# COMMON BOTTLENOSE DOLPHIN (*Tursiops truncatus truncatus*): Western North Atlantic Northern Florida Coastal Stock

## STOCK DEFINITION AND GEOGRAPHIC RANGE

Common bottlenose dolphins are found in estuarine, coastal, continental shelf, and oceanic waters of the western North Atlantic (wNA). Distinct morphological forms have been identified in offshore and coastal waters of the wNA off the U.S. East Coast: a smaller morphotype present in estuarine, coastal, and shelf waters from Florida to approximately Long Island, New York, and a larger, more robust morphotype present further offshore in deeper waters of the continental shelf and slope from Florida to Canada (Mead and Potter 1995). The two morphotypes also differ in parasite load and prey preferences (Mead and Potter 1995), and show significant genetic divergence at both mitochondrial and nuclear DNA markers (Hoelzel *et al*. 1998; Kingston and Rosel 2004; Kingston *et al.* 2009; Rosel *et al*. 2009). The level of genetic divergence is greater than that seen between some other dolphin species (Kingston and Rosel 2004; Kingston *et al.* 2009) suggesting the two morphotypes in the wNA may represent different subspecies or species. The larger morphotype makes up the wNA Offshore Stock of common bottlenose dolphins. Spatial distribution data (Kenney 1990; Garrison *et al.* 2017a), tag-telemetry studies (Garrison *et al.* 2017b), photo-identification (photo-ID) studies (e.g., Zolman 2002; Speakman *et al.* 2006; Stolen *et al.* 2007; Mazzoil *et al.* 2008), and genetic studies (Caldwell 2001; Rosel *et al.* 2009; Litz *et al.* 2012) indicate that the coastal morphotype comprises multiple stocks distributed in coastal and estuarine waters of the wNA. The Northern Florida Coastal Stock is one such stock.

Common bottlenose dolphins are found in coastal waters south of Cape Hatteras, North Carolina, to southern Florida year-round (Blaylock and Hoggard 1994; Garrison and Yeung 2001; Garrison *et al.* 2016; Caldwell 2016). Significant genetic differentiation was observed between animals sampled in coastal waters of Georgia and those sampled in the Jacksonville, Florida, area (Rosel *et al*. 2009), indicative of demographic independence between animals sampled in these two coastal regions. Genetic analyses of dolphins sampled in coastal and estuarine waters near both Jacksonville,

