BOTTLENOSE DOLPHIN (*Tursiops truncatus*):
Gulf of Mexico Outer Continental Shelf Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The Gulf of Mexico Outer Continental Shelf (OCS) bottlenose dolphin stock is assumed to consist of the shallow, warm water bottlenose dolphin ecotype hypothesized by Hersh and Duffield (1990) inhabiting waters over the U.S. OCS in the northern Gulf of Mexico from approximately 9 km seaward of the 18 m isobath to approximately 9 km seaward of the 183 m isobath and from the U.S.-Mexican border to the Florida Keys. The stock range may extend into Mexican and Cuban territorial waters; however, there are no available estimates of either abundance or mortality from those countries. As a working hypothesis, the bottlenose dolphins inhabiting the 0-18 m depth stratum are believed to constitute coastal stocks in the western, northern, and eastern U.S. Gulf of Mexico separate from the OCS stock; however, the OCS stock may overlap with coastal stocks in some areas and may be genetically indistinguishable from those stocks. The OCS stock may be combined with some or all of the coastal stocks when additional data become available.

In addition, the aerial surveys from which the current abundance estimates were derived overlapped the outer continental shelf edge which is believed to be inhabited by the OCS edge and continental slope stock (Fig. 1). This stock is believed to consist of the deep, cold water ecotype described by Hersh and Duffield for the Atlantic (1990). It is not currently possible to differentiate the two ecotypes visually during aerial surveys.

POPULATION SIZE

Preliminary estimates of abundance were derived using distance sampling analysis (Buckland et al. 1993) and the computer program DISTANCE (Laake et al. 1993) with sighting data collected during Gulf of Mexico regional aerial line-transect surveys in September-October 1992 and 1993 (Blaylock and Hoggard 1994) and 1994 (NMFS unpublished data). Transects providing systematic coverage of the area and assumed to be randomly placed with respect to bottlenose dolphin distribution extended orthogonally from approximately 9 km past the 18 m isobath to approximately 9 km past the 183 m isobath. Approximately 3.3% of the total area was visually sampled. Preliminary analyses provided a bottlenose dolphin abundance estimate of 50,247 dolphins with coefficient of variation (CV) = 0.18. The survey area overlapped with a portion of the area occupied by the OCS edge and continental slope stock which was assumed to occur in waters over the OCS edge and beyond to the seaward limits of the U.S. Exclusive Economic Zone. This would tend to inflate the abundance estimate, but it is not currently possible to estimate the amount of potential bias.

Figure 1. Sightings of U.S. Gulf of Mexico outer continental shelf (OCS) bottlenose dolphin stock during GOMEX regional aerial surveys (filled circles). Bottlenose dolphin sightings along the OCS edge and continental slope during NOAA Ship Oregon II surveys (unfilled circles), shown for comparison, are believed to be a separate stock. The straight lines show transects during two ship surveys and are examples of typical ship survey transects. Isobaths are in 183 m (100 fm) intervals.

Minimum Population Estimate

The minimum population estimate was based on the abundance estimate of 50,247 dolphins (CV = 0.18). 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). The minimum population estimate is 43,233 bottlenose dolphins.
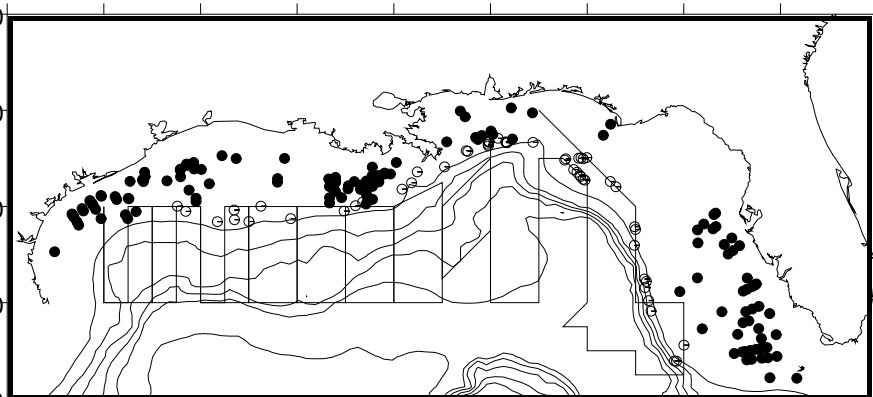
Current Population Trend

The data are insufficient to determine population trends. Aerial surveys conducted during autumn 1983 and 1985 by the Southeast Fisheries Science Center (SEFSC) produced an abundance estimate of 31,519 bottlenose dolphins (CV = 0.08) for this stock (Scott et al. 1989). This population thus appears to have increased from earlier estimated levels; however, a valid statistical comparison of the historical and present estimated population sizes is not presently possible because of the preliminary nature of the recent population size estimate and the possible biases caused by overlap of the survey area with the OCS edge and continental slope stock.

