BOTTLENOSE DOLPHIN (*Tursiops truncatus*):
Eastern Gulf of Mexico Coastal Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The eastern Gulf of Mexico coastal bottlenose dolphin stock has been defined for management purposes as the bottlenose dolphins occupying the area which extends from approximately 84° W Longitude to Key West, Florida, from shore, barrier islands, or presumed bay boundaries to 9.3 km seaward of the 18.3 m isobath (Fig. 1). As a working hypothesis, it is assumed that the dolphins occupying habitats with dissimilar climactic, coastal, and oceanographic characteristics might be restricted in their movements between habitats and, thus, constitute separate stocks. The eastern coastal stock area is temperate to subtropical in climate, is bordered by a mixture of coastal marshes, sand beaches, marsh and mangrove islands, and has an intermediate level of freshwater input. It is bordered on the north by an extensive area of coastal marsh and marsh islands typical of Florida's Apalachee Bay. The western coastal area is characterized by an arid to temperate climate, sand beaches, and low fresh water input. The northern coastal stock area is characterized by a temperate climate, barrier islands, sand beaches, coastal marshes and marsh islands, and has a relatively high level of fresh water input from rivers and streams.
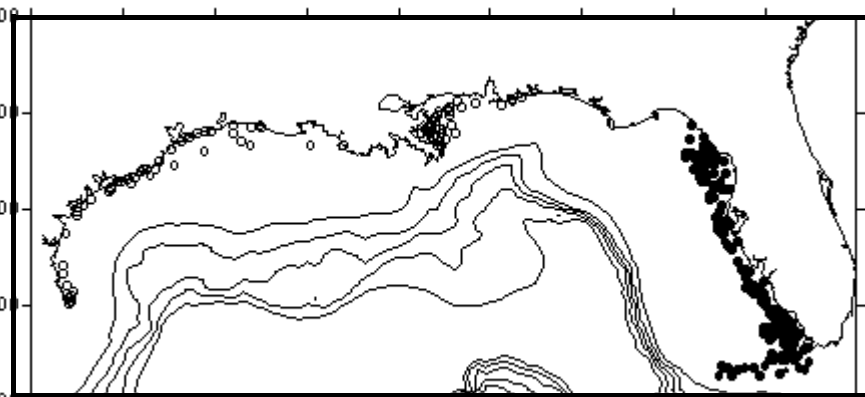

Figure 1. *Sightings of coastal bottlenose dolphins during GOMEX aerial surveys of the Gulf of Mexico in 1992-1994. Eastern Gulf of Mexico coastal bottlenose dolphin stock is shown with filled circles. Isobaths are in 183 m (100 fm) intervals.*

Portions of this stock may co-occur with the U.S. Gulf of Mexico outer continental shelf (OCS) stock. The seaward boundary for this stock corresponds to aerial survey strata (NMFS unpublished data) and thus, represents a management boundary rather than an ecological boundary. Anecdotal evidence suggests that both the coastal and OCS stocks consist of the shallow, warm water ecotype described by Hersh and Duffield (1990). Data are not currently available to determine genetically if the two stocks should be separated or, if so, where; and interbreeding may occur at the boundary interface.

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 aerial line-transect surveys conducted during autumn 1994 (NMFS unpublished data). Systematic sampling transects, placed randomly with respect to the bottlenose dolphin distribution, extended orthogonally from shore out to approximately 9 km past the 18 m isobath. Approximately 5% of the total survey area was visually searched. Bottlenose dolphin abundance was estimated to be 9,912 dolphins with coefficient of variation (CV) = 0.12.

Minimum Population Estimate

The minimum population estimate was based on the 1994 abundance estimate of 9,912 (CV = 0.12) (NMFS unpublished data). The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normally distributed abundance estimate. This is equivalent to the 20th percentile of the log-normal distribution as specified by Wade and Angliss (1997). The minimum population estimate is 8,963 bottlenose dolphins.

Current Population Trend

Aerial surveys of this area conducted by NMFS in autumn 1985, resulted in an estimated bottlenose dolphin abundance of 4,711 (CV = 0.05). The data are not sufficient to conduct a statistical trend analysis, but the current population size estimate is significantly higher than the 1985 estimate (Student's t-test, P < 0.0005).

