

COMMON DOLPHIN (*Delphinus delphis*): Western North Atlantic Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The common dolphin may be one of the most widely distributed species of cetaceans, as it is found world-wide in temperate, tropical, and subtropical seas. In the North Atlantic, common dolphins appears to be present along the coast over the continental shelf along the 200-300 m isobaths or over prominent underwater topography from 50° N to 40° S latitude (Evans 1994). The species is less common south of Cape Hatteras, although schools have been reported as far south as eastern Florida (Gaskin 1992). At least some of the reported sightings of common dolphins in the Gulf of Mexico may have been *Stenella clymene*, which has a color pattern similar to that of common dolphins (Evans 1994). Information regarding common dolphin stock structure in the western North Atlantic does not exist. However, a high variance in skull morphometric measurements suggests the existence of more than a single stock (J. G. Mead, personal communication).

Common dolphins are distributed in broad bands along the continental slope (100 to 2,000 meters), and are associated with other Gulf Stream features in waters off the northeastern U.S. coast (CeTAP 1982; Selzer and Payne 1988; Waring et al 1992). They are widespread from Cape Hatteras northeast to Georges Bank (35° to 42° North latitude) in outer continental shelf waters from mid-January to May (Hain et al. 1981; CeTAP 1982; Payne et al. 1984). Common dolphins move northward onto Georges Bank and the Scotian Shelf from mid-summer to autumn. Selzer and Payne (1988) reported very large aggregations (greater than 3,000 animals) on Georges Bank in autumn. Common dolphins are rarely found in the Gulf of Maine, where temperature and salinity regimes are lower than on the continental slope of the Georges Bank/mid-Atlantic region (Selzer and Payne 1988). Migration onto the Scotian Shelf and continental shelf off Newfoundland occurs during summer and autumn when water temperatures exceed 11°C (Sergeant et al. 1970).

POPULATION SIZE

The total number of common dolphins off the eastern U.S. and Canadian Atlantic coast is unknown, although several estimates from selected regions do exist. Seasonal abundance estimates are available from an aerial line transect survey program conducted in continental shelf and continental shelf edge waters between Cape Hatteras, North Carolina, and Nova Scotia from 1978 to 1982 (CeTAP 1982). R. Kenney (personal communication) provided abundance estimates that accounted for survey effort in two continental slope survey blocks and uncertainties resulting from sightings of unidentified small dolphins. An estimate based on an inverse variance weighted pooling of revised CeTAP (1982) spring and summer data is 29,610 (CV = 0.39). An average for these two seasons was chosen because the greatest proportion of the population off the northeast U.S. coast appears to be in the CeTAP study area in these seasons. This estimate was not corrected for $g(0)$, the probability of detecting an animal group on the trackline.

More recent abundance estimates were derived using data collected during two fine-scale ship line transect surveys (June-July 1991 and June-July 1993) conducted in continental shelf edge and deeper oceanic waters (Northeast Fisheries Science Center NMFS

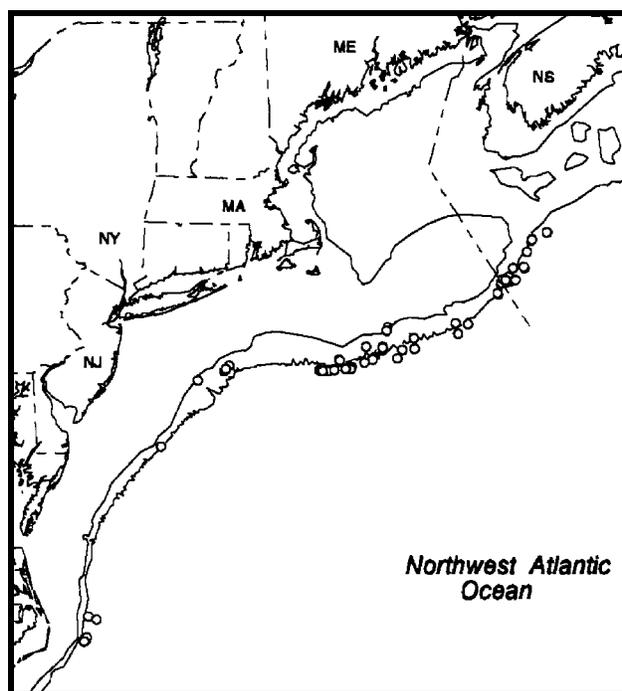


Figure 1. Distribution of common dolphin sightings from NEFSC shipboard surveys during the summer in 1990-1994. Isobaths are at 100 m and 1,000 m.

unpublished data). Common dolphin sightings during these surveys are shown in Figure 1. The data were analyzed using DISTANCE (Buckland et al. 1993; Laake et al. 1993) where confidence intervals were calculated using the bootstrap lognormal method. An abundance estimate from the 1991 survey, based principally on sighting effort conducted between the 200 and 2,000 meter isobaths from Cape Hatteras to Georges Bank was 4,984 common dolphins (CV = 0.55). 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 1,645 common dolphins (CV = 0.47).

Although the 1991 and 1993 surveys did not sample the same areas or encompass the entire common dolphin habitat (e. g., little effort in mid-continental shelf waters), they did focus on segments of known or suspected high-use habitats off the northeastern U.S. coast. The 1991 and 1993 data suggest that, seasonally, at least several thousand common dolphins are occupying continental shelf edge waters, with perhaps highest abundance in the Georges Bank region. This is consistent with the earlier CeTAP data from a decade previous. Survey coverage to date is not adequate to provide a definitive estimate of common dolphin abundance for the western North Atlantic and because the estimates presented here were not corrected for school size bias and $g(0)$, they probably underestimate actual abundance.

