

# Observations of Sowerby's Beaked Whales, *Mesoplodon bidens*, in the Gully, Nova Scotia

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Hooker, Sascha K., and Robin W. Baird. 1999. Observations of Sowerby's Beaked Whales, *Mesoplodon bidens*, in the Gully, Nova Scotia. *Canadian Field-Naturalist* 113(2): 273-277.

Little is known about most members of the family Ziphiidae, the beaked whales. Sowerby's Beaked Whale (*Mesoplodon bidens*) is known from only a handful of sightings and strandings; few descriptions of group composition or surfacing behaviour are available. During 1997 and 1998, groups of Sowerby's Beaked Whales were observed in the Gully, a submarine canyon off eastern Canada, on four occasions. Sightings were in water depths of between 550 and 1500 m. Group size varied from 3 to 8-10 individuals. A mixed composition group was observed on one occasion, consisting of at least two female-calf pairs and two to four adult males (based on the presence of visible teeth and extensive scarring). Another group consisted of three quite heavily-scarred and therefore presumably male animals. Whales were observed to dive for between 12 and 28 minutes. Blows were either invisible or relatively inconspicuous. During all surfacings the long beak projected from the water well before the rest of the head or back was visible. While surfacing behaviour was generally unremarkable, one individual tail-slapped repeatedly.

Key Words: Sowerby's Beaked Whale, *Mesoplodon bidens*, Ziphiidae, surfacing behaviour, group composition, Nova Scotia.

Beaked whales (family Ziphiidae) are notoriously difficult to observe and identify at sea (International Whaling Commission 1989; Mead 1989), due to their tendency to live in deep (and thus, usually, offshore) waters, to dive for long periods of time, and because of similarities in appearance between species. Seven species of beaked whales have been recorded in the North Atlantic (Jefferson et al. 1993). The Northern Bottlenose Whale (*Hyperoodon ampullatus*) is probably the best known of these, primarily due to recent at-sea studies in the Gully, a submarine canyon off the coast of Nova Scotia (Whitehead et al. 1997a; b). Other North Atlantic beaked whales include Cuvier's Beaked Whale (*Ziphius cavirostris*) and the Mesoplodonts: Blainville's Beaked Whale (or Dense-beaked Whale, *Mesoplodon densirostris*), Sowerby's Beaked Whale (*Mesoplodon bidens*), True's Beaked Whale (*Mesoplodon mirus*), Gervais' Beaked Whale (*Mesoplodon europaeus*), and Gray's Beaked Whale (*Mesoplodon grayi*) (International Whaling Commission 1989; Jefferson et al. 1993). Like other species in the genus *Mesoplodon*, most of what is known about Sowerby's Beaked Whales comes from stranded individuals and a few scattered sightings, and relatively little is known about group composition or even details of surface behaviour (Sergeant and Fisher 1957; Lien et al. 1990; Ostrom et al. 1993). The group composition and behaviour of Sowerby's Beaked Whales sighted during two research trips studying Northern Bottlenose Whales in the Gully, a submarine canyon off Eastern Canada (Figure 1), are described here.

## Methods

Observations were made by the authors and by several observers from a 13 m diesel-powered auxiliary yacht, which was under power throughout the observation periods. Sowerby's Beaked Whales were sighted and positively identified on four occasions (Table 1). During the first encounter in 1997 and both encounters in 1998, no other cetaceans were present in the area, but the second sighting in 1997 was of Sowerby's Beaked Whales within 300 m of a group of three Northern Bottlenose Whales.

During the first encounter in 1997 (08:51, 8 July), a total of 87 photographic frames were taken (51 colour, 36 black-and-white). None were taken during the second sighting (18:40, 8 July) but observed field

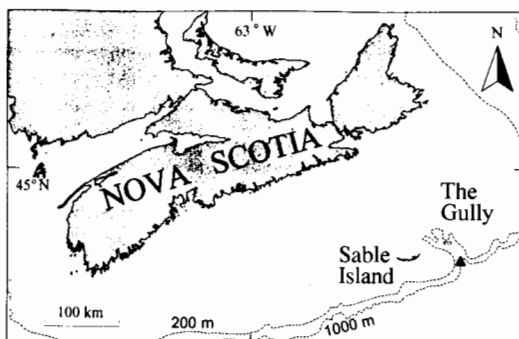


FIGURE 1. Map showing location of the Gully relative to mainland Nova Scotia (▲ denotes area of sightings).

TABLE 1. Sightings of Sowerby's Beaked Whales in the Gully, Nova Scotia.

