-Toothed Dolphin, *Steno bredanensis*: Observed only once for 30 minutes these 15 to 25 animals rode the bow of the boat, rubbed each other and rolled at the surface, perhaps while socializing.

Striped Dolphin, *Stenella coeruleoalba*: This group of 20 to 70 animals approached the boat while leaping to ride the bow. This species was sighted only once.

Common Bottlenose Dolphin, *Tursiops truncatus*: Observed 4 times, small groups of this species commonly rode the bow wake of the vessel. Sighting #43 was made 0.5 nautical miles off of Pointe Michele, a small village located just south of Roseau.

Short-Finned Pilot Whale, *Globicephala macrorhynchus*: Three groups of pilot whales were observed off the coast of Dominica. On one occasion (sighting #72, 0.5 nautical miles south-west of Scott's Head, the southern tip of the island) they were observed in proximity to a mother-calf pair of sperm whales.

Melon-headed Whales, *Peponocephala electra*: This species was identified 6 times. In all cases, the animals were swimming quite quickly, making very short surfacings. Mother-calf pairs were observed on at least one occasion, but animals of various sizes were included in all sightings. On two occasions (sighting #80 and #81) we were unable to conclusively distinguish between pygmy killer whales and melon-headed whales. Melon-headed whales and pygmy killer whales overlap in range, and are approximately the same size, but can be distinguished from the false killer whale (*Pseudorca crassidens*) by being half the size (Reeves *et al.*, 2002). For these sightings (#73 – 78), we used the prominent, erect dorsal fin; the triangular narrowed head of the melon-headed whale to make the identification (Reeves *et al.*, 2002).

Pygmy Killer Whales, *Feresa attenuata*: Only identified once. This group of 6-12 individuals was observed approximately 1.5 nautical miles directly off of Woodbridge Bay, just north of the capital city of Roseau. They were observed in close proximity to a group of 4 sperm whales (4 adults and 1 calf). On two occasions (sighting #80 and #81) we were unable to conclusively distinguish the identification between pygmy killer whales and melon-headed whales. For this sighting, we used the rounded head as opposed to the triangular narrowed head of the melon-headed whale to make the identification, as well as, the well-defined dorsal cape and the fact that they are considerable less active and animated than most other oceanic dolphins (Reeves *et al.*, 2002).

Unidentified Dolphin: Of the 25 unidentified sightings, only one was noted with a probable species (Fraser's dolphins, sighting #50). Many of the others were either animals briefly seen at a distance or groups of animals seen at a few hundred meters while focused research was being completed on sperm whales.

Cuvier's Beaked Whale, *Ziphius cavirostris*: Identified only once, this group of three animals (1 mature male, 1 female, and 1 juvenile) surfaced 50 meters from the vessel and surfaced several times before disappearing.

Unidentified Beaked Whales: Beaked whales were seen on two other occasions, but species identifications could not be made. Sighting #84 was made 2 nautical miles off of the village of Salisbury, located a few miles south of the major northerly city of Portsmouth.

Table 1 – Details of small cetacean sightings off the leeward shore of the Commonwealth of Dominica during the 74 days of effort during the 2005 and 2006 field seasons. NA – not available.

Sighting Number	Date	Group Size			Position		Beaufort
		Minimum	Best	Maximum	Latitude (North)	Longitude (West)	
Atlantic Spotted Dolphin (<i>Stenella frontalis</i>)							
1	15-Jan-05	20	100	250	15.28	61.46	4
Pantropical Spotted Dolphin (<i>Stenella attenuata</i>)							
2	26-Jan-05	8	10	15	15.34	61.44	2
3	26-Jan-05	4	4		NA	NA	1
4	2-Feb-05	20	30	40	15.22	61.40	2
5	8-Feb-05	50	100	150	15.34	61.45	3
6	8-Feb-05	20	30	40	15.23	61.40	0
7	12-Feb-05	4	8	10	15.23	61.49	0
8	16-Feb-05	20	30	50	15.28	61.44	3
9	24-Feb-05	150	200	250	15.28	61.49	1
10	25-Feb-05	15	20	25	15.26	61.42	4
11	3-Mar-05	6	10	12	15.43	61.51	2
12	10-Mar-05	5	10	15	14.77	61.31	0
13	27-Mar-05	6		18	15.26	61.43	2
14	3-Apr-05	6	10	12	15.37	61.46	2
15	3-Apr-05	20	30	40	15.55	61.51	2
16	3-Apr-05	3	3		15.47	61.57	2
17	4-Apr-05	40	60	80	15.48	61.50	2
18	8-Apr-05	10	15	20	15.50	61.52	2
19	17-Jan-06		20		NA	NA	2
20	18-Jan-06	5	10	15	15.26	61.41	2
21	21-Jan-06	50	75	100	NA	NA	3
22	23-Jan-06	75	100	125	NA	NA	3

Table 1 – Details of small cetacean sightings off the leeward shore of the Commonwealth of Dominica during the 74 days of effort during the 2005 and 2006 field seasons continued from previous page. NA – not available.