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. 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 "recovery " factor, which accounts for endangered, depleted, and 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 this stock is 90 dolphins.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

The level of direct human-caused mortality in this stock is unknown. An annual mean of eight bottlenose dolphins (CV = 0.41) stranded on the Florida Gulf coast during the period 1988-1993, showing signs of fishery interactions such as net entanglement, mutilation, gunshot wounds, etc. (Southeast U.S. Marine Mammal Stranding Network unpublished data). This was 8.9% of the total bottlenose dolphin strandings reported for this area. Morgan and Patton (1990) reported that 12.9% of 116 cetaceans examined by Mote Marine Laboratory's marine mammal stranding response program on the west coast of Florida between 1984 and 1990 exhibited evidence of human-caused mortality or serious injury. The stranding networks reported a total of 62 bottlenose dolphin strandings in 1994 with only one reported human interaction. Eighty-three strandings were reported in 1995 and 2 had evidence of human interactions. One was found entangled in a gillnet, and one was a boat strike. The network reported 111 bottlenose dolphins from January through August 31, 1996. Three showed signs of human interaction (one entanglement-gillnet, one boat strike and one mutilation).

There are a number of difficulties associated with the interpretation of stranding data. It is possible that some or all of the stranded dolphins may have been from a bay, sound or estuarine stock; however, the proportion of the stranded dolphins belonging to another stock cannot be determined because of the difficulty of determining from where the stranded carcass originated. Stranding data probably underestimate the extent of fishery-related mortality and serious injury because not all of the dolphins which die or are seriously injured in fishery interactions wash ashore, nor will all of those that do wash ashore necessarily show signs of entanglement or other fishery-interaction. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interaction.

Fisheries Information

Annual fishing effort for the shrimp trawl fishery in the eastern Gulf of Mexico coastal stock area during 1988-1993 averaged approximately 0.102 million hours of tows (CV = 0.30) (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 was one report in 1992 of an incidental mortality in the eastern Gulf of Mexico coastal bottlenose dolphin stock which was associated with the shrimp trawl fishery in this area.

Gillnets are not used in Texas, and gillnets over 46 m^3 in area will not be allowed in Florida past July 1995, but fixed and runaround gillnets are currently in use in Louisiana, Mississippi, and Alabama. These fisheries, for the most part, operate year around. They are state-controlled and licensed, and vary widely in intensity and target species. No marine mammal mortalities associated with gillnet fisheries have been reported in these states, but stranding data suggest that gillnet and marine mammal interaction does occur, causing mortality and serious injury. A coastal gillnet fishery for menhaden was reported to have taken one bottlenose dolphin in 1991 (NMFS unpublished data). There are no effort data available for this fishery.

The menhaden purse seine fishery targets the Gulf menhaden, *Brevoortia patronus*, in Gulf of Mexico coastal waters approximately 3-18 m in depth (NMFS 1991). Seventy-five menhaden vessels operate within 1.6 km of shore from Apalachicola, Florida to Freeport, Texas, from April-October. Lethal takes of bottlenose dolphins reported by the menhaden fishery during the period 1982-1988 ranged between 0-4 dolphins annually (NMFS unpublished data).

Other clupeid purse seiners opportunistically target Spanish sardine, thread herring, ladyfish, cigarfish, and blue runners. There are no effort data available for this fishery and there are no estimates of dolphin mortality associated with this fishery.

A fishery for blue crabs operates in estuarine areas throughout the Gulf coast employing traps attached to a buoy with rope. Bottlenose dolphins have been reported stranded in other coastal locations in the Gulf of Mexico with polypropylene rope around their flukes indicating the possibility of entanglement with crab pot lines (NMFS 1991); however, this fishery has not been monitored by observers.

Other Mortality

The nearshore habitat occupied by this stock is adjacent to areas of high human population and in some areas of Florida, such as the Tampa Bay area, is highly industrialized. PCB concentrations in three stranded dolphins sampled from this stock ranged from 16-46 µg/g wet weight. Concentrations of α-HCB, p,p,DDE, and PCB's were inversely related to the magnitude of the serum antibody titer to *Erysipelas* spp. and *Staphylococcus* spp. bacteria in a study of bottlenose dolphins in Texas (Reif et al., in review). A similar and more pronounced trend was seen in relationship to the pseudorabies virus; however, since pseudorabies virus is not known to infect bottlenose dolphins, the significance of this finding is not clear. Concentrations of contaminants were higher in dolphins having evidence of exposure to the cetacean morbillivirus. The reason for the difference in the relationship between antibody titers to bacteria and pseudorabies and antibody titers to cetacean morbillivirus is not understood.

STATUS OF STOCK

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

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