Date	Time (W)	Position	Group Size	Depth (m)
8 July 1997	08:51 – 10:18	43°49.4' N; 58°57.6' W	8-10	1000
8 July 1997	18:40 – 18:46	43°54.6' N; 58°59.1' W	at least 3	1500
17 August 1998	11:06 – 11:58	43°45.9' N; 58°57.4' W	3	1250
20 August 1998	16:22 – 16:24	43°50.5' N; 58°59.4' W	4-5	550

characteristics were identical to those during the earlier encounter. Whales were tentatively identified in the field as *Mesoplodon bidens* and later confirmed from the photographs taken, which showed the long and uniformly grey beak (Figure 2; Jefferson et al. 1993). The whales were first sighted approximately 1000 m away, from the crow's nest vantage point (10 m up the mast). Their blows were relatively inconspicuous; the primary sighting cue was the silhouettes of the whales' backs in the fairly calm sea conditions (light winds, 30 cm sea swell and 15 cm chop). Sighting conditions were overcast (90% cloud cover) with good visibility. Sea surface temperature was 12.1°C; air temperature was 16.5°C.

In 1998, a total of 71 photographic frames (14 colour, 57 black-and-white) were taken during the first encounter (17 August), while only 8 frames (all black-and-white) were taken during the second encounter (20 August). Sighting characteristics of the first encounter were similar to those in 1997: whales were first seen 700 m away in calm sea conditions (light winds, 40 cm swell and 15 cm chop) with an overcast sky and good visibility. The second encounter was in slightly heavier sea conditions (1 m swell and 10 cm chop with 60% cloud cover). Whales were first observed only 200 – 300 m from the research vessel but dove as the vessel approached to within 50 m and were not seen again. Sea surface temperature for both sightings in 1998 was 20.5°C; air temperature was 22°C.

### Observations

Sightings varied in depth from 550 to 1500 m (Table 1). Sightings were all in the same general location (within a 16 km by 3 km area) on the south-west edge of the Gully submarine canyon (Figure 1). During all encounters, animals usually surfaced within a couple of body lengths from each other, breathing within 4 to 5 seconds of each other (Figure 2a). The surfacing appearance of these whales was very different to that of Northern Bottlenose Whales. On surfacing, the beak appeared first, at an angle of 30-45° to the water surface, then dipped into the water just before the animals exhaled and the slate-grey back and dorsal fin appeared. Carlström et al. (1997) describe similar surfacing behaviour for two *Mesoplodon bidens* observed in the Norwegian Sea.

During the first encounter (8 July 1997), a total of 8-10 whales were present. The presence of so many

individuals prevented reliable estimation of dive times. However, all animals were submerged between 09:22 and 09:50, so individual dives were a minimum of 28 min. For the majority of the sighting, individuals appeared to be milling in the same general area, although they moved continuously at 1 to 2 knots at the surface. At 10:05, one whale tail-slapped a number of times.

Sizes of whales observed were estimated as ranging from 2 - 4.5 m. Based on the relative size of individuals (noted both in the field and from photographs, Figure 2b), at least two calves were present, each associating with different adult-sized animals. From examination of photographs, two individuals were positively identified as adult males (Figure 2c), with erupted teeth visible (Lien and Barry 1990). Four whales (including the two known males) showed long linear scars on their backs and sides. Such scarring has previously been documented solely on adult males (Heyning 1984; MacLeod 1998). Neither of the adults associated with calves had such scars. On the basis of this, at least four adult males, two adult females and two calves were present. One of the known males was missing a large chunk out of the top of its dorsal fin (Figure 2d).

During the third encounter (17 August 1998), three individuals were present. The sizes of these animals were estimated in the field as approximately 4.5 m. Photographs taken showed a fairly substantial amount of linear scarring on all three individuals, which were therefore probably males (Heyning 1984; MacLeod 1998). During the encounter, four surfacing bouts were observed. Surfacing bouts were generally 1-2 min duration, during which time the animals would surface 6 to 8 times. The whales appeared to have no fixed direction of travel during surfacing bouts and would change direction up to 180° between surfacings. The dive times between these surfacing bouts were 14 min, 14 min and 12 min. The horizontal distance travelled during two of these dives was measured (using the research vessel's GPS) as 600 m and 750 m. The final surfacing bout was 7 min long, after which the whales were not observed again.

