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

STOCK DEFINITION AND GEOGRAPHIC RANGE

The northern Gulf of Mexico (i.e., U.S. Gulf of Mexico) Continental Shelf Stock of common bottlenose dolphins inhabits waters from 20 to 200 m deep in the northern Gulf from the U.S.-Mexican border to the Florida Keys (Figure 1). Genetically distinct "coastal" and "offshore" ecotypes of bottlenose dolphins (Hoelzel *et al.* 1998; Vollmer 2011) occur in the Gulf of Mexico, and the Continental Shelf Stock, while predominantly of the coastal ecotype, may also include dolphins of the offshore ecotype (Vollmer 2011). The Continental Shelf Stock range may extend into Mexican and Cuban territorial waters; for example, a stranded dolphin from the Florida Panhandle was rehabilitated and released over the shelf off western Florida and traveled into the Atlantic Ocean (Wells *et al.* 1999). However, there are no available estimates of either abundance or mortality from Mexico or Cuba to incorporate in this assessment. Recently, genetic analyses of population structure in coastal, shelf, and oceanic waters of the Gulf of Mexico revealed seven demographically independent populations in the northern Gulf of Mexico, suggesting the current stock designations and boundaries in these waters do not accurately reflect the population structure (Vollmer and Rosel 2017). In continental shelf waters, at least two demographically independent populations were identified, split in the north central Gulf of Mexico (Vollmer and Rosel 2017).

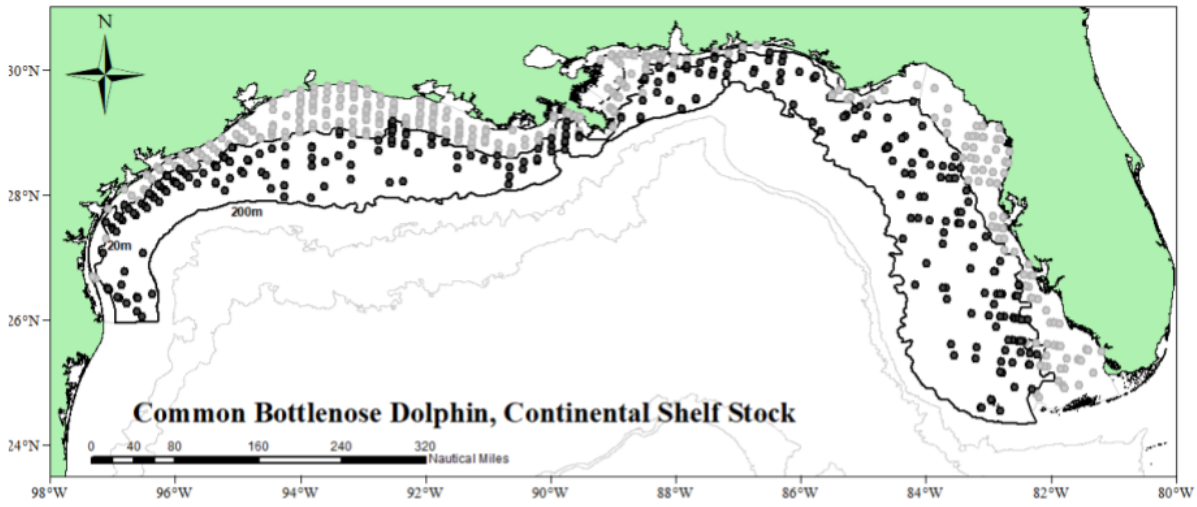

Figure 1. Distribution of common bottlenose dolphin on-effort sightings in coastal (gray circles) and continental shelf (black circles) waters during SEFSC aerial surveys in summer 2017, winter 2018, and fall 2018. Isobaths are the 20-m, 200-m, 1,000-m, and 2,000-m depth contours.

