

## ATLANTIC SPOTTED DOLPHIN (*Stenella frontalis*): Northern Gulf of Mexico Stock

### STOCK DEFINITION AND GEOGRAPHIC RANGE

The Atlantic spotted dolphin is endemic to the Atlantic Ocean in temperate to tropical waters (Perrin *et al.* 1987, 1994). In the Gulf of Mexico, Atlantic spotted dolphins occur primarily from continental shelf waters 10-200 m deep to slope waters <500 m deep (Fulling *et al.* 2003; Mullin and Fulling, in review). This species has also been reported around oceanic islands and far offshore in other areas (Perrin *et al.* 1994). Atlantic spotted dolphins were seen in all seasons during GulfCet aerial surveys of the northern Gulf of Mexico from 1992 to 1998 (Hansen *et al.* 1996; Mullin and Hoggard 2003). It has been suggested that this species may move inshore seasonally during spring, but data supporting this hypothesis are limited (Caldwell and Caldwell 1966; Fritts *et al.* 1983).

In a recent study, Bero (2001) presented strong genetic support for differentiation between Gulf of Mexico and western North Atlantic management stocks using both mitochondrial and nuclear markers. However, this study did not test for further population subdivision within the Gulf of Mexico. Perrin *et al.* (1994) suggested that island and offshore form of the Atlantic spotted dolphin may be a different stock from those occurring on the continental shelf. However, the Atlantic spotted dolphin has not been sighted in the deep waters of the northern Gulf of Mexico (Mullin and Fulling, in review).

### POPULATION SIZE

Estimates of abundance were derived through the application of distance sampling analysis (Buckland *et al.* 2001) and the computer program DISTANCE (Thomas *et al.* 1998) to sighting data. From 1991 through 1994, line-transect vessel surveys were conducted during spring in the northern Gulf of Mexico from the 200 m isobath to the seaward extent of the U.S. Exclusive Economic Zone (EEZ) (Hansen *et al.* 1995). Survey effort-weighted estimated average abundance of Atlantic spotted dolphins for all surveys combined was 3,213 (CV=0.44) (Hansen *et al.* 1995). This is probably an underestimate and should be considered a partial stock estimate because the continental shelf was not entirely covered during these surveys. As recommended in the GAMMS Workshop Report (Wade and Angliss 1997), estimates older than eight years are deemed unreliable, and therefore should not be used for PBR determinations.

Data were collected from 1996 to 2001 during spring and fall plankton surveys conducted from NOAA ships *Oregon II* (1996, 1997, 1999, 2000) and *Gordon Gunter* (1998, 2000, 2001). Tracklines, which were perpendicular to the bathymetry, covered shelf waters from the 20 m to the 200 m isobaths in the fall of 1998 and 1999 (Fig. 1, Table 1; Fulling *et al.*, 2003). Surveys were also conducted from April to May 1996 to 2001 (excluding 1998) in oceanic waters of the northern Gulf of Mexico from 200 m to the offshore extent of the U.S. EEZ. Estimates for all oceanic strata were summed, as survey effort was not uniformly distributed, to calculate a total estimate for the entire northern Gulf of Mexico oceanic waters (Fig. 1 and Table 1; Mullin and Fulling, in review). Due to limited survey effort in any given year, survey effort was pooled across all years to develop an average abundance estimate for both areas.

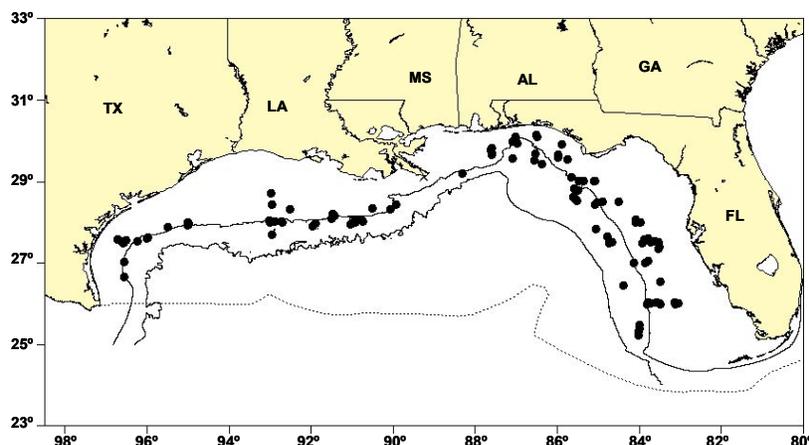


Figure 1. Distribution of Atlantic spotted dolphin sightings from SEFSC spring and fall vessel surveys during 1996-2001. All the on-effort sightings are shown, though not all were used to estimate abundance. Solid lines indicate the 100 m and 1000 m isobaths and the dotted line shows the offshore extent of the U.S. EEZ.

