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

STOCK DEFINITION AND GEOGRAPHIC RANGE

Common bottlenose dolphins inhabit coastal waters throughout the northern Gulf of Mexico (i.e., U.S. Gulf of Mexico; Mullin *et al.* 1990). As a working hypothesis, it is assumed that the dolphins occupying habitats with dissimilar climatic, coastal and oceanographic characteristics might be restricted in their movements between habitats, and thus constitute separate stocks. Therefore, northern Gulf of Mexico coastal waters have been divided for management purposes into three stock areas: eastern, northern and western, with coastal waters defined as waters between the shore, barrier islands or presumed outer bay boundaries out to the 20-m isobath (Figure 1). The 20-m depth seaward boundary corresponds to survey strata (Scott 1990; Blaylock and Hoggard 1994; Fulling *et al.* 2003), and thus represents a management boundary rather than an ecological boundary. The Eastern Coastal common bottlenose dolphin stock area extends from 84ºW longitude to Key West, Florida. The region 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. Dolphins belonging to this stock are all expected to be of the coastal ecotype (Vollmer 2011). 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). Sampling within the range of the Eastern Coastal Stock was very limited and further work is necessary to determine the boundaries of these demographically independent populations.

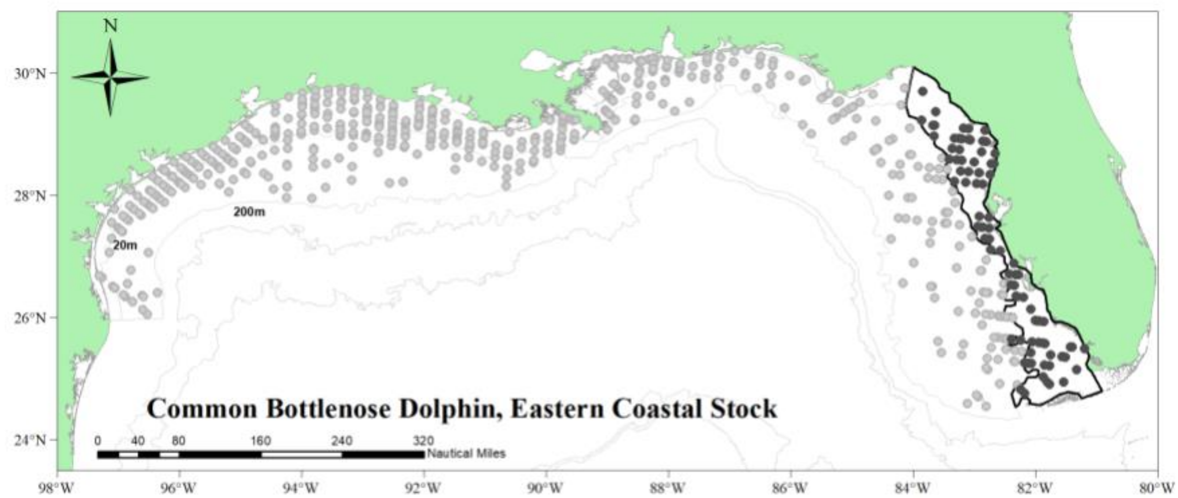

Figure 1. Distribution of common bottlenose dolphin on-effort sightings in coastal and continental shelf waters during SEFSC aerial surveys in summer 2017, winter 2018, and fall 2018. Sightings within the boundaries of the Eastern Coastal Stock are denoted by the black circles. Isobaths are the 20-m, 200-m, 1,000-m, and 2,000-m depth contours.

