

SPINNER DOLPHIN (*Stenella longirostris longirostris*): Western North Atlantic Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Spinner dolphins are distributed in tropical oceanic and coastal waters worldwide (Leatherwood *et al.* 1976). The species is found in offshore, deep-waters (Schmidly 1981; Perrin and Gilpatrick 1994) but island associated populations are documented in the Pacific (Karczmarski *et al.* 2005; Andrews *et al.* 2010) and the Indian Ocean (Oremus *et al.* 2007; Viricel *et al.* 2016) where they often use shallower waters for resting during the day. Restricted levels of gene flow have been documented among some island populations (Oremus *et al.* 2007; Viricel *et al.* 2016) and among pelagic populations in eastern tropical Pacific (Leslie and Morin 2016). The species' distribution in the western North Atlantic is very poorly known. Spinner dolphin sightings have occurred almost exclusively in deeper (>2,000 m) oceanic waters (CETAP 1982; Waring *et al.* 1992) off the northeast U.S. coast. There was one sighting during summer 2011 in oceanic waters off North Carolina, and two additional sightings during summer 2016 in oceanic waters off Virginia (Figure 1). They are more commonly sighted in the Gulf of Mexico than the western North Atlantic. Stranding records exist from North Carolina, South Carolina, Florida, and Puerto Rico in the Atlantic, and in Texas, Louisiana, Alabama, and Florida in the Gulf of Mexico.

Spinner dolphins in the western North Atlantic are managed separately from those in the northern Gulf of Mexico. Although there have been no directed studies of the degree of demographic independence between the two areas, this management structure is consistent with evidence for population structure in other areas, including more pelagic waters of the eastern tropical Pacific (Leslie and Morin 2016), and is further supported because the two stocks occupy distinct marine ecoregions (Spalding *et al.* 2007; Moore and Merrick 2011). Due to the paucity of sightings, there are insufficient data to determine whether the western North Atlantic stock comprises multiple demographically independent populations. Additional morphological, acoustic, genetic, and/or behavioral data are needed to further delineate population structure within the western North Atlantic and across the broader geographic area.

POPULATION SIZE

The best abundance estimate available for spinner dolphins in the western North Atlantic is 4,102 (CV=0.99; Garrison 2020; Palka 2020). This estimate is from summer 2016 surveys covering waters from central Florida to the lower Bay of Fundy. The number of spinner dolphins off the U.S. Atlantic coast has not previously been estimated because there have only been three sightings during recent NMFS surveys.

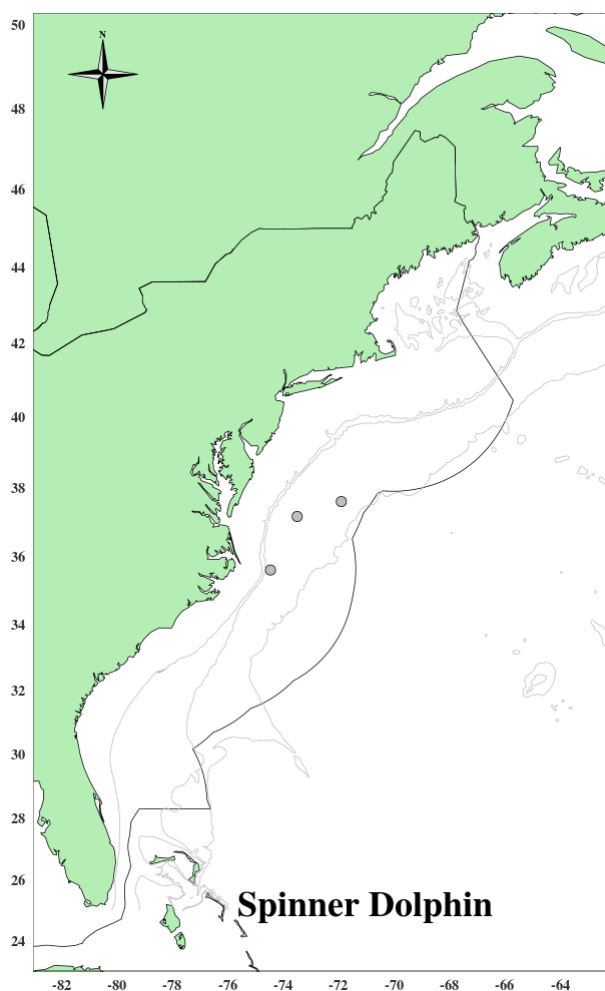


Figure 1. Distribution of spinner dolphin sightings from NEFSC and SEFSC shipboard (circles) and aerial (squares) surveys during 1995, 1998, 1999, 2002, 2004, 2006, 2007, 2008, 2010, 2011 and 2016. Isobaths are the 200m, 1,000m and 4,000m depth contours. The darker line indicates the U.S. EEZ.

