BOTTLENOSE DOLPHIN (*Tursiops truncatus*): Western North Atlantic Offshore Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

There are two hematologically and morphologically distinct bottlenose dolphin ecotypes (Duffield et al. 1983; Duffield 1986) which correspond to a shallow, warm water ecotype and a deep, cold water ecotype; both ecotypes have been shown to inhabit waters in the western North Atlantic Ocean (Hersh and Duffield 1990).

Bottlenose dolphins which had stranded alive in the western North Atlantic in areas with direct access to deep oceanic waters had hemoglobin profiles which matched that of the deep, cold water ecotype (Hersh and Duffield 1990). Hersh and Duffield (1990) also described morphological differences between the deep, cold water ecotype dolphins and dolphins with hematological profiles matching the shallow, warm water ecotype which had stranded in the Indian/Banana River in Florida. Based on the distribution of sightings during ship-based surveys (Fig. 1) and survey personnel observations (NMFS unpublished data), the western North Atlantic offshore stock is believed to consist of bottlenose dolphins corresponding to the hematologically and morphologically distinct deep, cold water ecotype.

Extensive aerial surveys in 1979-1981 indicated that the stock extended along the entire continental shelf break from Georges Bank to Cape Hatteras during spring and summer (CeTAP 1982; Kenney 1990). The distribution of sightings contracted towards the south in the fall and the central portion of the survey area was almost devoid of sightings in the winter, although there were still sightings as far north as the southern edge of Georges Bank. The offshore stock is concentrated along the continental shelf break in waters of depths > 25 m and extends beyond the continental shelf into continental slope waters in lower concentration (Fig. 1) (Kenney 1990). No distribution or abundance data are available from Canadian waters. Dolphins with characteristics of the offshore type have been stranded as far south as the Florida Keys, but there are no abundance or distribution estimates available for this stock in U.S. Exclusive Economic Zone (EEZ) waters south of Cape Hatteras.

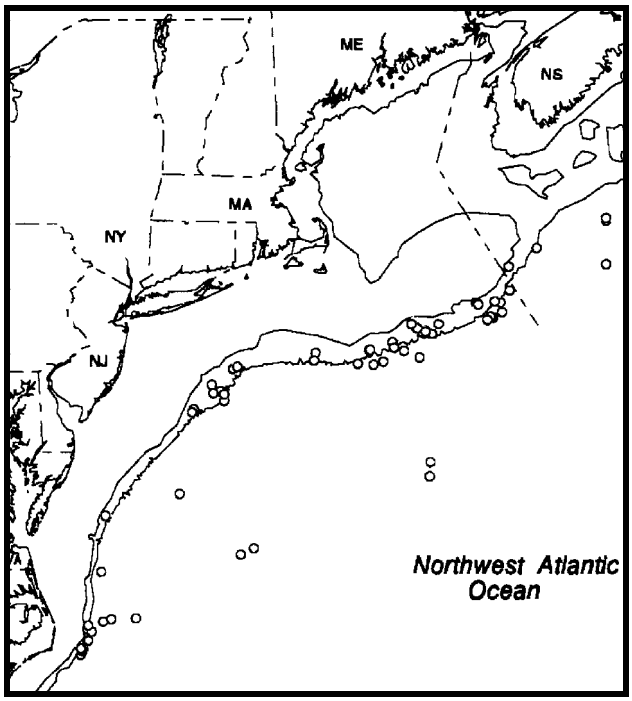

Figure 1. *Distribution of bottlenose dolphin sightings from NEFSC shipboard surveys during the summer in 1990-1994. Isobaths are at 100 m and 1,000 m.*

POPULATION SIZE

The total number of bottlenose dolphins off the Atlantic U.S. coast is unknown. Historical seasonal abundance estimates are available from an aerial survey program conducted in the continental shelf waters between Cape Hatteras, North Carolina, and Nova Scotia from 1978 to 1982 (CeTAP 1982). The peak average estimated abundance of the offshore stock occurred in the fall and was estimated to be 7,696 with coefficient of variation (CV) = 0.58.

Recent abundance was estimated using data collected during an autumn 1991 aerial line transect survey in the CeTAP study area (NMFS unpublished data), which included an interplatform experiment between a Twin Otter and an AT-11 aircraft, and from three fine-scale ship surveys (August 1990, June-July 1991, and June-July 1993) conducted in continental shelf edge and deeper oceanic waters (NMFS unpublished data).

The three shipboard surveys covered relatively small portions of the northeastern U.S. EEZ. The abundance estimate from the August 1990 survey, conducted principally along the Gulf Stream north wall between Cape Hatteras and Georges Bank, was 2,903 bottlenose dolphins (CV = 0.66). The 1991 survey estimate, based principally on

sighting effort conducted between the 200 and 2,000 meter isobaths from Cape Hatteras to Georges Bank was 5,990 bottlenose dolphins (CV = 0.39). The estimate for the 1993 survey, conducted principally between the 200 and 2,000 meter isobaths from the southern edge of Georges Bank, across the Northeast Channel to the southwestern edge of the Scotian Shelf was 716 bottlenose dolphins (CV = 0.44). Although the 1990-1993 surveys did not sample the same areas or encompass the entire bottlenose dolphin habitat, they did focus on segments of known or suspected high-use habitats off the northeastern U.S. coast. The collective 1990-93 data suggest that, seasonally, at least several thousand bottlenose dolphins are occupying these waters; however, survey coverage to date is not judged adequate to provide a definitive estimate of bottlenose dolphin abundance in the western North Atlantic because of the limited scope of the shipboard surveys.