This stock's boundaries abut other common bottlenose dolphin stocks, namely the Continental Shelf Stock, the Northern Coastal Stock and several bay, sound and estuary stocks, and while individuals from different stocks may occasionally overlap, it is not thought that significant mixing or interbreeding occurs between them. Fazioli *et al.* (2006) conducted photo-identification surveys of coastal waters off Tampa Bay, Sarasota Bay and Lemon Bay, Florida, over 14 months. They found both 'inshore' and 'Gulf' dolphins inhabited coastal waters but the two types used coastal waters differently. Dolphins from the inshore communities were observed occasionally in Gulf near-shore waters adjacent to their inshore range, whereas 'Gulf' dolphins were found primarily in open Gulf of Mexico waters with some displaying seasonal variations in their use of the study area. The 'Gulf' dolphins did not show a preference for waters near passes as was seen for 'inshore' dolphins, but moved throughout the study area and made greater use of waters offshore of waters used by 'inshore' dolphins. During winter months abundance of 'Gulf' groups decreased while abundance for 'inshore' groups increased. These findings support an earlier report by Irvine *et al.* (1981) of increased use of pass and coastal waters by Sarasota Bay dolphins in winter. Seasonal movements of identified individuals and abundance indices suggested that part of the 'Gulf' dolphin community moved out of the study area during winter, but their destination is unknown (Fazioli *et al.* 2006). In a follow-up study, Sellas *et al.* (2005) examined genetic population subdivision in the study area of Fazioli *et al.* (2006), and found evidence of significant population structure among all areas. Rosel *et al.* (2017) also identified significant genetic differentiation between estuarine residents of Barataria Bay and the adjacent coastal stock, further supporting separation of coastal and estuarine stocks.

Finally, off Galveston, Texas, Beier (2001) reported an open population of individual dolphins in coastal waters, but several individual dolphins had been sighted previously by other researchers over a 10-year period. Some coastal animals may move relatively long distances alongshore. Two bottlenose dolphins previously seen in the South Padre Island area in Texas were seen in Matagorda Bay, 285 km north, in May 1992 and May 1993 (Lynn and Würsig 2002).

POPULATION SIZE

The best abundance estimate available for the northern Gulf of Mexico Eastern Coastal Stock of common bottlenose dolphins is 16,407 (CV=0.17; 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 Surveys and Abundance Estimates

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 Eastern Coastal Stock of common bottlenose dolphins were based upon tracklines and sightings in waters from the shoreline to the 20-m isobath and between 84°W longitude and the Florida Keys. The seasonal abundance estimates for this stock were: summer – 11,482 (CV=0.23) and fall – 21,386 (CV=0.24). 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 Eastern Coastal Stock of common bottlenose dolphins was 16,407 (CV=0.17; 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 Eastern Coastal Stock of common bottlenose dolphins (0–20-m isobaths) based on summer 2017, winter 2018, and fall 2018 aerial surveys.

Years	Area	N_{est}	CV
2017, 2018	Gulf of Mexico	16,407	0.17

Minimum Population Estimate

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 best estimate of abundance for the Eastern Coastal Stock of common bottlenose dolphins is 16,407 (CV=0.17). The minimum population estimate for the northern Gulf of Mexico Eastern Coastal Stock is 14,199 common bottlenose dolphins (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 Eastern Coastal 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. The resulting inverse variance weighted best abundance estimates for seasonal surveys were: 2011–2012 – 12,181 (CV=0.14) and 2017−2018 – 16,407 (CV=0.17). 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 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 minimum population size is 14,199. The maximum productivity rate is 0.04, the default value for cetaceans. The recovery factor is 0.4 because the CV of the shrimp trawl mortality estimate is greater than 0.8 (Wade and Angliss 1997). PBR for the northern Gulf of Mexico Eastern Coastal Stock of common bottlenose dolphins is 114 (Table 2).

Table 2. Best and minimum abundance estimates of the northern Gulf of Mexico Eastern Coastal 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
16,407	0.17	14,199	0.4	0.04	114

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

The total annual human-caused mortality and serious injury for the Eastern Coastal Stock of common bottlenose dolphins during 2015–2019 is unknown because this stock is known to interact with unobserved fisheries (see below). The five-year unweighted mean annual mortality estimate for 2015–2019 for the commercial shrimp trawl fishery was 7.6 (CV=1.05; see Shrimp Trawl section below). The mean annual fishery-related mortality and serious injury during 2015–2019 for other observations identified as fishery-caused was 1.2. Additional mortality or serious injury documented from other human-caused actions was 0.4. The minimum total mean annual human-caused mortality and serious injury for this stock during 2015–2019 was 9.2 (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, 2) stranding data are used as an indicator of fishery-related interactions and not all dead animals are recovered by the stranding network (Peltier *et al.* 2012; Wells *et al.* 2015), 3) cause of death is not (or cannot be) routinely determined for stranded carcasses, and 4) the estimate of fishery-related interactions includes an actual count of verified fishery-caused deaths and serious injuries and should be considered a minimum (NMFS 2016).