This stock's boundaries abut other bottlenose dolphin stocks, namely the Oceanic Stock and the three coastal stocks. While individuals from different stocks may occasionally overlap, the degree of overlap is unknown and it is not thought that significant mixing or interbreeding occurs between them. Genetic studies have shown significant differentiation between inshore stocks and the adjacent coastal stock (Sellas *et al.* 2005) and among dolphins living in coastal and shelf waters (Vollmer 2011; Vollmer and Rosel 2017). These results suggest that if there is spatial overlap there may be mechanisms reducing interbreeding between the stocks.

POPULATION SIZE

The best abundance estimate available for the northern Gulf of Mexico Continental Shelf Stock of common bottlenose dolphins is 63,280 (CV=0.11; Table 1; Garrison *et al.* 2021). This estimate is from an inverse-variance weighted average of seasonal abundance estimates from aerial surveys conducted during summer 2017 and fall 2018.

Earlier Abundance Estimates

Please see Appendix IV for a summary of abundance estimates, including earlier estimates and survey descriptions.

Recent Survey and Abundance Estimate

The Southeast Fisheries Science Center conducted aerial surveys of continental shelf waters (shoreline to 200 m depth) along the U.S. Gulf of Mexico coast from the Florida Keys to the Texas/Mexico border during summer (June–August) 2017 and fall (October–November) 2018 (Garrison *et al.* 2021). The stock was only partially surveyed during a winter 2018 aerial survey, and therefore this survey was not included in the current abundance estimates (Garrison *et al.* 2021). The surveys were conducted along tracklines oriented perpendicular to the shoreline and spaced 20 km apart. The total survey effort varied during each survey due to weather conditions, and was 10,781 km (fall) and 14,590 km (summer). Each of these surveys was conducted using a two-team approach to develop estimates of visibility bias using the independent observer approach with Distance analysis (Laake and Borchers 2004). Abundance was calculated using mark-recapture distance sampling implemented in package mrds (version 2.21; Laake *et al.* 2020) in the R statistical programming language. This approach estimates both the probability of detection on the trackline and within the surveyed strip accounting for the effects of sighting conditions (e.g., sea state, glare, turbidity, and cloud cover). A different detection probability model was used for each seasonal survey (Garrison *et al.* 2021). The survey data were post-stratified into spatial boundaries corresponding to the defined boundaries of common bottlenose dolphin stocks within the surveyed area. The abundance estimates for the Continental Shelf Stock of common bottlenose dolphins were based upon tracklines and sightings in waters from the 20-m to the 200-m isobaths and between the Texas-Mexico border and the Florida Keys. The seasonal abundance estimates for this stock were: summer – 74,959 (CV=0.15) and fall – 52,090 (CV=0.14). Due to the uncertainty in stock movements and apparent seasonal variability in the abundance of the stock, a weighted average of these seasonal estimates was taken where the weighting was the inverse of the CV. This approach weights estimates with higher precision more heavily in the final weighted mean. The resulting weighted mean and best estimate of abundance for the Continental Shelf Stock of common bottlenose dolphins was 63,280 (CV=0.11; Table 1; Garrison *et al.* 2021).

Table 1. Most recent abundance estimate (N_{est}) and coefficient of variation (CV) of the northern Gulf of Mexico Continental Shelf Stock of common bottlenose dolphins (20 – 200-m isobaths) based on season/year aerial surveys.

Years	Area	N_{est}	CV
2017, 2018	Gulf of Mexico	63,280	0.11

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 bottlenose dolphins is 63,280 (CV=0.11). The minimum population estimate for the northern Gulf of Mexico is 57,917 (Table 2).

Current Population Trend

The statistical power to detect a trend in abundance for this stock is poor due to the relatively imprecise abundance estimates and long intervals between surveys. For example, the power to detect a precipitous decline in abundance (i.e., 50% decrease in 15 years) with estimates of low precision (e.g., CV>0.30) remains below 80% (alpha=0.30) unless surveys are conducted on an annual basis (Taylor *et al.* 2007). Two point estimates of common bottlenose dolphin abundance for the Continental Shelf Stock have been made based on aerial data from surveys during 2011−2012 and 2017−2018 (Garrison *et al.* 2021). Each of these surveys had a similar design and was conducted using the same aircraft and observer configuration. The resulting inverse variance weighted best abundance estimates for seasonal surveys were: 2011–2012 – 48,060 (CV=0.11) and 2017−2018 – 63,280 (CV=0.11). A trends analysis is not possible because there are only two abundance estimates available. For further information on comparisons of old and current abundance estimates for this stock see Garrison *et al.* (2021).