Minimum Population Estimate

The minimum population estimate was based on the 1991 shipboard survey abundance estimate of 4,984 common dolphins (CV = 0.55) (NMFS unpublished data). This estimate was selected because it provided the most complete coverage of common dolphin habitat off the northeast U.S. coast. The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normal distributed abundance estimate, which is equivalent to the 20th percentile of the log-normal distribution as specified by NMFS (Anon. 1994), and was 3,233 common dolphins.

Current Population Trend

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

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) was 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 (OSP) (Anon. 1994). The recovery factor was set at 0.50 because of the stock's status relative to its OSP level is unknown. PBR for this stock is 32 common dolphins.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

During the period 1977-1986, observers recorded 123 mortalities in foreign *Loligo* squid-fishing activities (Waring et al. 1990). In 1985 and 1986, Italian vessels took 56 and 54 animals, respectively, which accounts for 89% (n = 110) of the total takes in foreign *Loligo* squid-fishing operations. No mortalities were reported in foreign *Illex* squid fishing operations. Because of spatial/temporal fishing restrictions, most of the by-catch occurred along the continental shelf edge (100 m) isobath during winter (December to February).

From 1977-1991, observers recorded 110 mortalities in foreign mackerel-fishing operations (Waring et al. 1990; NMFS unpublished data). This total includes one documented take by a U.S. vessel involved in joint-venture fishing operations in which U.S. captains transfer their catches to foreign processing vessels. The by-catch occurred during winter/spring (December to May).

Incidental mortality has also been observed in the pelagic drift gillnet and pair trawl fisheries (see below) off the U.S. Atlantic coast. No mortalities were documented in the Atlantic swordfish/tuna/shark longline, New England multispecies sink gillnet, and groundfish trawl observed fisheries. An unknown number of common dolphins have

been taken in an experimental salmon drift-gillnet fishery off Greenland (Read 1994). In general, there is little known regarding historical or current common dolphin by-catch in Canadian fisheries.

Estimated average annual mortality and serious injury for all of the NMFS-observed fisheries is 449 common dolphins per year ($CV = 0.47$). The total fishery-related mortality and serious injury for this stock 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.

Fisheries Information

Prior to 1977, there was no documentation of marine mammal by-catch in distant-water fleet (DWF) activities off the northeast coast of the U.S. With implementation of the Magnuson Fisheries Conservation and Management Act (MFCMA), an observer program was established which has recorded fishery data and information of incidental by-catch of marine mammals. DWF effort in the Atlantic coast Exclusive Economic Zone (EEZ) under MFCMA has been directed primarily towards Atlantic mackerel and squid. From 1977 through 1982, an average of 120 different foreign vessels per year (range 102-161) operated within the Atlantic coast EEZ. In 1982, there were 112 different foreign vessels; 16%, or 18, were Japanese tuna longline vessels operating along the U.S. east coast. This was the first year that the Northeast Regional Observer Program assumed responsibility for observer coverage of the longline vessels. Between 1983 and 1991, the numbers of foreign vessels operating within the Atlantic coast EEZ each year were 67, 52, 62, 33, 27, 26, 14, 13, and 9, respectively. 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 and mackerel ceased at the end of the 1986 and 1991 fishing seasons, respectively.

The Canadian and Greenland salmon gillnet fishery is seasonal, with the peak from June to September, depending on location. In southern and eastern Newfoundland, and Labrador during 1989, 2,196 nets 91 m long were used. The fishery was terminated in 1993 (Read 1994).

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) and provides observer coverage of vessels fishing south of Cape Hatteras.

Pelagic swordfish, tunas, and billfish are the targets of the longline fishery operating in the U.S. Atlantic and Gulf of Mexico. This fishery has been monitored with about 5% observer coverage, in terms of trips observed, since 1992. Total longline effort for the Atlantic pelagic fishery (including the Caribbean), based on mandatory logbook reporting, was 11,279 sets in 1991, 10,605 sets in 1992, and 11,538 in 1993 (Cramer 1994). There was no reported fishery-related mortality or serious injury to this stock attributable to this fishery.

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). Three hundred and seven common dolphin mortalities were observed between 1989 and 1993 in this fishery. Mortalities were observed in all seasons and areas. Five animals were released alive, but four were injured. Estimated annual mortality and serious injury attributable to this fishery (CV in parentheses) was 540 in 1989 (0.55), 893 in 1990 (0.40), 223 in 1991 (0.36), 227 in 1992 (0.20), and 238 in 1993 (0.16); average annual estimated fishery-related mortality during 1989-1993 attributable to this fishery was 424 common dolphins (0.50).

During the period 1989 to 1993, effort in the Atlantic swordfish/tuna/shark pair trawl fishery increased from zero hauls 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 from August to November in 1991, from June to November in 1992, and from June to October in 1993. Sea sampling began in October of 1992 where 101 sets (10% of the total) were sampled. In 1993, 201 hauls (18% of the total) were sampled. Nineteen vessels have operated in this fishery. The fishery operates in the area between 35°N to 41°N and 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. Examination of the locations and species composition of the by-catch, showed little seasonal change for the six months of operation and did not warrant any seasonal or areal stratification of this fishery. Nine mortalities were observed between 1991 and 1993. The estimated annual fishery-related mortality and serious injury attributable to this fishery (CV in parentheses) was 5.6 in 1991 (0.53), 32 in 1992 (0.48), and 35 in 1993 (0.43). Average annual estimate fishery-related mortality attributable to this fishery during 1991-1993 was 24 common dolphins (CV = 0.52).

STATUS OF STOCK

The status of common dolphins, relative to OSP, in the U.S. Atlantic EEZ is unknown. The species 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 is a strategic stock because average annual fishery-related mortality and serious injury exceeds PBR.

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