Fisheries Information

There are eight commercial fisheries that interact, or that potentially could interact, with this stock. These include three Category II fisheries (Southeastern U.S. Atlantic, Gulf of Mexico shrimp trawl; Gulf of Mexico gillnet; and

Southeastern U.S. Atlantic, Gulf of Mexico stone crab trap/pot); and five Category III fisheries (Southeastern U.S. Atlantic, Gulf of Mexico shark bottom longline/hook-and-line; Florida spiny lobster trap/pot; Gulf of Mexico blue crab trap/pot; Florida West Coast sardine purse seine; 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 Eastern Coastal Stock of common bottlenose dolphins is 7.6 (CV=1.05). Limitations and biases of annual bycatch mortality estimates are described in detail in Soldevilla *et al.* (2015, 2016, 2021).

Gillnet

During 2015–2019, there was one interaction observed between the Gulf of Mexico gillnet fishery and the Eastern Coastal Stock. During 2015, one animal was entangled and released alive without serious injury from a sink gillnet targeting Spanish mackerel (Mathers *et al.* 2016; Maze-Foley and Garrison 2020). Gillnet fishing is prohibited in Florida state waters, so there is no observer coverage of this fishery in state waters; however, there is limited observer coverage of this fishery in federal waters (e.g., Mathers *et al.* 2020). The documented interaction in this gear represents a minimum known count of interactions in the last five years.

Blue Crab, Stone Crab, and Spiny Lobster Trap/Pot

During 2015–2019, one entanglement associated with trap/pot fisheries was documented for the Eastern Coastal Stock. In 2018, one animal was disentangled from commercial stone crab trap/pot gear and released alive. It could not be determined if the animal was seriously injured following mitigation efforts (the initial determination was seriously injured; Maze-Foley and Garrison 2020). This live entanglement was included in the stranding database (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 25 August 2020) and in the stranding totals presented in Table 4, but it was not included in the annual human-caused mortality and serious injury total for this stock (Table 3).

In addition to animals included in the stranding database, during 2015–2019, there was one at-sea observation in the Eastern Coastal Stock area (in 2017) of a live common bottlenose dolphin entangled in trap/pot gear, and this animal was considered seriously injured (Maze-Foley and Garrison 2020). This serious injury was included in the annual human-caused mortality and serious injury total for this stock (Table 3).

Since there is no observer program, it is not possible to estimate the total number of interactions or mortalities associated with these trap/pot fisheries. The documented interactions in this gear represent a minimum known count of interactions in the last five years.

Shark Bottom Longline

During 2015–2019, no interactions between common bottlenose dolphins and this fishery were observed (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, one of which likely involved the Eastern Coastal Stock: in 1999, a hooked dolphin escaped at the vessel (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.

Florida West Coast Sardine Purse Seine

There have been no documented interactions between common bottlenose dolphins of the Eastern Coastal Stock and the Florida West Coast sardine purse seine fishery; however, it should be noted there is no observer coverage of the sardine purse seine fishery. Without an observer program, it is not possible to estimate the total number of interactions or mortalities associated with this gear.

Hook and Line (Rod and Reel)

During 2015–2019, five mortalities and one live release without serious injury involving hook and line gear entanglement or ingestion were documented. The mortalities occurred in 2015 (n=1), 2018 (n=1), and 2019 (n=3). For two of the five mortalities, available evidence from the stranding data suggested the hook and line gear interaction contributed to the cause of death. For two mortalities, available evidence suggested the gear interaction did not contribute to cause of death, and for the remaining mortality, it could not be determined if the gear contributed to cause of death. During 2015, one animal was released alive. For the live animal, it was initially seriously injured, but due to mitigation efforts, was released without serious injury (Maze-Foley and Garrison 2020). All six cases were included in the stranding database (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 25 August 2020) and are included in the stranding totals presented in Table 4. The two mortalities for which evidence suggested the gear contributed to cause of death were included in the annual human-caused mortality and serious injury total for this stock (Table 3).