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 (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 57,917. The maximum productivity rate is 0.04, the default value for cetaceans. The recovery factor is 0.48 because the CV of the shrimp trawl mortality estimates is greater than 0.3 (Wade and Angliss 1997). PBR for the Gulf of Mexico Continental Shelf Stock of common bottlenose dolphins is 556 (Table 2).

Table 2. Best and minimum abundance estimates of the northern Gulf of Mexico Continental Shelf Stock of common bottlenose dolphins with Maximum Productivity Rate (R_{max}), Recovery Factor (F_r) and PBR.

N_{est}	N_{est} CV	N_{min}	F_r	R_{max}	PBR
63,280	0.11	57,917	0.48	0.04	556

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Total annual fishery-related mortality and serious injury for the Continental Shelf Stock of common bottlenose dolphins during 2015–2019 is unknown because this stock is known to interact with unobserved fisheries (see below). The minimum mean annual fishery-related mortality and serious injury during 2015–2019 was 64 (CV=0.34) based on observer data for the commercial shrimp trawl fishery (Table 3; see Fisheries Information section below), and 0.6 for the commercial reef fish fishery. Mean annual mortality and serious injury during 2015–2019 due to the *Deepwater Horizon* (DWH) oil spill was predicted to be 231 continental shelf dolphins, which includes both Atlantic spotted dolphins and the Continental Shelf Stock of common bottlenose dolphins (see Appendix VI). Therefore, the mean annual mortality and serious injury for the Continental Shelf Stock of common bottlenose dolphins during 2015–2019 due to the DWH oil spill is unknown. Mean annual mortality and serious injury during 2015–2019 due to other human-caused actions (research take in hook and line fishing gear) was 0.2. The minimum total mean annual human-caused mortality and serious injury for this stock during 2015–2019 was, therefore, 65 (Table 3). This is considered a minimum because 1) not all fisheries that could interact with this stock are observed and/or observer coverage is very low, and 2) the population model used to estimate population decline for the northern Gulf of Mexico stocks impacted by the DWH oil spill includes both Atlantic spotted dolphins and common bottlenose dolphins inhabiting the continental shelf and does not estimate mortality and serious injury to common bottlenose dolphins alone. Therefore no estimate for injury has been included for the Continental Shelf Stock of common bottlenose dolphins due to the DWH oil spill.

Fisheries Information

There are four commercial fisheries that interact, or that potentially could interact, with this stock. These include one Category II fishery (Southeastern U.S. Atlantic, Gulf of Mexico shrimp trawl commercial fishery) and three Category III fisheries (Southeastern U.S. Atlantic, Gulf of Mexico shark bottom longline/hook-and-line; Southeastern U.S. Atlantic, Gulf of Mexico, Caribbean snapper-grouper and other reef fish; and Atlantic Ocean, Gulf of Mexico, Caribbean commercial passenger fishing vessel (hook and line). Detailed fishery information is presented in Appendix III.

Note: Animals reported in the sections to follow were ascribed to a stock or stocks of origin following methods described in Maze-Foley et al. (2019). These include strandings, observed takes (through an observer program), fisherman self-reported takes (through the Marine Mammal Authorization Program), research takes, and opportunistic at-sea observations.