23	24-Jan-06	25	50	75	NA	NA	NA
24	27-Jan-06	6	6	6	NA	NA	1
25	28-Jan-06	15	25	35	NA	NA	1
26	31-Jan-06	100	150	200	15.29	61.42	NA
27	6-Feb-06	100	150	200	NA	NA	NA
28	7-Feb-06	150	175	200	NA	NA	1
29	7-Feb-06	100	200	300	NA	NA	2
30	10-Feb-06	50	100	150	15.28	61.40	2
Spotted Dolphin sp?							
31	9-Feb-05		60		15.27	61.46	2
Fraser's Dolphin (<i>Lagenodelphis hosei</i>)							
32	27-Jan-05	NA	NA	NA	15.35	61.46	3
33	9-Feb-05		100		15.20	61.46	0
34	11-Apr-05	5	10	12	15.64	61.61	4
35	31-Jan-06	20	30	40	15.29	61.42	NA
36	6-Feb-06	40	50	80	NA	NA	NA
37	10-Feb-06	75	125	175	15.22	61.41	2
38	11-Feb-06	20	40	60	NA	NA	2
Rough-Toothed Dolphin (<i>Steno bredanensis</i>)							
39	3-Apr-05	15	20	25	15.36	61.53	2
Striped Dolphin (<i>Stenella coeruleoalba</i>)							
40	8-Mar-05	20	30	70	15.23	61.48	2
Common Bottlenose Dolphin (<i>Tursiops truncatus</i>)							
41	30-Jan-05	4	10		15.24	61.42	3
42	18-Jan-06	8	10	12	15.28	61.39	3
43	27-Jan-06	8	10	20	NA	NA	1
44	10-Feb-06	4	8	12	15.27	61.39	3
Unidentified Dolphin							
45	17-Jan-05	1	3	3	15.46	61.58	1
46	23-Jan-05	1	1	2	15.50	61.52	2
47	24-Jan-05	NA	NA	NA	15.37	61.45	2
48	25-Jan-05	4			15.56	61.52	1
49	26-Jan-05	2	2		15.37	61.45	2
50	26-Jan-05		50		15.36	61.44	2
51	30-Jan-05	10	10		15.31	61.44	0
52	15-Feb-05	5	10	15	15.29	61.43	3
53	16-Feb-05	2	5	8	15.28	61.47	3
54	23-Feb-05	1	1		15.23	61.39	3
55	23-Feb-05	10	40	50	15.20	61.42	0
56	24-Feb-05	5	10	20	15.37	61.52	3
57	24-Feb-05	5	10	20	15.37	61.51	2
58	25-Feb-05	10		25	15.34	61.44	3
59	27-Feb-05	1	1	1	15.35	61.48	2
60	27-Feb-05	30	30		15.37	61.47	3
61	2-Mar-05	1	1		15.37	61.47	3
62	3-Mar-05	3	3		15.25	61.41	2
63	8-Mar-05	2	3		15.25	61.50	1
64	10-Mar-05	2	5	10	14.23	61.22	1

Table 1 – Details of small cetacean sightings off the leeward shore of the Commonwealth of Dominica during the 74 days of effort during the 2005 and 2006 field seasons continued from previous page. NA – not available.

65	10-Mar-05	10	10		14.70	61.27	1
66	26-Mar-05		2		15.27	61.45	4
67	4-Apr-05	2	2		15.29	61.52	4
68	6-Apr-05	6	8	12	15.27	61.41	2
69	11-Apr-05	1	1		15.61	61.61	2
Short-finned Pilot Whale (<i>Globicephala macrorhynchus</i>)							
70	27-Jan-05	NA	NA	NA	15.35	61.46	3
71	22-Mar-05		20		15.37	61.52	3
72	1-Feb-06	40	50	100	NA	NA	NA
Melon-headed Whale (<i>Peponocephala electra</i>)							
73	2-Mar-05		20		15.36	61.50	3
74	2-Mar-05	NA	NA	NA	15.36	61.49	2
75	3-Mar-05	2	12		15.44	61.52	2
76	4-Mar-05	10	20	30	15.25	61.44	1
77	9-Apr-05	5	5		15.27	61.46	4
78	9-Apr-05	4	4		15.46	61.51	4
Pygmy Killer Whale (<i>Feresa attenuata</i>)							
79	9-Feb-06	6	10	12	NA	NA	NA
Melon-Headed Whale or Pygmy Killer Whale (unidentified)							
80	20-Jan-05	8	10	15	15.33	61.49	1
81	27-Feb-05	1	1		15.31	61.48	2
Cuvier's Beaked Whale (<i>Ziphius cavirostris</i>)							
82	6-Apr-05	3	3	3	15.26	61.46	0
Unidentified Beaked Whale							
83	20-Jan-05	1	1	1	15.32	61.49	1
84	4-Feb-06	2	2	2	NA	NA	3