In addition to animals included in the stranding database, during 2015–2019, there were three at-sea observations in the Eastern Coastal Stock area of live common bottlenose dolphins entangled in hook and line fishing gear. In two cases, the animals were considered seriously injured (2015, 2018), and for the remaining case (2018), it could not be determined if the animal was seriously injured (Maze-Foley and Garrison 2020). The two serious injuries were included in the annual human-caused mortality and serious injury total for this stock (Table 3).

It should be noted that, in general, it cannot be determined if hook and line gear originated from a commercial (i.e., charter boat and headboat) or recreational angler because the gear type used by both sources is typically the same. Also, it is not possible to estimate the total number of interactions with hook and line gear because there is no observer program. The documented interactions in this gear represent a minimum known count of interactions in the last five years.

Other Mortality

In addition to animals included in the stranding database and those mentioned above, during 2015–2019 in the Eastern Coastal Stock area, there were six at-sea observations of common bottlenose dolphins entangled in unidentified rope, unidentified line, a mesh net, and a cast net, an animal reported to be anchored/tethered, and an animal that was encircled in a net by the public. Two of these animals were considered seriously injured, and for the remaining four animals, it could not be determined whether they were seriously injured (Maze-Foley and Garrison 2020). The two serious injuries were included in the annual human-caused mortality and serious injury total for this stock (Table 3).

Depredation of fishing catch and/or bait is a growing problem in Gulf of Mexico coastal and estuarine waters and globally, and can lead to serious injury or mortality via ingestion of or entanglement in gear (e.g., Zollett and Read 2006; Read 2008; Powell and Wells 2011; Vail 2016), as well as changes in dolphin activity patterns, such as decreases in natural foraging (Powell and Wells 2011). It has been suggested that provisioning, or the illegal feeding, of wild common bottlenose dolphins, may encourage depredation because provisioning conditions dolphins to approach humans and vessels, where they then may prey on bait and catches (Vail 2016). Illegal feeding/provisioning has been documented in the literature in Florida and Texas (Bryant 1994; Samuels and Bejder 2004; Cunningham-Smith *et al.* 2006; Powell and Wells 2011; Powell *et al.* 2018). Such conditioning increases risks of subsequent injury or mortality (Christiansen *et al.* 2016).

Feeding or provisioning of wild common bottlenose dolphins has been documented in Florida, particularly near Panama City Beach in the Panhandle (Samuels and Bejder 2004) and south of Sarasota Bay (Cunningham-Smith *et al.* 2006; Powell and Wells 2011), and also in Texas near Corpus Christi (Bryant 1994). Feeding wild dolphins is defined under the MMPA as a form of 'take' because it can alter their natural behavior and increase their risk of injury or death. There are emerging questions regarding potential linkages between provisioning and depredation of recreational fishing gear and associated entanglement and ingestion of gear, which is increasing through much of

Florida. During 2006, an estimated 2% of the long-term resident dolphins of Sarasota Bay, immediately inshore of the Eastern Coastal Stock, died from ingestion of recreational fishing gear (Powell and Wells 2011).

Swimming with wild common bottlenose dolphins has also been documented in Florida, including Key West (Samuels and Engleby 2007) and Panama City Beach (Samuels and Bejder 2004), but to date, there are no records for this stock area.

All mortalities and serious injuries from known sources for the Eastern Coastal Stock are summarized in Table 3.

Table 3. Summary of the incidental mortality and serious injury of common bottlenose dolphins (Tursiops truncatus) of the Eastern Coastal 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. *Indicates the count would have been higher (5 instead of 4) had it not been for mitigation efforts (see text for that specific fishery for further details).