Shrimp Trawl

Between 1997 and 2019, 13 common bottlenose dolphins and nine unidentified dolphins, which could have been either common bottlenose dolphins or Atlantic spotted dolphins, became entangled in the lazy line, turtle excluder

device or tickler chain gear in observed trips of the commercial shrimp trawl fishery in the Gulf of Mexico (Soldevilla *et al.* 2021). All dolphin bycatch interactions resulted in mortalities except for one unidentified dolphin that was released alive in 2009 (Maze-Foley and Garrison 2016). Soldevilla *et al.* (2015, 2016, 2021) provided mortality estimates calculated from analysis of shrimp fishery effort data and NMFS's Observer Program bycatch data. Annual mortality estimates were calculated for the years 2015–2019 from stratified annual fishery effort and bycatch rates, and the five-year unweighted mean mortality estimate was calculated for Gulf of Mexico dolphin stocks (Soldevilla *et al.* 2021). The four-area (TX, LA, MS/AL, FL) stratification method was chosen because it best approximates how fisheries operate (Soldevilla *et al.* 2015, 2016, 2021). The mean annual mortality estimate for the continental shelf bottlenose dolphin stock is 64 (CV=0.34). Limitations and biases of annual bycatch mortality estimates are described in detail in Soldevilla *et al.* (2015, 2016, 2021).

Shark Bottom Longline

No interactions between common bottlenose dolphins and this fishery were observed during 2015–2019 (Enzenauer *et al.* 2016; Mathers *et al.* 2017, 2018, 2020, *in press*). The shark bottom longline fishery has been observed since 1994, and three interactions with bottlenose dolphins have been recorded, two of which likely involved the Continental Shelf Stock: one mortality (2003) and one hooked animal that escaped at the vessel (2002; Burgess and Morgan 2003). For the shark bottom longline fishery in the Gulf of Mexico, Richards (2007) estimated common bottlenose dolphin mortalities of 58 (CV=0.99), 0 and 0 for 2003, 2004 and 2005, respectively.

Reef Fish

During 2015–2019, two mortalities and one serious injury were observed in the snapper-grouper and other reef fish fishery. During 2019 a mortality occurred when a dolphin was hooked in the mouth/jaw, and during 2016 a mortality occurred when a dolphin was entangled by its flukes in the mainline of bottom longline gear. During 2018, a serious injury occurred in which a common bottlenose dolphin that was entangled broke the mainline and swam away with the terminal tackle of the bandit (25 hooks and a weight; Maze-Foley and Garrison 2020). All three animals were likely from the Continental Shelf Stock, with the two mortalities occurring off Florida's west coast and the serious injury occurring off Louisiana. In July 2006, NMFS implemented a mandatory observer program for this commercial fishery operating within the U.S. Gulf of Mexico (Scott-Denton *et al.* 2011).

Hook and Line (Rod and Reel)

During 2015–2019, there were no documented interactions between common bottlenose dolphins and this fishery. It is not possible to estimate the total number of interactions with hook and line gear because there is no observer program.

Other Mortality

A population model was developed to estimate the injury and time to recovery for stocks affected by the DWH oil spill, taking into account long-term effects resulting from mortality, reproductive failure, reduced survival rates, and the proportion of the stock exposed to DWH oil (DWH MMIQT 2015). Overall, the model estimated that continental shelf dolphins, which included Atlantic spotted dolphins and the continental shelf stock of common bottlenose dolphins, experienced a 3% maximum reduction in population size due to the oil spill (DWH MMIQT 2015). The mortality projected for the years 2010–2014 due to the spill has not been reported previously. Based on the population model, it was projected that 3,384 continental shelf dolphins died during 2010–2014 (five-year annual average of 677) due to elevated mortality associated with oil exposure (see Appendix VI). For the 2015–2019 reporting period of this SAR, the population model estimated 1,153 continental shelf dolphins died due to elevated mortality associated with oil exposure. The population model used to predict shelf dolphin mortality due to the DWH event has a number of sources of uncertainty. Model parameters (e.g., survival rates, reproductive rates, and life-history parameters) were derived from literature sources for common bottlenose dolphins occupying waters outside of the Gulf of Mexico. In addition, proxy values for the effects of DWH oil exposure on both survival rates and reproductive success were applied based upon estimated values for common bottlenose dolphins in Barataria Bay. Finally, there was no estimation of uncertainty in model parameters or outputs.

During 2017, one animal ascribed to the Continental Shelf Stock was seriously injured due to entanglement in research hook and line fishing gear (Maze-Foley and Garrison 2020). This animal was included in the annual human-caused mortality and serious injury total for this stock (Table 3) and in the stranding database (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 25 August 2020).