The 1991 aerial survey sightings during both the AT-11 and Twin Otter surveys were almost exclusively in the continental shelf edge waters. Data from both survey platforms was used in estimating stock size because the independent abundance estimates were not significantly different and coverage of continental shelf edge waters by both platforms was similar. The sighting data were analyzed using standard line transect perpendicular sighting distance analysis methods (Buckland et al. 1993) and the computer program DISTANCE (Laake et al. 1993). Bottlenose dolphin abundance was not significantly different between survey platforms and was estimated at 12,760 dolphins (CV = 0.84) from the AT-11 aircraft and 12,090 dolphins (CV = 0.38) from the Twin Otter aircraft. The inverse variance-weighted mean of these independent abundance estimates was used in calculating the minimum population estimate and was 12,194 bottlenose dolphins (CV = 0.35) (NMFS unpublished data).

Minimum Population Estimate

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normal distributed mean abundance estimate of 12,194 bottlenose dolphins (CV = 0.35) from the 1991 aerial surveys (NMFS unpublished data). This is equivalent to the 20th percentile of the log-normal distribution as specified by NMFS (Anon. 1994). The minimum population estimate is 9,195 bottlenose dolphins.

Current Population Trend

The data are insufficient to determine population trends. The recent aerial survey estimates are not comparable to the CeTAP estimates because the recent data are from a single survey conducted during August-October while the CeTAP estimates were based on data pooled over several years of seasonal surveys.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are not known for this stock. The maximum net productivity rate was assumed to be 0.04 for purposes of this assessment. This value is based on theoretical calculations showing that cetacean populations may not generally grow at rates much greater than 4% given the constraints of their reproductive life history (Reilly and Barlow 1986).

POTENTIAL BIOLOGICAL REMOVAL

Potential biological removal (PBR) has been specified as the product of minimum population size, one-half the maximum productivity rate, and a "recovery" factor for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population size (OSP). In accordance with the guidelines for estimating PBR, the recovery factor was 0.50 because of the stock's unknown status relative to OSP and because the coefficient of variation of the estimated fishery-related mortality and serious injury was less than 0.30. PBR for the mid-Atlantic offshore bottlenose dolphin stock is 92 dolphins.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There are no available estimates of human-caused mortality or serious injury except for estimates extrapolated from data obtained through NMFS fishery observer programs.

Estimated average annual fishery-related mortality or serious injury to this stock is 128 offshore bottlenose dolphins (CV = 0.39). This level is not less than 10% of the calculated PBR and, therefore, cannot be considered to be insignificant and approaching zero mortality and serious injury rate. This determination cannot be made for specific fisheries until the implementing regulations for Section 118 of the MMPA have been reviewed by the public and finalized.

Fishery Information

There was no documentation of marine mammal mortality or serious injury in distant-water fleet (DWF) activities off the northeast coast of the U.S. prior to 1977. A fisheries observer program which has recorded fishery data and information on incidental by-catch of marine mammals was established with implementation of the Magnuson Fisheries Conservation and Management Act (MFCMA) in 1977. DWF effort in the U.S. Atlantic EEZ under MFCMA was directed primarily towards Atlantic mackerel and squid. An average of 120 different foreign vessels per year (range 102-161) operated within the Atlantic coast EEZ from 1977 through 1982. In 1982, the first year that the NMFS Northeast Regional Observer Program assumed responsibility for observer coverage of the longline vessels, there were 112 different foreign vessels, eighteen (16%) of which were Japanese tuna longline vessels operating along the U.S. east coast. Between 1983 and 1991, the number of foreign fishing vessels operating within the U.S. Atlantic EEZ each year declined from 67 to nine. Between 1983 and 1988, the numbers of DWF vessels included 3, 5, 7, 6, 8, and 8, respectively, Japanese longline vessels. Observer coverage on DWF vessels was 25-35% during 1977-82, and increased to 58%, 86%, 95%, and 98%, respectively, in 1983-86. From 1987-91, 100% observer coverage was maintained. Foreign fishing operations for squid ceased at the end of the 1986 fishing season and for mackerel at the end of the 1991 season. Observers in this program recorded nine bottlenose dolphin mortalities in foreign-fishing activities during 1977-1988 (Waring et al. 1990). Seven takes occurred in the mackerel fishery, and one bottlenose dolphin each was caught in both the squid and hake trawl fisheries.

Data on current incidental takes in U.S. fisheries are available from several sources. In 1986, NMFS established a mandatory logbook system for large pelagic fisheries. Data files are maintained at the Southeast Fisheries Science Center (SEFSC). The Northeast Fisheries Science Center (NEFSC) Sea Sampling Observer Program was initiated in 1989, and since that year several fisheries have been covered by the program.