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, and/or Observer Data
Shrimp Trawl	2015–2019	Observer Data	7.6 (CV=1.05)	NA
Gillnet	2015–2019	Observer Data (minimum count only, no estimate available)	NA	1
Crab Trap/Pot	2015–2019	Stranding Data	NA	1
Shark Bottom Longline	2015–2019	Observer Data	0	NA
Florida West Coast Sardine Purse Seine	2015–2019	Stranding Data and MMAP Data	NA	0
Hook and Line	2015–2019	Stranding Data and At-Sea Observations	NA	4*
Mean Annual Mortality due to commercial fisheries (2015–2019)			**8.8**	
Mean Annual Mortality due to other takes (2015–2019)			**0.4**	
Minimum Total Mean Annual Human-Caused Mortality and Serious Injury (2015–2019)			**9.2**	

Strandings

During 2015–2019, 154 common bottlenose dolphins were found stranded in Eastern Coastal waters of the northern Gulf of Mexico (Table 4; NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 25 August 2020). There was evidence of human interaction (HI) for 16 of the strandings. No evidence of human interaction was detected for three strandings, and for the remaining 135 strandings, it could not be determined if there was evidence of human interaction. Human interactions were from several sources, including six entanglements with hook and line gear, one entanglement with commercial stone crab trap/pot gear, and two animals with evidence of a vessel strike (Table 4). It should be noted that evidence of human interaction does not necessarily mean the interaction caused the animal's stranding or death.

The assignment of animals to a single stock is impossible in some regions where stocks overlap, especially in nearshore coastal waters (Maze-Foley *et al.* 2019). Of the 154 strandings ascribed to the Eastern Coastal Stock, 149 were ascribed solely to this stock. The counts in Table 4 may include some animals from the St. Joseph Sound, Clearwater Harbor Stock or Tampa Bay Stock and thereby overestimate the number of strandings for the Eastern Coastal Stock. Stranded carcasses are not routinely identified to either the offshore or coastal morphotype of common bottlenose dolphin, therefore it is possible that some of the reported strandings were of the offshore form, though that number is likely to be low (Byrd *et al.* 2014).

There are a number of other difficulties associated with the interpretation of stranding data. Stranding data underestimate the extent of human and fishery-related mortality and serious injury because not all of the dolphins 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; Carretta *et al.* 2016). 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.

Since 1990, there have been 15 common bottlenose dolphin die-offs or Unusual Mortality Events (UMEs) in the northern Gulf of Mexico (http://www.nmfs.noaa.gov/pr/health/mmume/events.html, accessed 5 November 2020), and 5 of these have occurred within the boundaries of the Eastern Coastal Stock and may have affected the stock. 1) From January through May 1990, a total of 344 bottlenose dolphins stranded in the northern Gulf of Mexico. Overall this represented a two-fold increase in the prior maximum recorded strandings for the same period, but in some locations (i.e., Alabama) strandings were 10 times the average number. The cause of the 1990 mortality event could not be determined (Hansen 1992), however, morbillivirus may have contributed to this event (Litz *et al.* 2014). 2) An unusual mortality event was declared for Sarasota Bay, Florida, in 1991involving 31 bottlenose dolphins. The cause was not determined, but it is believed biotoxins may have contributed to this event (Litz *et al.* 2014). 3) In 2005, a particularly destructive red tide (*Karenia brevis*) bloom occurred off of central west Florida. Manatee, sea turtle, bird and fish mortalities were reported in the area in early 2005 and a manatee UME had been declared. Dolphin mortalities began to rise above the historical averages by late July 2005, continued to increase through October 2005, and were then declared to be part of a multi-species UME. The multi-species UME extended into 2006, and ended in November 2006. In total, 190 dolphins were involved, primarily bottlenose dolphins (plus strandings of 1 Atlantic spotted dolphin, *S. frontalis*, and 23 unidentified dolphins). The evidence suggests the effects of a red tide bloom contributed to the cause of this event (Litz *et al.* 2014). 4) A common bottlenose dolphin UME occurred in southwest Florida from 1 July 2018 through 30 June 2019, with peak strandings occurring between 1 July 2018 and 30 April 2019. In total, 183 dolphins were reported (note the dates and numbers are subject to change as the closure package has not yet been approved by the UME Working Group). All age classes of dolphins were represented and the majority of the animals recovered were in moderate to advanced stages of decomposition. The cause of the bottlenose dolphin UME was determined to be due to biotoxin exposure from the *K. brevis* harmful algal bloom off the coast of southwest Florida. The additional supporting evidence of fish kills and other species die-offs linked to brevetoxin during the same time and space support that the impacts of the harmful algal bloom caused the dolphin mortalities. 5) During 1 February 2019 to 30 November 2019, a UME was declared for the area from the eastern border of Taylor County, Florida, west through Alabama, Mississippi, and Louisiana (http://www.nmfs.noaa.gov/pr/health/mmume/cetacean_gulfofmexico.htm, accessed 5 November 2020). No strandings were reported within the Eastern Coastal Stock range during this event.