The use of explosives to remove oil rigs in portions of the continental shelf 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 Herczeg 1994). There were no reports of either serious injury or mortality to common bottlenose dolphins during 2015–2019.

Table 3. Summary of the incidental mortality and serious injury of common bottlenose dolphins (Tursiops truncatus) of the Continental Shelf Stock. For fisheries that do not have an ongoing, federal observer program, counts of mortality and serious injury were based on stranding data, at-sea observations, or fisherman self-reported takes via the Marine Mammal Authorization Program (MMAP). For strandings, at-sea counts, and fisherman self-reported takes, the number reported is a minimum because not all strandings, at-sea cases, or gear interactions are detected. See the Annual Human-Caused Mortality and Serious Injury section for biases and limitations of mortality estimates, and the Strandings section for limitations of stranding data. NA = not applicable.

Fishery	Years	Data Type	Mean Annual Estimated Mortality and Serious Injury Based on Observer Data	5-year Minimum Count Based on Stranding, At-Sea, MMAP, or Observer Data
Shrimp Trawl	2015–2019	Observer Data	64 (CV=0.34)	NA
Shark Bottom Longline	2015–2019	Observer Data	NA	0
Reef Fish	2015–2019	Observer Data	NA	3
Hook and Line	2015–2019	Stranding Data and At-Sea Observations	NA	0
Mean Annual Mortality due to commercial fisheries (2015–2019)			**64.6**	
Mean Annual Mortality due to research takes, other takes, and DWH (2015–2019)			**0.2**	
Minimum Total Mean Annual Human-Caused Mortality and Serious Injury (2015–2019)			**65**	

Strandings

During 2015–2019, 2,007 common bottlenose dolphins were found stranded in the northern Gulf of Mexico (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 25 August 2020). Of these, 207 showed evidence of human interactions (e.g., gear entanglement, mutilation, gunshot wounds). It should be noted that evidence of human interaction does not necessarily mean the interaction caused the animal's stranding or death. The vast majority of stranded bottlenose dolphins are assumed to come from stocks that live nearest to land, namely the bay, sound and estuary stocks and the three coastal stocks. Nevertheless, it is possible that some of the stranded bottlenose dolphins belonged to the Continental Shelf or Oceanic Stocks and that they were among those strandings with evidence of human interactions. (Strandings do occur for other cetacean species whose primary range in the Gulf of Mexico is outer continental shelf or oceanic waters.)

An Unusual Mortality Event (UME) was declared for cetaceans in the northern Gulf of Mexico beginning 1 March 2010 and ending 31 July 2014 (Litz *et al.* 2014; https://www.fisheries.noaa.gov/national/marine-life-distress/2010-2014-cetacean-unusual-mortality-event-northern-gulf-mexico). It included cetaceans that stranded prior to the DWH oil spill (see "Habitat Issues" below), during the spill, and after. Exposure to the DWH oil spill was determined to be the primary underlying cause of the elevated stranding numbers in the northern Gulf of Mexico after the spill (e.g., Schwacke *et al.* 2014; Venn-Watson *et al.* 2015; Colegrove *et al.* 2016; DWH NRDAT 2016; see Habitat Issues

section). During 2010–2014, 973 common bottlenose dolphins were considered to be part of the UME. The vast majority of stranded common bottlenose dolphins are assumed to belong to one of the coastal stocks or to bay, sound and estuary stocks. Nevertheless, it is possible that some of the stranded common bottlenose dolphins considered part of the UME belonged to the Continental Shelf Stock.