CONCLUSIONS

Most of the sightings were made within the lee of the island and under good conditions (Bft 0-3). However, the directed research being accomplished on sperm whales during the 2005 season most likely affected the ability to sight other cetacean species in the surrounding area. This is evident in the fact that even large groups of delphinids went unidentified even in very calm conditions as priority was given to the ongoing research. During the 2006 season, aboard the whale watch vessel, sighting effort was more consistent and all species were approached for observation. Unfortunately, due to a lack of equipment, only positions relative to shore could be collected.

It is clear that the Caribbean is a species rich and diverse area. To improve estimates of abundance and distribution for small cetacean species, future research should focus on inter- and intra-island surveys. Meanwhile, it is important that all research activity in this area report their opportunistic sightings; so that a better overall picture can be produced through a synthesis of these sparse data sets. The establishment of a collaborative searchable database for the Caribbean region, similar to other regional Ocean Biogeographic Information System nodes like OBIS-Canada curated by the Centre for Marine Biodiversity and the Bedford Institute of Oceanography, would facilitate the gathering and sharing of small opportunistic data sets. OBIS is a project of the Census for Marine Life. There is currently no regional OBIS node for the Caribbean region, but the means and documentation are available online for a Caribbean based group to develop a regional OBIS node (OBIS, 2006).

ACKNOWLEDGEMENTS

Research in Dominica was carried out under a scientific research permit (SCR 013/05-02) provided by the Ministry of Agriculture and Environment of the Commonwealth of Dominica. We would like to thank all of *Balaena's* crew members; Andrew Amour for collaborating with us and the staff at the Anchorage Hotel and Dive Center for their kind support while in Dominica; and the crews of the various whale watching groups in Dominica for their cooperation. The project was supported by operating and equipment grants to H.W. from the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Whale and Dolphin Conservation Society, to Luke Rendell from the U.K. Natural Environment Research Council and S.G. was supported during the course of this study by an NSERC Postgraduate Scholarship (PGS-M).