In late 1992 and in 1993, the SEFSC provided observer coverage of pelagic longline vessels fishing off the Grand Banks (Tail of the Banks). SEFSC also provides observer coverage of vessels fishing south of Cape Hatteras. The Atlantic longline fisheries target primarily swordfish and yellowfin tuna from the Grand Banks south into the Caribbean and the Gulf of Mexico. There have been no reported lethal takes of this stock by the longline fishery recently, but one bottlenose dolphin was taken and released alive by the fishery during 1993 in offshore waters outside of the U.S. EEZ (NMFS unpublished data).

The estimated total number of hauls in the Atlantic large pelagic drift gillnet fishery increased from 714 in 1989 to 1,144 in 1990; thereafter, with the introduction of quotas, effort was severely reduced. The estimated number of hauls in 1991, 1992, and 1993 were 233, 243, and 232 respectively. Fifty-nine different vessels participated in this fishery at one time or another between 1989 and 1993. Observer coverage, expressed as percent of sets observed, ranged from 8% in 1989, 6% in 1990, 20% in 1991, to 40% in 1992, and 42% in 1993. Effort was concentrated along the southern edge of Georges Bank and off Cape Hatteras. Examination of the species composition of the catch and locations of the fishery throughout the year, suggested that the drift gillnet fishery be stratified into two strata, a southern or winter stratum, and a northern or summer stratum. Estimates of the total by-catch, for each year, were obtained using the aggregated (pooled 1989-1993) catch rates, by strata (Northridge, in review). Thirty-nine bottlenose dolphin mortalities have been observed between 1989 and 1993. Estimated bottlenose dolphin kills (CV in parentheses) extrapolated for each year were 72 in 1989 (0.59), 115 in 1990 (0.42), 26 in 1991 (0.44), 28 in 1992 (0.21), and 22 in 1993 (0.25). Mean annual estimated fishery-related mortality for this fishery in 1989-1993 was 53 bottlenose dolphins (CV = 0.56).

Atlantic swordfish/tuna/shark pair trawl fishery effort has increased from none in 1989 and 1990, to an estimated 171 hauls in 1991, and then to an estimated 989 and 1,087 hauls in 1992 and 1993, respectively. The fishery operated in August-November in 1991, June-November in 1992, and June-October in 1993. Sea sampling began in October of 1992 when 101 hauls (10% of the total) were sampled. In 1993, 201 hauls (18%) were sampled. Nineteen vessels have operated in this fishery. The fishery extends from 35°N to 41°N, and from 69°W to 72°W. Approximately 50% of the total effort was within a one degree square at 39°N, 72°W, around Hudson Canyon. Fishery locations and species composition of the by-catch showed little seasonal change during the six months of operation and did not warrant stratification of observer effort. Twenty-one bottlenose dolphin mortalities were observed between 1991 and 1993. Estimated annual fishery-related mortality (CV in parentheses) was 13 dolphins in 1991 (0.53), 73 in 1992 (0.49), and 85 in 1993 (0.41). The estimated mean annual bottlenose dolphin mortality attributable to this fishery is 57 (CV = 0.51).

Vessels in the New England groundfish multispecies trawl fishery, a Category III fishery under the MMPA, were observed in order to meet fishery management needs, rather than marine mammal management needs. An average of 970 (CV = 0.04) vessels (full and part time) participated annually in the fishery during 1989-1993. The fishery is active in New England waters in all seasons. One bottlenose dolphin mortality was documented in 1991 and the total estimated mortality in this fishery in 1991 was 91 (CV = 0.97). The average fishery-related mortality attributable to this fishery between 1989-1993 was 18 bottlenose dolphins (CV = 2.17).

The mid-Atlantic mackerel and squid trawl fisheries were combined into the Atlantic mid-water trawl fishery in the revised proposed list of fisheries in 1995. The fishery occurs along the U.S. mid-Atlantic continental shelf region between New Brunswick, Canada, and Cape Hatteras year around. The mackerel trawl fishery was classified as a Category II fishery since 1990 and the squid fishery was originally classified as a Category II fishery in 1990, but was reclassified as a Category III fishery in 1992. The combined fishery has been proposed for classification as a Category II fishery. Although there were reports of bottlenose dolphin mortalities in the foreign fishery during 1977-1988, there were no fishery-related mortalities of bottlenose dolphins reported in logbook reports from the mackerel trawl fishery between 1990-1992.

Other Mortality

There are no other known sources of human-caused mortality affecting this stock.

STATUS OF STOCK

The status of this stock relative to OSP is unknown. The western north Atlantic offshore bottlenose dolphin is not listed as threatened or endangered under the Endangered Species Act. In Canada, the Cetacean Protection Regulations of 1982, promulgated under the Standing Fisheries Act, prohibit the catching or harassment of all cetacean species. There are insufficient data to determine the population trends for this species. This stock is a strategic stock because estimated annual fishery-related mortality and serious injury exceeds PBR.

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