HABITAT ISSUES

The *Deepwater Horizon* MC252 drilling platform, located approximately 80 km southeast of the Mississippi River Delta in waters about 1,500 m deep, exploded on 20 April 2010. The rig sank, and over 87 days up to ~3.2 million barrels of oil were discharged from the wellhead until it was capped on 15 July 2010 (DWH NRDAT 2016). Shortly after the oil spill, the Natural Resource Damage Assessment (NRDA) process was initiated under the Oil Pollution Act of 1990. A variety of NRDA research studies were conducted to determine potential impacts of the spill on marine mammals. These studies estimated that 13% (95% CI: 9–19) of continental shelf dolphins, including Atlantic spotted dolphins and the continental shelf stock of common bottlenose dolphins, in the Gulf were exposed to oil, that 6% (95% CI: 3–8) of females suffered from reproductive failure, and 5% (95% CI: 2–7) of continental shelf dolphins suffered adverse health effects (DWH MMIQT 2015). A population model estimated that the stock experienced a 3% maximum reduction in population size (see Other Mortality section above).

STATUS OF STOCK

Common bottlenose dolphins are not listed as threatened or endangered under the Endangered Species Act, and the northern Gulf of Mexico Continental Shelf Stock is not considered strategic under the MMPA. Total U.S. fishery-related mortality and serious injury for this stock is unknown, but at a minimum is greater than 10% of the calculated PBR and, therefore, cannot be considered to be insignificant and approaching zero mortality and serious injury rate. The status of bottlenose dolphins, relative to optimum sustainable population, in the northern Gulf of Mexico continental shelf waters is unknown. There are insufficient data to determine population trends for this stock.

REFERENCES CITED

Barlow, J., S.L. Swartz, T.C. Eagle and P.R. Wade. 1995. U.S. marine mammal stock assessments: Guidelines for preparation, background, and a summary of the 1995 assessments. NOAA Tech. Memo. NMFS-OPR-6. 73pp.

Burgess, G. and A. Morgan. 2003. Commercial shark fishery observer program. Renewal of an observer program to monitor the directed commercial shark fishery in the Gulf of Mexico and the south Atlantic: 2002(2) and 2003(1) fishing seasons. Final Report, U.S. National Marine Fisheries Service, Highly Migratory Species Management Division Award NA16FM0598.

Burn, D. and G.P. Scott. 1988. Synopsis of available information on marine mammals-fisheries interactions in the southeastern United States: Preliminary report. NMFS/SEFC, Miami Laboratory, Coastal Resources Division, Contribution ML-CRG-87/88-26. 37pp.

Colegrove, K.M., S. Venn-Watson, J. Litz, M.J. Kinsel, K.A. Terio, E. Fougeres, R. Ewing, D.A. Pabst, W.A. McLellan, S. Raverty, J. Saliki, S. Fire, G. Rappucci, S. Bowen-Stevens, L. Noble, A. Costidis, M. Barbieri, C. Field, S. Smith, R.H. Carmichael, C. Chevis, W. Hatchett, D. Shannon, M. Tumlin, G. Lovewell, W. McFee and T.K. Rowles. 2016. Fetal distress and *in utero* pneumonia in perinatal dolphins during the Northern Gulf of Mexico unusual mortality event. Dis. Aquat. Org. 119(1):1–16.

DWH [*Deepwater Horizon*] MMIQT. 2015. Models and analyses for the quantification of injury to Gulf of Mexico cetaceans from the *Deepwater Horizon* Oil Spill, MM_TR.01_Schwacke_Quantification.of.Injury.to.GOM.Cetaceans. Southeast Fisheries Science Center, Protected Resources and Biodiversity Division, 75 Virginia Beach Dr., Miami, Florida 33140. PRBD Contribution #: PRBD-2020-02.

DWH NRDAT [*Deepwater Horizon* Natural Resource Damage Assessment Trustees]. 2016. *Deepwater Horizon* oil spill: Final programmatic damage assessment and restoration plan and final programmatic environmental impact statement. http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan

Enzenauer, M.P., B.M. Deacy and J.K. Carlson. 2016. Characterization of the shark bottom longline fishery, 2015. NOAA Tech. Memo. NMFS-SEFSC-689. 23pp.

Garrison, L.P., J. Ortega-Ortiz and G. Rappucci. 2021. Abundance of coastal and continental shelf stocks of common bottlenose and Atlantic spotted dolphins in the northern Gulf of Mexico: 2017–2018. Southeast Fisheries Science Center, Protected Resources and Biodiversity Division, 75 Virginia Beach Dr., Miami, Florida 33140. PRD-2021-01. 25pp.

