

NORTHERN BOTTLENOSE WHALE (*Hyperoodon ampullatus*): Western North Atlantic Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Northern bottlenose whales are characterized as extremely uncommon or rare in waters of the U.S. Atlantic Exclusive Economic Zone (EEZ). The two sightings of three individuals constituted less than 0.1% of the 11,156 cetacean sightings in the 1978-82 CETAP surveys. Both sightings were in the spring, along the 2,000-m isobath (CETAP 1982). In 1993 and 1996, two sightings of single animals, and in 1996, a single sighting of six animals (one juvenile), were made during summer shipboard surveys conducted along the southern edge of Georges Bank (NMFS 1993; 1996). More recent sightings of northern bottlenose whales are shown in Figure 1.

Northern bottlenose whales are distributed in the North Atlantic from Nova Scotia to about 70°N in the Davis Strait, along the east coast of Greenland to 77°N and from England, Norway, Iceland and the Faroe Islands to the south coast of Svalbard. It is largely a deep-water species and is very seldom found in waters less than 2,000 m deep (Mead 1989; Whitehead and Hooker 2012).

There are two main centers of bottlenose whale distribution in the western North Atlantic, one in the area called "The Gully" just north of Sable Island, Nova Scotia, and the other in Davis Strait off northern Labrador (Reeves *et al.* 1993). Studies at the entrance to the Gully from 1988 to 1995 identified 237 individuals and estimated the local population size at about 230 animals (95% C.I. 160-360) (Whitehead *et al.* 1997). Wimmer and Whitehead (2004) identified individuals moving between several Scotian Shelf canyons more than 100 km from the Gully. Whitehead and Wimmer (2005) estimated a population of 163 animals (95% confidence interval 119-214), with no statistically significant population trend. O'Brian and Whitehead (2013) applied mark-recapture techniques to estimate the current population size of northern bottlenose whales on the Scotian Shelf as 143 animals (95% CI: 95 to 156 animals). These individuals are believed to be year-round residents and all age and sex classes are present (Gowans *et al.* 2000; Hooker *et al.* 2002). Mitchell and Kozicki (1975) reported stranding records in the Bay of Fundy and as far south as Rhode Island. Lucas and Hooker (2000) documented three stranded individuals on Sable Island, Nova Scotia, Canada.

Several genetic studies have been undertaken in the waters off Nova Scotia (Dalebout *et al.* 2001; Hooker *et al.* 2001a; Hooker *et al.* 2001b; Hooker *et al.* 2002; Dalebout *et al.* 2006). Dalebout *et al.* (2006) found distinct differences in the nuclear and mitochondrial markers for the small populations of bottlenose whales of the Gully, Labrador and Iceland. Stock identity is currently unknown for those individuals inhabiting/visiting U.S. waters.

POPULATION SIZE

The total number of northern bottlenose whales off the eastern U.S. coast is unknown.

Minimum Population Estimate

Present data are insufficient to calculate a minimum population estimate.

Current Population Trend

There are insufficient data to determine the population trends for this species.

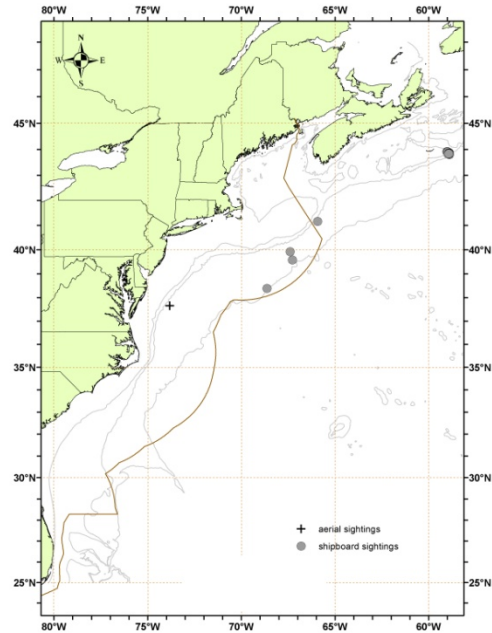


Figure 1: NEFSC and SEFSC shipboard and aerial surveys during the summers of 1998, 1999, 2002, 2004, 2006 and 2007. Isobaths are the 100-m, 1000-m and 4000-m depth contours.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are unknown for this stock. For purposes of this assessment, the maximum net productivity rate was assumed to be 0.04. This value is based on theoretical modeling showing that cetacean populations may not grow at rates much greater than 4% given the constraints of their reproductive life history (Barlow *et al.* 1995).

