

## ROUGH-TOOTHED DOLPHIN (*Steno bredanensis*): Northern Gulf of Mexico Stock

### STOCK DEFINITION AND GEOGRAPHIC RANGE

The rough-toothed dolphin is distributed worldwide in tropical to warm temperate waters (Leatherwood and Reeves 1983; Miyazaki and Perrin 1994). Rough-toothed dolphins occur in both oceanic and continental shelf waters in the northern Gulf of Mexico (Fulling *et al.* 2003; Mullin and Fulling, in review). Rough-toothed dolphins were seen in all seasons during GulfCet aerial surveys of the northern Gulf of Mexico between 1992 and 1998 (Hansen *et al.* 1996; Mullin and Hoggard 2000).

The Gulf of Mexico population is provisionally being considered one stock for management purposes. Additional morphological, genetic and/or behavioral data are needed to provide further information on stock delineation.

### 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 rough-toothed dolphins for all surveys combined was 852 (CV= 0.31) (Hansen *et al.* 1995). This was probably an underestimate and should be considered a partial stock estimate because the continental shelf areas were not entirely covered by either the vessel or GulfCet aerial 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, 1999, 2000, 2001). Tracklines, which were perpendicular to the bathymetry, covered shelf waters from 20 to 200 m deep in the fall of 1998 and 1999 (Fig. 1 and Table 1; Fulling *et al.* 2003). Surveys were also conducted during April/May from 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.

Table 1. Abundance estimates ( $N_{best}$ ) and Coefficient of Variation (CV) of rough-toothed 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 (200 m 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	1,238	0.65
Spring 1996-2001	Oceanic	985	0.44
<b>Spring &amp; Fall 1996-2001</b>	<b>OCS &amp; Oceanic</b>	<b>2,469</b>	<b>0.40</b>

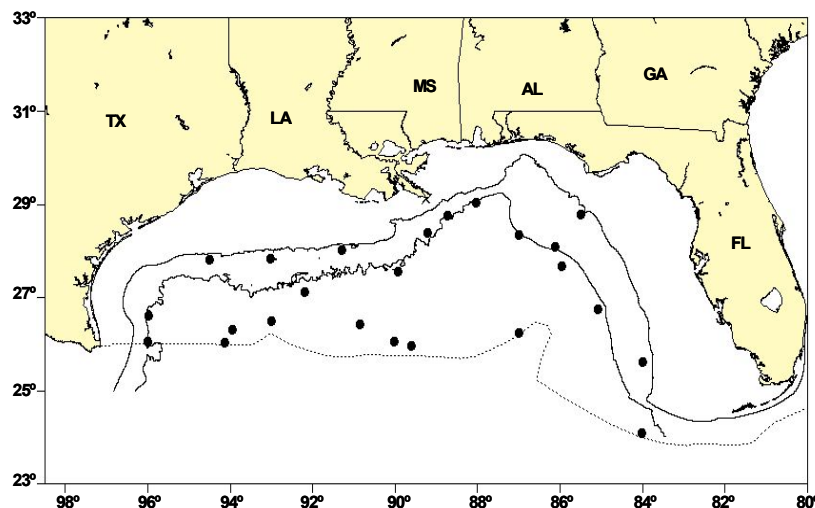


Figure 1. Distribution of rough-toothed dolphin sightings from SEFSC spring and fall vessel surveys during 1996-2001. All the on-effort sightings are shown, though not all were used to estimate abundance. Solid lines indicate the 100 m and 1000 m isobaths and the dotted line shows the offshore extent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

The combined estimated abundance of rough-toothed dolphins, pooled from 1998 through 2001, for the outer continental shelf shipboard surveys was 1,238 (CV=0.65) (Fulling *et al.* 2003). The estimate of abundance for rough-toothed dolphins in oceanic waters, pooled from 1996 through 2001, is 985 (CV=0.44) (Mullin and Fulling, in review).

The best available abundance estimate for the rough-toothed 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 2,223 (CV=0.41). This estimate is considered the best because these surveys have the most complete coverage of the species' habitat. This species was observed in shelf waters, with two sightings occurring off the coast of Texas and one sighting off the southern Florida Panhandle (Fulling *et al.* 2003). Group sizes recorded for rough-toothed dolphins in shelf waters were 8, 11 and 20 individuals. The differences between the older (1991-1994) and the more recent (1996-2001) abundance estimates are a result of including an estimate from shelf waters.

#### **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 rough-toothed dolphins is 2,223 (CV=0.41). The minimum population estimate for the northern Gulf of Mexico is 1,595 rough-toothed 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 1,595 (CV=0.41). 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 rough-toothed dolphin is 16.

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

There were two documented strandings of rough-toothed dolphins in the northern Gulf of Mexico during 1987-1994 which were classified as likely caused by fishery interactions.

#### **Fisheries Information**

The level of past or current, direct, human-caused mortality of rough-toothed dolphins in the northern Gulf of Mexico is unknown. Pelagic swordfish, tunas, and billfish are the targets of the longline fishery operating in the U.S. Gulf of Mexico. There were no reports of mortality or serious injury to rough-toothed dolphins by this fishery in the Gulf of Mexico (Yeung 1999; Yeung 2001).

#### **Other Mortality**

There was one reported stranding of a rough-toothed dolphin in the northern Gulf of Mexico between 1997 and 2002 which was classified as likely caused by fishery interactions or other human-related causes. 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 rough-toothed dolphins in the northern Gulf of Mexico relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance. Rough-toothed 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 rough-toothed 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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