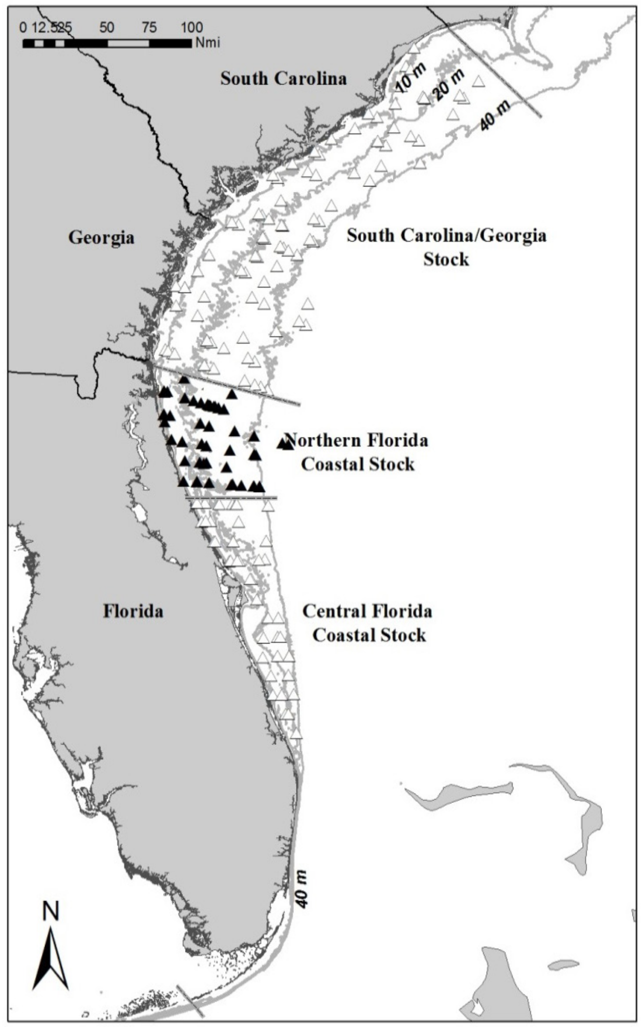


Figure 1. *The Northern Florida Coastal Stock of common bottlenose dolphins (Georgia/Florida border to 29.4°N). Symbols represent all sightings of bottlenose dolphin groups from NMFS 2010, 2011, and 2016 aerial surveys; dark symbols - groups within the boundaries of this stock. In waters > 20 m, sightings may include the offshore morphotype of bottlenose dolphins. Horizontal gray lines intersecting the coast denote the stock boundaries.*

Florida, and the Indian River Lagoon, Florida, revealed significant differentiation (Rosel *et al.* 2009; Richards *et al.* 2013), indicating the presence of demographically independent coastal and estuarine stocks along the Florida coast. Similarly, photo-ID studies in the same area distinguished between dolphins that used coastal waters and those using estuarine waters of the intracoastal waterway and St. John's River (Caldwell 2001; 2016).

The Northern Florida Coastal Stock is delimited as the dolphins of the coastal morphotype inhabiting coastal waters from the shoreline to approximately the 200-m isobath from the Georgia/Florida border (30.7°N) south to 29.4°N (Figure 1). The northern and southern boundaries for this stock are provisional as the spatial extent of this stock is poorly understood. These boundaries are derived from the first delimitation of coastal stocks in 2002 (Waring *et al.* 2002) when the original single, coast-wide coastal stock suggested by Scott *et al.* (1988) was broken into seven management units (Waring *et al.* 2002). The offshore boundary was determined based on a combined genetic and logistic regression analysis that incorporated depth, latitude, and distance from shore to model the probability that a particular bottlenose dolphin group seen in coastal waters south of Cape Hatteras was of the coastal morphotype (Garrison *et al.* 2017a). Dolphins of the coastal morphotype were identified in waters out to 97 m depth. The logistic regression predicted that the majority of the coastal morphotype inhabits waters 0–20 m in depth and that the density of the coastal morphotype declines with increasing depth (Garrison *et al.* 2017a). South of Cape Hatteras in waters less than 20 m depth, 70% of the bottlenose dolphins were predicted to be of the coastal morphotype and fewer than 10% of the animals present beyond 35 m depth were predicted to be of the coastal morphotype (Garrison *et al.* 2017a).

While common bottlenose dolphins do exhibit significant site fidelity, it is unlikely this stock contains multiple demographically independent populations because the habitat inhabited by the stock is relatively homogeneous, it does not cross any known biogeographic breaks nor cover multiple marine ecoregions (Spalding *et al.* 2007). Recently, Caldwell (2016) reported that three dolphins sighted behind trawling shrimp boats offshore of Jacksonville, Florida, were also photographed behind shrimp boats trawling off Hilton Head and/or Myrtle Beach, South Carolina. These sightings suggest the stock may cover a larger area. To date, no analyses of stock structure within this stock have been performed.

During cold water months, this stock likely overlaps with the Southern Migratory Coastal Stock, which is thought to migrate south from waters of southern Virginia and north central North Carolina in the summer to waters south of Cape Fear and as far south as coastal Florida during winter months (Garrison *et al*. 2017b). There is no firm boundary defining the offshore extent of the Northern Florida Coastal Stock and it overlaps to some degree with the Offshore Stock of common bottlenose dolphins (Garrison *et al.* 2017a). The spatiotemporal overlap of this stock with other stocks complicates the ability to definitively identify the offshore extension for the stock and the assignment of human-caused dolphin mortalities to stock at certain times of the year.

## POPULATION SIZE

The best available abundance estimate for the Northern Florida Coastal Stock of common bottlenose dolphins in the western North Atlantic is 877 (CV=0.49; Table 1; Garrison *et al.* 2017a). This estimate is derived from aerial surveys conducted during the summer of 2016 covering coastal and shelf waters from Florida to New Jersey.