Gitschlag, G.R. and B.A. Herczeg. 1994. Sea turtle observations at explosive removals of energy structures. Mar. Fish. Rev. 56(2):1–8.

Hoelzel, A.R., C.W. Potter and P.B. Best. 1998. Genetic differentiation between parapatric 'nearshore' and 'offshore' populations of the bottlenose dolphin. Proc. R. Soc. Lond. B 265:1177–1183.

Laake, J.L. and D.L. Borchers. 2004. Methods for incomplete detection at distance zero. Pages 108-189 *in:* S.T. Buckland, D.R. Andersen, K.P. Burnham, J.L. Laake and L. Thomas (eds). Advanced distance sampling. Oxford University Press, New York. 434pp.

Laake, J., D. Borchers, L. Thomas, D. Miller and J. Bishop. 2020. Package 'mrds': Mark-recapture distance sampling. Version 2.2.3. http://github.com/DistanceDevelopment/mrds/

Litz, J.A., M.A. Baran, S.R. Bowen-Stevens, R.H. Carmichael, K.M. Colegrove, L.P. Garrison, S.E. Fire, E.M. Fougeres, R. Hardy, S. Holmes, W. Jones, B.E. Mase-Guthrie, D.K. Odell, P.E. Rosel, J.T. Saliki, D.K. Shannon, S.F. Shippee, S.M. Smith, E.M. Stratton, M.C. Tumlin, H.R. Whitehead, G.A.J. Worthy and T.K. Rowles. 2014. Review of historical unusual mortality events (UMEs) in the Gulf of Mexico (1990–2009): Providing context for the complex and long-lasting northern Gulf of Mexico cetacean UME. Dis. Aquat. Organ. 112:161–175.

Mathers, A.N., B.M. Deacy, M.P. Enzenauer and J.K. Carlson. 2017. Characterization of the shark bottom longline fishery, 2016. NOAA Tech. Memo. NMFS-SEFSC-714. 23pp.

Mathers, A.N., B.M. Deacy, H.E. Moncrief-Cox and J.K. Carlson. 2018. Characterization of the shark bottom longline fishery, 2017. NOAA Tech. Memo. NMFS-SEFSC-727. 21pp.

Mathers, A.N., B.M. Deacy, H.E. Moncrief-Cox and J.K. Carlson. 2020. Characterization of the shark bottom longline fishery: 2018. NOAA Tech. Memo. NMFS-SEFSC-744. 26pp.

Mathers, A.N., B.M. Deacy, H.E. Moncrief-Cox and J.K. Carlson. *in press*. Characterization of the shark bottom longline fishery: 2019. NOAA Tech. Memo.

Maze-Foley, K. and L.P. Garrison. 2016. Serious injury determinations for small cetaceans off the southeast U.S. coast, 2007–2011. Southeast Fisheries Science Center, Protected Resources and Biodiversity Division, 75 Virginia Beach Dr., Miami, FL 33140. PRBD Contribution # PRBD-2016-04. 16pp.

Maze-Foley, K. and L.P. Garrison. 2020. Serious injury determinations for small cetaceans off the southeast U.S. coast, 2014–2018. Southeast Fisheries Science Center, Protected Resources and Biodiversity Division, 75 Virginia Beach Dr., Miami, FL 33140. PRBD Contribution # PRBD-2020-06. 43pp.

Maze-Foley, K., B.L. Byrd, S.C. Horstman and J.R. Powell. 2019. Analysis of stranding data to support estimates of mortality and serious injury in common bottlenose dolphin (*Tursiops truncatus truncatus*) stock assessments for the Atlantic Ocean and Gulf of Mexico. NOAA Technical Memorandum NMFS-SEFSC-742. 42pp. https://repository.library.noaa.gov/view/noaa/23151

Richards, P.M. 2007. Estimated takes of protected species in the commercial directed shark bottom longline fishery 2003, 2004, and 2005. NMFS SEFSC Contribution PRD-06/07-08, June 2007. 21pp.