The last encounter (20 August 1998) was estimated in the field to be of a group of 3-4 animals of approximately 4 - 4.5 m length and one calf of 2.5 - 3 m length. Photographs taken during this encounter showed that at least one animal in this group had a



FIGURE 2. Sowerby's Beaked Whales seen in the Gully, 8 July 1997: (a) typical surfacing appearance; (b) female and calf (right); (c) two adult males (foreground), erupted while tip of tooth visible (under magnification) in the centre of each jaw; (d) adult male with M-shaped dorsal fin. Photographs (a) (c) and (d) by R.W. Baird; (b) by B. Müller.

small amount of linear scarring, while the adult-calf pair had no visible scarring.

### Discussion

The group of 8-10 individuals observed on 7 July 1997 is larger than has been documented for any of the strandings (up to 6 individuals, Lien et al. 1990) or sightings (up to 5 individuals, Marion et al. 1988) in the western North Atlantic. However, such large groups have been seen elsewhere in the North Atlantic. A group of 8-10 individuals was sighted northeast of the Shetland Islands (Benjaminsen et al. 1976; Christensen 1977) and a group of about ten individuals was sighted in the Norwegian Sea (Øynes 1974). The confirmed mixed-sex composition of this group (and the probable mixed sex composition of the group observed on 20 August 1998) contradict suggestions that *Mesoplodon bidens* groups may be segregated by size, age or sex (Lien et al. 1990). However, since we could not confirm the presence of immature animals, we cannot refute the possibility that these may form separate groups or that at times such larger groups may separate. In fact, it is likely that the group of three animals seen on 17 August 1998 were all males. It is interesting to note that all reported records of sightings and strandings of Sowerby's Beaked Whales in the western North Atlantic have occurred between the months of July and October (Lien and Barry 1990). However, given the small sample size and likelihood of low observer effort (both at sea and monitoring strandings) during winter, this may be an artefact of effort.

The linear scarring observed on these animals (Figure 2d) is consistent with that shown by Heyning (1984), but appeared less extensive than that seen for some other *Mesoplodon* species. Heyning (1984) discusses the mechanism by which such scars are caused by intra-specific aggression between males. The presence of single linear rakes observed on Sowerby's Beaked Whales is consistent with this hypothesis, since the teeth of male Sowerby's Beaked Whales are located far back in the jaw, thus rendering it impossible to cause scarring with both teeth at once. However, it cannot be determined whether some of the scarring observed, particularly the missing dorsal fin tip (Figure 2d), could have been caused by another factor (possibly a shark, fishing gear or ship collision).

These encounters provide the first descriptions of at-sea behaviour of Sowerby's Beaked Whales in Canadian waters. There have only been six prior reports of this species in Canada (Lien and Barry 1990). Furthermore, there have previously been only three detailed reports of Sowerby's Beaked Whale sightings from the western North Atlantic, two of which were observed inshore in shallow water just prior to stranding (Dix et al. 1986; Lien et al. 1990), while the other was a sighting of three adults and

two calves in the Hydrographer Canyon region, offshore of New Jersey (Marion et al. 1988). The lack of time spent at the surface by these whales, their fairly inconspicuous blows, and their distribution in offshore waters, are all probably responsible for the paucity of sightings. In the Gully, over 1800 hours of effort have been spent searching for whales (Hooker et al. *in press*) and these were the first confirmed identifications of Sowerby's Beaked Whales, although unidentified *Mesoplodon* species have been seen at least four times (H. Whitehead, personal communication). By comparison, Northern Bottlenose Whales are seen in the Gully at least daily (weather permitting), and on some days numerous times, so it is clear that despite the difficulties in observing Sowerby's Beaked Whales at sea, they should be considered quite uncommon in the Gully area.

### Acknowledgments

Many thanks to Bob Pitman who looked at some of the slides and confirmed their identification as Sowerby's Beaked Whales. These sightings took place during research on Northern Bottlenose Whales in the Gully by Hal Whitehead's Research Group, Dalhousie University. Funding for this work is provided by a variety of sources, including the Natural Sciences and Engineering Research Council of Canada (NSERC), the Whale and Dolphin Conservation Society, World Wildlife Fund Canada, and the Canadian Federation of Humane Societies. Many thanks to crew members who participated in the research, particularly B. Carter and A. Gorgone. SKH was supported by a Canadian Commonwealth Scholarship, and RWB was supported by an NSERC post-doctoral fellowship. The manuscript benefitted from comments by J. Christal, S. Gowans, H. Whitehead, and two anonymous reviewers.

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Received 8 May 1998

Accepted 23 September 1998