Table 4. Common bottlenose dolphin strandings occurring in the Eastern Coastal Stock area from 2015 to 2019, including the number of strandings for which evidence of human interaction (HI) was detected and number of strandings for which it could not be determined (CBD) if there was evidence of HI. Data are from the NOAA National Marine Mammal Health and Stranding Response Database (unpublished data, accessed 25 August 2020). Please note HI does not necessarily mean the interaction caused the animal's death.

Stock	Category	2015	2016	2017	2018	2019	Total
Eastern Coastal Stock	Total Stranded	13	15	8	96	22	154

	Human Interaction						
	---Yes	5[a]	2[b]	0	5[c]	4[d]	16
	---No	0	1	1	1	0	3
	---CBD	8	12	7	90	18	135

a. Includes 3 fisheries interactions (FIs), 2 of which were entanglement interactions with hook and line gear (1 mortality, 1 released alive without serious injury), and 1 mortality with evidence of a vessel strike.
b. Includes 1 mortality with evidence of a vessel strike and 1 FI (mortality).
c. Includes 3 FIs, 1 of which was an entanglement interaction with hook and line gear (mortality) and 1 was an entanglement interaction with commercial stone crab trap/pot gear (released alive, CBD if seriously injured).
d. Includes 3 FIs, all of which were entanglement interactions with hook and line gear (mortalities).

HABITAT ISSUES

The *Deepwater Horizon* (DWH) MC252 drilling platform, located approximately 80 km southeast of the Mississippi River Delta in waters about 1500 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). Because the range of the Eastern Coastal Stock of common bottlenose dolphins does not extend west of 84°W longitude, this stock is not thought to have experienced oil exposure due to the DWH event.

The nearshore habitat occupied by the three coastal stocks is adjacent to areas of high human population and in some areas, such as Tampa Bay, Florida, Galveston, Texas, and Mobile, Alabama, is highly industrialized. Concentrations of anthropogenic chemicals such PCBs and DDT and its metabolites vary from site to site, and can reach levels of concern for bottlenose dolphin health and reproduction in the southeastern U.S. (Schwacke *et al.* 2002). PCB concentrations in three stranded dolphins sampled from the Eastern Coastal Stock area ranged from 16-46µg/g wet weight. Two stranded dolphins from the Northern Coastal Stock area had the highest levels of DDT derivatives of any of the bottlenose dolphin liver samples analyzed in conjunction with a 1990 mortality investigation conducted by NMFS (Varanasi *et al.* 1992). The significance of these findings is unclear, but there is some evidence that increased exposure to anthropogenic compounds may reduce immune function in bottlenose dolphins (Lahvis *et al.* 1995), or impact reproduction through increased first-born calf mortality (Wells *et al.* 2005).

STATUS OF STOCK

The common bottlenose dolphin is not listed as threatened or endangered under the Endangered Species Act, and the Eastern Coastal Stock is not considered strategic under the MMPA. Total U.S. fishery-related mortality and serious injury for this stock is unknown. The minimum estimate of fishery-related mortality and serious injury is less than 10% of PBR, but there is insufficient information (see Annual Human-Caused Mortality and Serious Injury section) available to determine whether the total fishery-related mortality and serious injury is insignificant and approaching the zero mortality and serious injury rate. The status of this stock relative to optimum sustainable population in the Gulf of Mexico EEZ is unknown. There are insufficient data to determine the population trends for this stock.

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