

WHITE-BEAKED DOLPHIN (*Lagenorhynchus albirostris*): Western North Atlantic Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The dolphin genus *Lagenorhynchus* is currently proposed to be revised (Vollmer *et al.* 2019); though until the revision is officially accepted, the previous definitions will be used. White-beaked dolphins are the more northerly of the two species of *Lagenorhynchus* in the northwest Atlantic (Leatherwood *et al.* 1976). The species is found in waters from southern New England to southern Greenland and Davis Straits (Leatherwood *et al.* 1976; CETAP 1982), across the Atlantic to the Barents Sea and south to at least Portugal (Reeves *et al.* 1999). Differences in skull features indicate that there are at least two separate stocks, one in the eastern and one in the western North Atlantic (Mikkelsen and Lund 1994). No genetic analyses have been conducted to corroborate this stock structure.

In waters off the northeastern U.S. coast, white-beaked dolphin sightings are concentrated in the western Gulf of Maine and around Cape Cod (CETAP 1982). The limited distribution of this species in U.S. waters has been attributed to opportunistic feeding (CETAP 1982). Prior to the 1970's, white-sided dolphins (*L. acutus*) in U.S. waters were found primarily offshore on the continental slope, while white-beaked dolphins were found on the continental shelf. During the 1970's, there was an apparent switch in habitat use between these two species. This shift may have been a result of the increase in sand lance in the continental shelf waters (Katona *et al.* 1993; Kenney *et al.* 1996).

POPULATION SIZE

The best abundance estimate for the western North Atlantic white-beaked dolphin is 536,016 (CV=0.31), an estimate derived from aerial survey data collected in during the Canadian Northwest Atlantic International Sightings Survey (NAISS) survey in the summer of 2016.

As recommended in the GAMMS Workshop Report (Wade and Angliss 1997), estimates older than eight years are deemed unreliable and should not be used for PBR determinations.

Recent surveys and abundance estimates

An abundance estimate of 530,538 (CV=0.39; Table 1) white-beaked dolphins in Atlantic Canadian waters was generated from an aerial survey conducted by the Department of Fisheries and Oceans, Canada (DFO). This survey covered Atlantic Canadian shelf and shelf break waters extending from the northern tip of Labrador to the U.S border off southern Nova Scotia in August and September of 2016 (Lawson and Gosselin 2018). A total of 29,123 km were flown over the Gulf of St. Lawrence/Bay of Fundy/Scotian Shelf strata using two Cessna Skymaster 337s and 21,037 km were flown over the Newfound/Labrador strata using a DeHavilland Twin Otter. The estimate was derived from the Skymaster data using single team multi-covariate distance sampling with left truncation (to accommodate the

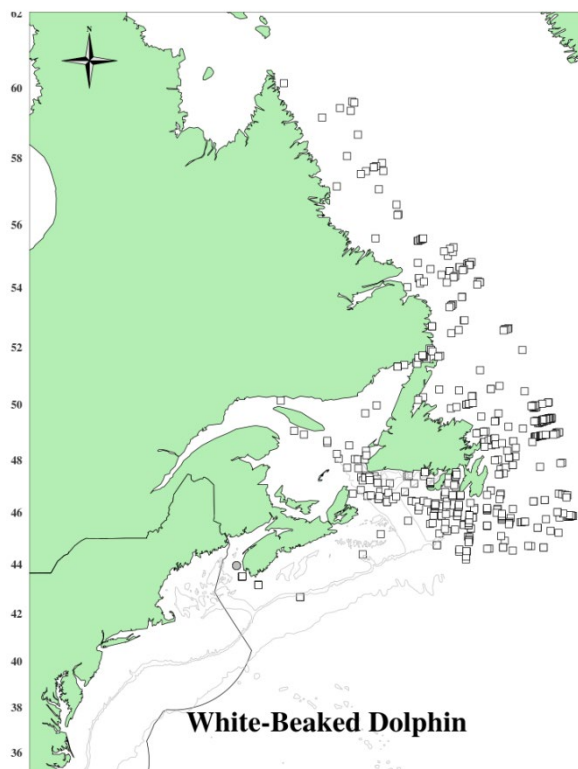


Figure 1. Distribution of white-beaked dolphin sightings from NEFSC and SEFSC shipboard and aerial surveys during the summers of 1998, 1999, 2002, 2004 and 2006, 2011 and 2016 and DFO's 2007 TNASS and 2016 NAISS surveys. Isobaths are the 100m, 200m, 1000m and 4000m depth contours.

obscured area under the plane) where size-bias was also investigated. The Otter-based perception bias correction, which used double platform mark-recapture methods, was applied to all platform estimates. An availability bias correction factor, which was based on published records of the cetaceans' surface intervals, was also applied.