Schwacke, L.H., C.R. Smith, F.I. Townsend, R.S. Wells, L.B. Hart, B.C. Balmer, T.K. Collier, S. De Guise, M.M. Fry, L.J. Guillette, S.V. Lamb, S.M. Lane, W.E. McFee, N.J. Place, M.C. Tumlin, G.M. Ylitalo, E.S. Zolman and T.K. Rowles. 2014. Health of bottlenose dolphins (*Tursiops truncatus*) in Barataria Bay, Louisiana following the *Deepwater Horizon* oil spill. Environ. Sci. Technol. 48(1):93–103.

Scott-Denton, E., P.F. Cryer, J.P. Gocke, M.R. Harrelson, D.L. Kinsella, J.R. Pulver, R.C. Smith and J. Williams. 2011. Descriptions of the U.S. Gulf of Mexico reef fish bottom longline and vertical line fisheries based on observer data. Mar. Fish. Rev. 73(2):1–26.

Sellas, A.B., R.S. Wells and P.E. Rosel. 2005. Mitochondrial and nuclear DNA analyses reveal fine scale geographic structure in bottlenose dolphins (*Tursiops truncatus*) in the Gulf of Mexico. Conserv. Genet. 6: 715–728.

Soldevilla, M.S., L.P. Garrison, E. Scott-Denton and J.M. Nance. 2015. Estimation of marine mammal bycatch mortality in the Gulf of Mexico shrimp otter trawl fishery. NOAA Tech. Memo. NMFS-SEFSC-672. 70pp.

Soldevilla, M.S., L.P. Garrison, E. Scott-Denton and R.A. Hart. 2016. Estimated bycatch mortality of marine mammals in the Gulf of Mexico shrimp otter trawl fishery during 2012 to 2014. NOAA Tech. Memo. NMFS-SEFSC-697. 47pp.

Soldevilla, M.S., L.P. Garrison, E. Scott-Denton and J. Primrose. 2021. Estimated bycatch mortality of marine mammals in the Gulf of Mexico shrimp otter trawl fishery during 2015 to 2019. NOAA Tech. Memo. NMFS-SEFSC-749. 78pp.

Taylor, B.L., M. Martinez, T. Gerrodette, J. Barlow and Y.N. Hrovat. 2007. Lessons from monitoring trends in abundance in marine mammals. Mar. Mamm. Sci. 23(1):157–175.

Venn-Watson, S., K.M. Colegrove, J. Litz, M. Kinsel, K. Terio, J. Saliki, S. Fire, R. Carmichael, C. Chevis, W. Hatchett, J. Pitchford, M. Tumlin, C. Field, S. Smith, R. Ewing, D. Fauquier, G. Lovewell, H. Whitehead, D. Rotstein, W. McFee, E. Fougeres and T. Rowles. 2015. Adrenal gland and lung lesions in Gulf of Mexico common bottlenose dolphins (*Tursiops truncatus*) found dead following the *Deepwater Horizon* Oil Spill. PLoS ONE 10(5):e0126538.

Vollmer, N.L. 2011. Population structure of common bottlenose dolphins in coastal and offshore waters of the Gulf of Mexico revealed by genetic and environmental analyses. Ph.D. Dissertation from University of Louisiana at Lafayette. 420pp.

Vollmer, N.L. and P.E. Rosel. 2017. Fine-scale population structure of common bottlenose dolphins (*Tursiops truncatus*) in offshore and coastal waters of the US Gulf of Mexico. Mar. Biol. 164:160.

Wade, P.R. and R.P. Angliss. 1997. Guidelines for assessing marine mammal stocks: Report of the GAMMS Workshop April 3–5, 1996, Seattle, WA. NOAA Tech Memo. NMFS-OPR-12. 93pp.

Wells, R.S., H.L. Rhinehart, P. Cunningham, J. Whaley, M. Baran, C. Koberna and D.P. Costa. 1999. Long-distance offshore movements of bottlenose dolphins. Mar. Mamm. Sci. 15(4):1098–1114.