REFERENCES

- Caldwell, D. K. and M. C. Caldwell. 1975. Dolphin and small whale fisheries of the Caribbean and West Indies: occurrence, history, and catch statistics - with special reference to the Lesser Antillean island of St. Vincent. *J. Fish. Res. Board Can.* 32:1105-1110.
- Caldwell, D. K., M. C. Caldwell and R. V. Walker. 1976. First records for Fraser's dolphin (*Lagenodelphis hosei*) in the Atlantic and the melon-headed whale (*Peponocephala electra*) in the western Atlantic. *Cetology* 25:1-4.
- Caldwell, D. K., M. C. Caldwell, W. F. Rathjen and J. R. Sullivan. 1971. Cetaceans from the Lesser Antillean island of St. Vincent. *Fish. Bull., U.S.* 69:303-312.
- Cardona-Maldonado, M. A. and A. A. Mignucci-Giannoni. 1999. Pygmy and dwarf sperm whales in Puerto Rico and the Virgin Islands with a review of *Kogia* in the Caribbean. *Carib. J. Sci.* 35:29-37.
- Debrot, A. O. and N. B. Barros. 1994. Additional cetacean records for the Leeward Dutch Antilles. *Mar. Mamm. Sci.* 10:359-368.
- Debrot, A. O., J. A. De Meyer and P. J. E. Desentje. 1998. Additional records and a review of the cetacean fauna for the Leeward Dutch Antilles. *Carib. J. Sci.* 34:204-210.
- Erdman, D. S. 1970. Marine mammals from Puerto Rico to Antigua. *J. Mammal.* 51:636-639.
- Erdman, D. S., J. Harms and M. M. Flores. 1973. Cetacean records from the northeastern Caribbean Sea. *Cetology* 17:1-14.
- Jefferson, T. A. and S. K. Lynn. 1994. Marine mammal sightings in the Caribbean Sea and Gulf of Mexico, summer 1991. *Carib. J. Sci.* 30:83-89.
- Mignucci-Giannoni, A. A. 1998. Zoogeography of cetaceans off Puerto Rico and the Virgin Islands. *Carib. J. Sci.* 34:173-190.
- Mignucci-Giannoni, A. A., S. L. Swartz, A. Martinez, C. M. Burks and W. A. Watkins. 2003. First records of the pantropical spotted dolphin (*Stenella attenuata*) for the Puerto Rican Bank, with a review of the species in the Caribbean. *Carib. J. Sci.* 39:381-392.
- Ocean Biogeographic Information System. Viewed March 15, 2006. Regional Obis Nodes. Last modified December 23, 2005. www.obis.org/obisrns
- Reeves, R. R., B. S. Stewart, P. J. Clapham and J. A. Powell. 2002. *National Audubon Society: Guide to Marine Mammals of the World*. Alfred A. Knopf, Inc., New York. 528pp.
- Roden, C. L. and K. D. Mullin. 2000. Sightings of cetaceans in the northern Caribbean Sea and adjacent waters, winter 1995. *Carib. J. Sci.* 36:280-288.
- Rosario-Delestre, R. J., M. A. Rodriguez-Lopez, A. A. Mignucci-Giannoni and J. G. Mead. 1999. New records of beaked whales (*Mesoplodon* spp.) for the Caribbean. *Carib. J. Sci.* 35:144-148.
- Swartz, S. L., T. Cole, M. A. McDonald, J. A. Hildebrand, E. M. Oleson, A. Martinez, P. J. Clapham, J. Barlow and M. L. Jones. 2003. Acoustic and visual survey of humpback whale (*Megaptera novaeangliae*) distribution in the eastern and southeastern Caribbean Sea. *Carib. J. Sci.* 39:195-208.
- Taruski, A. G. and H. E. Winn. 1976. Winter sightings of odontocetes in the West Indies. 22:1-22.
- van Bree, P. J. H. 1975. Preliminary list of the cetaceans of the southern Caribbean. *Stud. Fauna Curaçao Caribb. Isl.* 48:79-87.
- Watkins, W. A. and K. E. Moore. 1982. An underwater acoustic survey of sperm whales (*Physeter macrocephalus*) and other cetaceans in the southeast Caribbean. *Cetology* 46:1-7.

Watkins, W. A., M. A. Daher, A. Samuels and D. P. Gannon. 1997. Observations of *Peponocephala electra*, the melon-headed whale, in the southeastern Caribbean. *Carib. J. Sci.* 33:34-40.

FIGURES

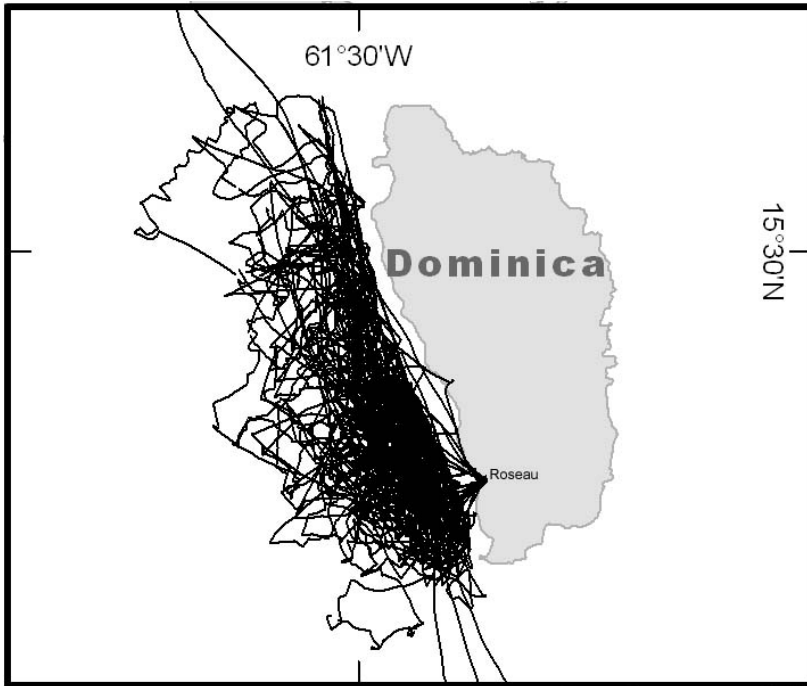


Figure 1 – GIS map of research sailing vessel during the 2005 field season