No white-beaked dolphins were seen on the summer 2016 U.S. surveys.

Table 1. Summary of abundance estimates for western North Atlantic white-beaked dolphins. Month, year, and area covered during each abundance survey, and resulting abundance estimate (N_{best}) and coefficient of variation (CV).

Month/Year	Area	N_{best}	CV
Aug–Sep 2016	Bay of Fundy/Scotian Shelf	5,478	0.495
Aug–Sep 2016	Newfoundland/Labrador	530,538	0.314
Aug–Sep 2016	Canadian Atlantic waters (COMBINED)	536,016	0.31

Minimum Population Estimate

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log- normally distributed best abundance estimate. This is equivalent to the 20th percentile of the log-normal distribution as specified by Wade and Angliss (1997). The best estimate of abundance for the western North Atlantic stock of white-beaked dolphins is 536,016 (CV=0.31). The minimum population estimate for these white-beaked dolphins is 415,344.

Current Population Trend

There are insufficient data to determine population trends for this species. The change in abundance estimates between the DFO 2007 and 2016 aerial surveys in Canadian waters could not have resulted from reproduction alone so immigration from other areas of the north Atlantic likely occurred.

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 (Wade and Angliss 1997). The minimum population size of white-beaked dolphins is 415,344. The maximum productivity rate is 0.04, the default value for cetaceans. The “recovery” factor, which accounts for endangered, depleted, threatened stocks, 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 white-beaked dolphin is 4,153.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There are no documented reports of fishery-related mortality or serious injury to this stock in the U.S. EEZ.

Fishery Information

Because of the absence of observed fishery-related mortality and serious injury to this stock in the U.S. and Canadian waters, no fishery information is provided.

Other Mortality

Recent white-beaked dolphin strandings on the U.S. Atlantic coast are documented in Table 2 (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 23 October 2018). Human interaction was indicated in 2 records during this period, one due to plastic ingestion as well as buckshot found in the

blubber (healed) and one due to post-mortem carcass handling. Neither of these were classified as fishery interactions.

Table 2. Summary of number of stranded white-beaked dolphins during 2013 to 2017, by year and area within U.S. and Canada.

Area	Year					Total
	2013	2014	2015	2016	2017	
Massachusetts	0	4	0	0	0	4
North Carolina ^a	0	0	1	0	0	1
TOTAL US	0	4	0	1	0	5
Nova Scotia ^b	0	2	0	0	0	2
Newfoundland/Labrador ^c	0	68	6	0	11	85
GRAND TOTAL	2	3	0	1	1	7

a. North Carolina stranding was a new southerly record for this species (Thayer *et al.* 2018).
b. Data supplied by Nova Scotia Marine Animal Response Society (pers. comm.).
c. Data supplied by the Newfoundland and Labrador Whale Release and Strandings Program (Ledwell and Huntington 2013, 2014, 2015, 2017, 2018). Includes animals released alive.

HABITAT ISSUES

The chronic impacts of contaminants (polychlorinated biphenyls [PCBs] and chlorinated pesticides [DDT, DDE, dieldrin, etc.]) on marine mammal reproduction and health are of concern (e.g., Jepson *et al.* 2016; Hall *et al.* 2018), but research on contaminant levels for the western north Atlantic stock of white-beaked dolphins is lacking.

Climate-related changes in spatial distribution and abundance, including poleward and depth shifts, have been documented in or predicted for plankton species and commercially important fish stocks (Nye *et al.* 2009; Pinsky *et al.* 2013; Poloczanska *et al.* 2013; ; Hare *et al.* 2016; Grieve *et al.* 2017; Morley *et al.* 2018) and cetacean species (e.g., MacLeod 2009; Sousa *et al.* 2019). There is uncertainty in how, if at all, the distribution and population size of this species will respond to these changes and how the ecological shifts will affect human impacts to the species.

STATUS OF STOCK

The status of white-beaked dolphins, relative to OSP, in U.S. Atlantic coast waters is unknown. The species is not listed as threatened or endangered under the Endangered Species Act. There are insufficient data to determine population trends for this species. The total documented U.S. fishery-related mortality and serious injury for this stock (0) is less than 10% of the calculated PBR (4.153) and, therefore, is considered to be insignificant and at zero mortality and serious injury rate. This is a non-strategic stock because the 2013-2017 estimated average annual human related mortality does not exceed PBR.

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