Table 1. Abundance estimates ( $N_{best}$ ) and Coefficient of Variation (CV) of Atlantic spotted dolphins in the northern U.S. Gulf of Mexico outer continental shelf (OCS) (waters 20-200 m deep) during fall 1998-2001 and oceanic waters (200m to the offshore extent of the EEZ) during spring 1996-2001 (excluding 1998).

Month/Year	Area	$N_{best}$	CV
Fall 1998-2001	Outer Continental Shelf	30,772	0.27
Spring 1996-2001	Oceanic	175	0.84
<b>Spring &amp; Fall 1996-2001</b>	<b>OCS &amp; Oceanic</b>	<b>30,947</b>	<b>0.27</b>

The combined estimated abundance of Atlantic spotted dolphins, pooled from 1998 through 2001, for the outer continental shelf shipboard surveys was 30,772 (CV=0.27) (Fulling *et al.*, 2003). The estimate of abundance for Atlantic spotted dolphins in oceanic waters, pooled from 1996 through 2001, is 175 (CV=0.84) (Mullin and Fulling, in review).

The best available abundance estimate for the Atlantic spotted dolphin in the northern Gulf of Mexico is the combined estimate of abundance for both the outer continental shelf and oceanic waters from 1996 to 2001, which is 30,947 (CV=0.27). This estimate is considered the best because these surveys have the most complete coverage of the species' habitat. The differences between the older (1991-1994) and the more recent (1996-2001) abundance estimates occurred because the 1991-1994 estimate was based vessel surveys that occurred in waters >100 m deep and therefore covered very little of the range of Atlantic spotted dolphins in the northern Gulf of Mexico.

#### Minimum Population Estimate

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normal distributed abundance estimate. This is equivalent to the 20th percentile of the log-normal distributed abundance estimate as specified by Wade and Angliss (1997). The best estimate of abundance for Atlantic spotted dolphins is 30,947 (CV=0.27). The minimum population estimate for the northern Gulf of Mexico is 24,752 Atlantic spotted 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 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 history (Barlow *et al.* 1995).

#### POTENTIAL BIOLOGICAL REMOVAL

Potential biological removal level (PBR) is the product of the minimum population size, one half the maximum net productivity rate, and a "recovery" factor (MMPA Sec. 3.16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is 24,752. 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. PBR for the northern Gulf of Mexico Atlantic spotted dolphin is 248.

#### ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There has been no reported fishing-related mortality of a spotted dolphin since 1994 (Yeung 1999; Yeung 2001), when two incidental takes and releases were recorded.

#### Fisheries Information

The level of past or current, direct, human-caused mortality of Atlantic spotted dolphins in the northern Gulf of Mexico is unknown; however, interactions between spotted dolphins and fisheries have been observed in the northern Gulf of Mexico. Pelagic swordfish, tunas, and billfish are the targets of the longline fishery operating in the U.S. Gulf of Mexico. There were two observed incidental takes and releases of spotted dolphins in the Gulf of Mexico during 1994, but no recent reported takes of Atlantic spotted dolphins by this fishery in the Gulf of Mexico. Either spotted dolphin species may have been involved in the observed fishery-related mortality and serious injury incidents, but because of the uncertainty in species identification by fishery observers, they cannot currently be separated. Estimated average annual fishing-related mortality and serious injury of spotted dolphins attributable to this fishery during 1991-1993 was 1.5 annually (CV=0.33).

## Other Mortality

A total of 12 Atlantic spotted dolphins stranded in the Gulf of Mexico between 1997 and 2002. There were no indications of human interactions in any of these stranded animals. Some of these stranded animals may have been confused with pantropical spotted dolphins due to similarities with this species. There were two documented strandings of Atlantic spotted dolphins in the northern Gulf of Mexico during 1987-1994 which were classified as likely caused by fishery interactions. Stranding data probably underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals which die or are seriously injured in fishery interactions wash ashore, not all that wash ashore are discovered, reported or investigated, 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 interactions.

## STATUS OF STOCK

The status of Atlantic spotted dolphins in the northern Gulf of Mexico relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance. Atlantic spotted dolphins are not listed as “threatened” or “endangered” under the Endangered Species Act (1973), nor as “depleted” under the MMPA. The northern Gulf of Mexico stock is not considered a strategic stock under the 1994 amendments to the MMPA, because the estimated rate of serious injury within the U.S. EEZ, is less than the PBR. However, there is no systematic monitoring of all fisheries that may take this species. Insufficient information is available to determine whether the total fishery mortality and serious injury for Atlantic spotted dolphins is insignificant and approaching zero mortality and serious injury rate. The potential impact, if any, of coastal pollution may be an issue for this species in portions of its habitat, though little is known on this to date.

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