POTENTIAL BIOLOGICAL REMOVAL

Potential Biological Removal (PBR) is the product of minimum population size, one-half the maximum productivity rate, and a “recovery” factor (MMPA Sec. 3. 16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is unknown. The maximum productivity rate is 0.04, the default value for cetaceans. The “recovery” factor, which accounts for endangered, depleted, threatened stock, or stocks of unknown status relative to optimum sustainable population (OSP) is assumed to be 0.5 because this stock is of unknown status. PBR for the western North Atlantic northern bottlenose whale is unknown because the minimum population size cannot be determined.

ANNUAL HUMAN-CAUSED MORTALITY

No mortalities have been reported in U.S. waters. A fishery for northern bottlenose whales existed in Canadian waters during both the 1800s and 1900s. Its development was due to the discovery that bottlenose whales contained spermaceti. A Norwegian fishery expanded from east to west (Labrador and Newfoundland) in several episodes. The fishery peaked in 1965. Decreasing catches led to the cessation of the fishery in the 1970s, and provided evidence that the population was depleted. A small fishery operated by Canadian whalers from Nova Scotia operated in the Gully, and took 87 animals from 1962 to 1967 (Mitchell 1977; Mead 1989). Canadian Department of Fisheries and Oceans (2009) had 8 At-Sea Observer program reports of entanglements of northern bottlenose whales in Atlantic Canada and one entanglement in the Gully observed by Dalhousie University since the early 1980s. These entanglements were in fisheries using benthic and pelagic long-lines and otter-trawls. (DFO 2009).

Fishery Information

The only documented U.S. fishery interaction with northern bottlenose whales occurred in 2001 in the U.S. Northeast Distant Water experimental pelagic longline fishery in Canadian waters. The animal was released alive, but considered a serious injury (Garrison 2003).

Other Mortality

In 2006, two northern bottlenose whales stranded alive in Delaware Bay. This mother-calf pair was first reported stranded in New Jersey, where volunteers pushed them off the beach. The two animals re-stranded in Delaware, where the calf was encouraged back into the water and was last seen swimming, but the mother stranded dead. This is believed to be the southernmost U.S. stranding record for this species.

STATUS OF STOCK

The status of northern bottlenose whales relative to OSP in U.S. Atlantic EEZ is unknown; however, the depletion in Canadian waters in the 1970s may have impacted U.S. distribution and may be relevant to current status in U.S. waters. The Canadian Scotian Shelf population was designated by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as of Special Concern. Its status was uplisted to Endangered in November 2002, based on its small population and the potential threat posed by oil and gas development in and around the population’s prime habitat (COSEWIC 2002). This population was listed under the Canadian Species at Risk Act in 2006 (DFO 2007). This species is not listed as threatened or endangered under the U.S. Endangered Species Act. There are insufficient data to determine population trends for this species. The total level of U.S. fishery-caused mortality and serious injury is unknown. Because this stock has a marginal occurrence in U.S. waters and there are no documented takes in U.S. waters, this stock has been designated as not strategic.

REFERENCES CITED

- Barlow, J., S. L. Swartz, T. C. Eagle and P. R. Wade. 1995. U.S. Marine Mammal Stock Assessments: Guidelines for preparation, background, and a summary of the 1995 assessments. NOAA Tech. Memo. NMFS-OPR-6. 73 pp.
- CETAP. 1982. A characterization of marine mammals and turtles in the mid- and north Atlantic areas of the U.S. outer continental shelf, final report. #AA551-CT8-48. University of Rhode Island, Cetacean and Turtle Assessment Program. Bureau of Land Management, Washington, DC. 576 pp.