### Background

Estimating the abundance of the Northern Florida Coastal Stock is complicated by the spatiotemporal overlap the stock has with the Southern Migratory Coastal Stock in cold water months, the potential for some overlap with the wNA Offshore Stock, and by the presence, in nearshore coastal waters, of dolphins from estuarine common bottlenose dolphin stocks in Florida (Mazzoil *et al.* 2011; Caldwell 2016). Summer surveys are best for estimating the abundance for this stock because it overlaps least with the Southern Migratory Coastal Stock during warm water months. Using the logistic regression described above (Garrison *et al.* 2017a), abundance estimates for the Northern Florida Coastal Stock were made using sightings observed in the 0–200 m depth stratum during summer aerial surveys between the Georgia/Florida border and 29.4°N. The regression model was used to estimate the probability that each sighting during the aerial survey is of the coastal (vs. offshore) morphotype. This probability and associated estimates of uncertainty were then incorporated into the abundance estimate for the coastal morphotype within the stock's range (Garrison *et al*. 2017a).

### Earlier abundance estimates (>8 years old)

Aerial surveys were conducted during the summers of 2002 and 2004. Survey tracklines for the 2002 and 2004 surveys were set perpendicular to the shoreline and effort was stratified into 0–20 m and 20–40 m strata with the majority of effort in the shallow depth stratum (Garrison *et al.* 2017a). The 2002 surveys employed two observer teams operating independently on the same aircraft to estimate the probability of detection on the trackline. This estimate was also applied to the 2004 survey to reduce bias in the resulting abundance estimate. The resulting abundance estimates from the 2002 and 2004 summer aerial surveys for the Northern Florida Coastal Stock were 299 (CV=0.84) and 2,130 (CV=0.41), respectively (Garrison *et al.* 2017a). There were strong differences in spatial distribution between these two survey years, suggesting that the large difference in estimates was related to changes in distribution rather than population size of the stock (Garrison *et al.* 2017a). As recommended in the GAMMS II Workshop Report (Wade and Angliss 1997), these estimates are >8 years old and deemed unreliable and should not be used for PBR determinations. However, these estimates are included below in the assessment of trends for this stock.

**Recent surveys and abundance estimates**

The Southeast Fisheries Science Center conducted aerial surveys of continental shelf waters along the U.S. East Coast from southeastern Florida (26.9°N) to Sandy Hook, New Jersey (40.3°N), during the summers of 2010, 2011, and 2016 (see Garrison *et al.* 2017a for survey design). The surveys were conducted along tracklines spaced latitudinally at 20-km intervals and oriented perpendicular to the shoreline, and covered waters from the shoreline to the continental shelf break (Garrison *et al.* 2017a).

The recent surveys were conducted using a two-team approach to develop estimates of detection probabilities using the independent observer approach with Distance analysis (Laake and Borchers 2004). The detection functions from each survey indicated a decreased probability of detection near the trackline. The sighting data were therefore “left-truncated” by analyzing only sightings occurring greater than 80 m from the trackline during the 2010 survey, 70 m during the 2011 survey, and 100 m from the trackline during the 2016 survey (see Buckland *et al.* 2001 for left-truncation methodology). The independent observer method assuming point independence was used to estimate detection probability on the trackline. This estimate accounts for the probability of detecting a marine mammal group conditional on it being available to both survey teams. Covariates that may influence detection probabilities (e.g., sea state, glare, cloud cover, visibility) were incorporated into both the mark-recapture and distance function components of the detection models (Laake and Borchers 2004; Garrison *et al.* 2017a). In addition, the probability that an observed group was of the coastal morphotype was incorporated into the abundance estimates as noted above. The resulting abundance estimates are negatively biased due to the effects of animals spending some time underwater where they are not available to the survey teams. However, due to the relatively short dive times of bottlenose dolphins (Wells *et al.* 2013) and the large group sizes, it is likely that this bias is small (Garrison *et al.* 2017a).

The abundance estimates derived from the summer 2010, 2011, and 2016 surveys were 4,355 (CV=0.45), 8,618 (CV=0.83), and 877 (CV=0.49). The 2016 estimate was used as the best estimate of the current population size for the stock due to possible effects from the 2013–2015 unusual mortality event (see Strandings section). Uncertainties in the abundance estimate arise primarily from annual, and unquantified, variation in stock distribution (See Current Population Trend section).