Recent surveys and abundance estimates

Abundance estimates of 160 (CV=0; based on a single sighting) and 3,942 (CV=1.03) spinner dolphins were generated from vessel surveys conducted in U.S. waters of the western North Atlantic during the summer of 2016 (Garrison 2020; Palka 2020). One survey was conducted from 27 June to 25 August in waters north of 38°N latitude and consisted of 5,354 km of on-effort trackline along the shelf break and offshore to the U.S. EEZ (NEFSC and SEFSC 2018). The second vessel survey covered waters from Central Florida to approximately 38°N latitude between the 100-m isobaths and the U.S. EEZ during 30 June–19 August. A total of 4,399 km of trackline was covered on effort (NEFSC and SEFSC 2018). Both surveys utilized two visual teams and an independent observer approach to estimate detection probability on the trackline (Laake and Borchers 2004). Mark-recapture distance sampling was used to estimate abundance. Estimates from the two surveys were combined and CVs pooled to produce a species abundance estimate for the stock area.

Minimum Population Estimate

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normally distributed best abundance estimate. This is equivalent to the 20th percentile of the log-normal distribution as specified by Wade and Angliss (1997). The best estimate of abundance for spinner dolphins is 4,102 (CV=0.99). The minimum population estimate for spinner dolphins is 2,045.

Current Population Trend

There are insufficient data to determine the population trends for this stock because only one estimate of population size is available.

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 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 (MMPA Sec. 3. 16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is unknown. 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 because this stock is of unknown status. PBR for the western North Atlantic spinner dolphin is 20

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Total annual estimated fishery-related mortality and serious injury to this stock during 2013–2017 was presumed to be zero, as there were no reports of mortalities or serious injuries to spinner dolphins in the western North Atlantic.

Fishery Information

The commercial fisheries that interact, or that could potentially interact, with this stock in the Atlantic Ocean are the Category I Atlantic Highly Migratory Species longline and Atlantic Ocean, Caribbean, Gulf of Mexico large pelagics longline fisheries (Appendix III). Percent observer coverage (percentage of sets observed) for these longline fisheries for each year during 2013–2017 was 9, 10, 12, 15, and 12, respectively.

The Atlantic Highly Migratory Species longline fishery operates outside the U.S. EEZ. No takes of spinner dolphins within high seas waters of the Atlantic Ocean have been observed or reported thus far.

The Atlantic Ocean, Caribbean, Gulf of Mexico large pelagics longline fishery operates in the U.S. Atlantic (including Caribbean) and Gulf of Mexico EEZ, and pelagic swordfish, tunas and billfish are the target species. There were no observed mortalities or serious injuries to spinner dolphins by this fishery in the Atlantic Ocean during 2013–2017 (Garrison and Stokes 2014; 2016; 2017; 2019; 2020).

Other Mortality

During 2013–2017, two spinner dolphins were reported stranded on the U.S. East Coast, both occurring in Florida

(one in 2016, one in 2017) (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 13 June 2018 (SER) and 8 June 2018 (NER)). It could not be determined whether there was evidence of human interaction for one of the strandings, and for the other, no evidence of human interaction was detected. Stranding data probably underestimate the extent of human and fishery-related mortality and serious injury because not all of the marine mammals that die or are seriously injured in human interactions wash ashore, or, if they do, they are not all recovered (Peltier *et al.* 2012; Wells *et al.* 2015). In particular, shelf and slope stocks in the western North Atlantic are less likely to strand than nearshore coastal stocks. Additionally, not all carcasses will show evidence of human interaction, entanglement or other fishery-related interaction due to decomposition, scavenger damage, etc. (Byrd *et al.* 2014). Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of human interaction.

HABITAT ISSUES

Anthropogenic sound in the world's oceans has been shown to affect marine mammals, with vessel traffic, seismic surveys, and active naval sonars being the main anthropogenic contributors to low- and mid-frequency noise in oceanic waters (e.g., Nowacek *et al.* 2015; Gomez *et al.* 2016; NMFS 2018). The long-term and population consequences of these impacts are less well-documented and likely vary by species and other factors. Impacts on marine mammal prey from sound are also possible (Carroll *et al.* 2017), but the duration and severity of any such prey effects on marine mammals are unknown.

The chronic impacts of contaminants (polychlorinated biphenyls [PCBs] and chlorinated pesticides [DDT, DDE, dieldrin, etc.]) on marine mammal reproduction and health are of concern (e.g., Schwacke *et al.* 2002; Jepson *et al.* 2016; Hall *et al.* 2018), but research on contaminant levels for this stock is lacking.

Climate-related changes in spatial distribution and abundance, including poleward and depth shifts, have been documented in or predicted for plankton species and commercially important fish stocks (Nye *et al.* 2009; Pinsky *et al.* 2013; Poloczanska *et al.* 2013; Grieve *et al.* 2017; Morley *et al.* 2018) and cetacean species (e.g., MacLeod 2009; Sousa *et al.* 2019). There is uncertainty in how, if at all, the distribution and population size of this species will respond to these changes and how the ecological shifts will affect human impacts to the species.

STATUS OF STOCK

Spinner dolphins are not listed as threatened or endangered under the Endangered Species Act, and the western North Atlantic stock is not considered strategic under the Marine Mammal Protection Act. No fishery-related mortality or serious injury has been observed in recent years; therefore, total fishery-related mortality and serious injury can be considered insignificant and approaching the zero mortality and serious injury rate. The status of spinner dolphins in the U.S. western North Atlantic EEZ relative to OSP is unknown. There are insufficient data to determine the population trends for this species.

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