- COSEWIC. 2002. COSEWIC assessment and update status report on the northern bottlenose whale *Hyperoodon ampullatus* (Scotian shelf population) in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa. Vi + 22 pp.
- Dalebout, M.L., Hooker, S.K. and I. Christensen. 2001. Genetic diversity and population structure among northern bottlenose whales, *Hyperoodon ampullatus*, in the western North Atlantic Ocean. *Can. J. Zool.* 79(3): 478-484.
- Dalebout, M.L., D.E. Ruzzante, H. Whitehead and N. Oien. 2006. Nuclear and mitochondrial markers reveal distinctiveness of a small population of bottlenose whales, *Hyperoodon ampullatus*, in the western North Atlantic. *Mol. Ecol.* 15: 3115-3129.
- DFO. 2007. Recovery potential assessment of northern bottlenose whale, Scotian Shelf population. Dept. of Fisheries and Oceans. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2007/011.
- DFO. 2009. Recovery strategy for the Northern Bottlenose Whale (*Hyperoodon ampullatus*), Scotian Shelf population, in Atlantic Canadian waters [Proposed]. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, vi+60 pp. http://publications.gc.ca/collections/collection_2009/mpo-dfo/En3-4-66-2009E.pdf
- Garrison, L.P. 2003. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2001-2002. NOAA Tech. Memo. NMFS-SEFSC-515. 52 pp.
- Gowans, S., H. Whitehead, J.K. Arch and S.K. Hooker. 2000. Population size and residency patterns of northern bottlenose whales (*Hyperoodon ampullatus*) using the Gully, Nova Scotia. *J. Cetacean Res. Manage.* 2(3): 201-210.
- Hooker, S.K., R.W. Baird, S. Al-Omari, S. Gowans and H. Whitehead. 2001a. Behavioral reactions of northern bottlenose whales (*Hyperoodon ampullatus*) to biopsy darting and tag attachment procedures. *Fish. Bull.* 99(2): 303-308.
- Hooker, S.K., S.J. Iverson, P. Ostrom and S.C. Smith. 2001b. Diet of northern bottlenose whales inferred from fatty-acid and stable-isotope analyses of biopsy samples. *Can. J. Zool.* 79(8): 1442-1454.
- Hooker, S.K., H. Whitehead, S. Gowans and R.W. Baird. 2002. Fluctuations in distribution and patterns of individual range use of northern bottlenose whales. *Mar. Ecol. Prog. Ser.* 225: 287-297.
- Lucas, Z.N. and S.K. Hooker. 2000. Cetacean strandings on Sable Island, Nova Scotia, 1970-1998. *Can. Field-Nat.* 114(1): 46-61.
- Mead, J.G. 1989. Bottlenose whales. Pages 321-348 in: S.H. Ridgway and R. Harrison, (eds.) Handbook of marine mammals, Volume 4: River dolphins and the larger toothed whales. Academic Press, New York.
- Mitchell, E.D. 1977. Evidence that the northern bottlenose whale is depleted. *Rep. Int. Whal. Comm.* 27: 195-203.
- Mitchell, E.D. and V.M. Kozicki. 1975. Autumn stranding of a northern bottlenose whale (*Hyperoodon ampullatus*) in the Bay of Fundy. *J. Fish. Res. Board Can.* 32: 1019-1040.
- NMFS. 1993. Cruise results, NOAA ship DELAWARE II, Cruise No. DEL 93-06, Marine Mammal Survey. National Marine Fisheries Service. NOAA NMFS NEFSC, Woods Hole Laboratory, Woods Hole, MA. 5 pp.
- NMFS. 1996. Cruise results, R/V ABEL-J, Cruise No. AJ-9601, Part III, Marine Mammal Survey. National Marine Fisheries Service. NOAA NMFS NEFSC, Woods Hole Laboratory, Woods Hole, MA. 7 pp.
- O'Brien, K. and H. Whitehead. 2013. Population analysis of endangered northern bottlenose whales on the Scotian Shelf seven years after the establishment of a Marine Protected Area. *Endang. Sp. Res.* 21(3):273-284.
- Reeves, R.R., E. Mitchell and H. Whitehead. 1993. Status of the northern bottlenose whale, *Hyperoodon ampullatus*. *Can. Field-Nat.* 107: 490-508.
- Wade, P.R. and R.P. Angliss. 1997. Guidelines for assessing marine mammal stocks: Report of the GAMMS Workshop April 3-5, 1996, Seattle, Washington. NOAA Tech. Memo. NMFS-OPR-12. 93 pp.
- Whitehead, H., S. Gowans, A. Faucher and S. W. McCarrey. 1997. Population analysis of northern bottlenose whales in the Gully, Nova Scotia. *Mar. Mamm. Sci.* 13(2): 173-185.
- Whitehead, H. and T. Wimmer. 2005. Heterogeneity and the mark-recapture assessment of the Scotian Shelf population of northern bottlenose whales (*Hyperoodon ampullatus*). *Can. J. Fish. Aquat. Sci.* 62(11): 2573-2585.
- Whitehead, H. and S.K. Hooker. 2012. Uncertain status of the northern bottlenose whale *Hyperoodon ampullatus*: population fragmentation, legacy of whaling and current threats. *Endang. Sp. Res.* 19:47-61.
- Wimmer, T. and H. Whitehead. 2004. Movements and distribution of northern bottlenose whales, *Hyperoodon ampullatus*, on the Scotian Slope and in adjacent waters. *Can. J. Zool.* 82(11): 1782-1794.