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 432 bottlenose dolphins.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There are no observed cases of human-caused mortality and serious injury in this stock; however, based on an observed non-lethal take in U.S. Atlantic waters in 1993 in the pelagic longline fishery, this stock may be subject to incidental take resulting in serious injury or mortality. Fishery interactions have been reported to occur between bottlenose dolphins and the longline swordfish/tuna fishery in the Gulf of Mexico (SEFSC unpublished logbook data) and annual fishery-related mortality and serious injury to bottlenose dolphins is estimated to be 2.8 per year (CV = 0.74) during 1992-1993. This could include bottlenose dolphins from the outer continental shelf edge and continental slope stock.

Total fishery-related mortality and serious injury for this stock is less than 10% of the calculated PBR and, therefore, can 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

Annual fishing effort for the shrimp trawl fishery in the U.S. Gulf of Mexico OCS during 1988-1993 averaged approximately 2.58 million hours of tows (CV = 0.07) (NMFS unpublished data). This fishery was monitored by NMFS observers in 1992 and 1993, but less than 1% of the fishing effort was observed (NMFS unpublished data). There have been no reports of incidental mortality or injury associated with the shrimp trawl fishery in this area.

Pelagic swordfish, tunas, and billfish are the targets of the longline fishery operating in the U.S. Gulf of Mexico. Total longline effort for the Gulf of Mexico pelagic fishery, including OCS edge, continental slope, and Mexican territorial waters, based on mandatory logbook reporting, was 4,400 sets in 1991, 4,850 sets in 1992, and 3,260 sets in 1993 (Cramer 1994). This fishery has been monitored with about 5% observer coverage, in terms of trips observed, since 1992. Estimated take was based on a generalized linear model (Poisson error assumption) fit to the available observed incidental take and self-reported incidental take and effort data for the fishery. The following estimates were based on observed takes across the Atlantic longline swordfish/tuna fishery (which includes the Gulf of Mexico). All observed takes were used because the species occurs generally throughout the area of the fishery, but observed takes were infrequent in any given region of the fishery. There were no lethal takes of bottlenose dolphins observed or reported in 1992 and 1993, and only one non-lethal take was reported in 1993, which is assumed to have caused serious injury. The estimated level of fishery-related mortality and serious injury for the entire fishery, including waters outside of the Gulf of Mexico, in 1993 was 16 bottlenose dolphins (CV = 0.19). No take was observed in the Gulf of Mexico, but interactions between bottlenose dolphins and this fishery in the Gulf of Mexico have been reported under the Marine Mammal Protection Act Interim Exemption Program (NMFS 1993).

Given the fact that fishery interactions have been reported to occur between bottlenose dolphins and the longline swordfish/tuna fishery in the Gulf of Mexico, a probable level of fishery-related mortality and serious injury rate can be estimated. Under the assumption that the probability of an incidental take is proportional to fishing effort (number of sets),

the estimated level of incidental mortality and serious injury partitioned to include only the Gulf of Mexico stock would be 5.5 bottlenose dolphins in 1993 (CV = 0.19). Average annual fishery-related mortality and serious injury during 1992-1993 would be 2.8 bottlenose dolphins (CV = 0.74). This estimate could include dolphins from the OCS edge and continental slope stock.

Pair trawl fishing gear has the potential to capture marine mammals, but there have been no reports of mortality or serious injury to marine mammals in the Gulf of Mexico. This fishery has not been observed by NMFS observers, and there are no other data available as to the extent of this fishery in the Gulf of Mexico. It is assumed that it is very limited in scope and duration in the Gulf of Mexico.

A trawl fishery for butterfish was monitored by NMFS observers for a short period in the 1980's with no records of incidental take of marine mammals (Burn and Scott 1988; NMFS unpublished data), although an experimental set by NMFS resulted in the death of two bottlenose dolphins (Burn and Scott 1988). There are no other data available.

Other Human-Related Mortality or Serious Injury

The use of explosives to remove oil rigs in the portions of the OCS in the western Gulf of Mexico has the potential to cause serious injury or mortality to marine mammals. These activities have been closely monitored by NMFS observers since 1987 (Gitschlag and Hale, in press) and Gitschlag and Herczeg (in press) described the monitoring activities that occurred in 1992. There have been no reports of either serious injury or mortality to bottlenose dolphins (NMFS unpublished data).

STATUS OF STOCK

The status of this stock relative to OSP is not known and the population trend cannot be determined due to insufficient data. This species is not listed as threatened or endangered under the Endangered Species Act. This is not a strategic stock because fishery-related mortality and serious injury does not exceed PBR.

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