Table 1. Summary of abundance estimates for the western North Atlantic Northern Florida Coastal Stock of common bottlenose dolphins. Month, year, and area covered during each abundance survey, and resulting abundance estimate ($N_{best}$) and coefficient of variation (CV).

| Month/Year | Area | $N_{best}$ | CV |
|---|---|---|---|
| July-August 2002 | Georgia/Florida border (30.7°N) to 29.4°N latitude | 299 | 0.84 |
| July-August 2004 | Georgia/Florida border (30.7°N to 29.4°N latitude | 2,130 | 0.41 |
| July-August 2010 | Georgia/Florida border (30.7°N to 29.4°N latitude | 4,355 | 0.45 |

| | | | |
|---|---|---|---|
| July-August 2011 | Georgia/Florida border (30.7°N to 29.4°N latitude | 8,618 | 0.83 |
| July-August 2016 | Georgia/Florida border (30.7°N to 29.4°N latitude | 877 | 0.49 |

### 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. The best estimate for the Northern Florida Coastal Stock is 877 (CV=0.49). The resulting minimum population estimate is 595.

### Current Population Trend

Available surveys allow a limited analysis of trend in population size for coastal stocks of common bottlenose dolphins. A standardized analytical approach accounting for variation in survey execution and environmental conditions was used to derive unbiased abundance estimates for each survey (Garrison *et al.* 2017a). A weighted generalized linear model was used to evaluate trends in population size by stock using abundance estimates from surveys conducted in the summers of 2002, 2004, 2010, 2011, and 2016. Abundance estimates were weighted by the inverse of their standard error, which reduces the influence of less certain estimates (Neter *et al.* 1983). Stock was treated as a fixed factor, and surveys were grouped into three periods to test for long term trends in population size: 2002–2004, 2010–2011, and 2016. Period was also included as a fixed factor in the model along with the interaction between stock and period. Contrasts were specified to test for differences in abundance between periods for each stock (Garrison *et al.* 2017a). For the Northern Florida Coastal Stock, the resulting mean abundance estimate for 2002–2004 was 740 (CV=1.81), and that for 2010–2011 was 5,270 (CV=0.71). There was no significant difference between these estimates and the estimate of 877 (CV=0.49) for 2016. There is limited power to detect a significant change given the high CV of the estimates, interannual variability in spatial distribution and stock abundance between 2002 and 2004, and the availability of only one recent survey (Garrison *et al.* 2017a). However, see the Strandings section for a discussion of coast-wide trends in population size.

## CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are not known for the wNA coastal morphotype. The maximum net productivity rate was assumed to be 0.04. This value is based on theoretical modeling showing that cetacean populations likely do 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 the 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; Wade 1998). The minimum population size of the Northern Florida Coastal Stock of common bottlenose dolphins is 595. The maximum productivity rate is 0.04, the default value for cetaceans. The recovery factor is 0.5 because this stock is depleted. PBR for this stock of common bottlenose dolphins is 6.0.

## ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

The total annual human-caused mortality and serious injury for the Northern Florida Coastal Stock during 2011–2015 is unknown. The mean annual fishery-related mortality and serious injury for strandings identified as fishery-related was 0. Mean annual mortality and serious injury due to other human-caused sources (fishery research and entanglements in unidentified gear and wire) was 0.6. Therefore, the minimum total mean annual human-caused mortality and serious injury for this stock during 2011–2015 was also 0.6 (Table 2). This is a minimum estimate because 1) not all fisheries that could interact with this stock are observed, 2) stranding data are used as an indicator of fishery-related interactions and not all dead animals are detected and 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 includes an actual count of verified human-caused deaths and serious injuries and should be considered a minimum (NMFS 2016). In the sections below, dolphin mortalities were assigned to a stock or stocks by comparing the time and geographic location of the mortality to the stock boundaries and geographic range delimited for each stock.

**Fishery Information**

There are four commercial fisheries that interact, or that potentially could interact, with this stock. These include four Category II fisheries (Southeastern U.S. Atlantic shark gillnet, Southeast Atlantic gillnet, Southeastern U.S. Atlantic shrimp trawl, and Atlantic blue crab trap/pot fisheries) and one Category III fishery (Atlantic Ocean, Gulf of Mexico, Caribbean commercial passenger fishing vessel (hook and line) fishery). Only limited observer data are available for these and other fisheries that may interact with this stock. Detailed fishery information is presented in Appendix III.

**Southeastern U.S. Atlantic Shark Gillnet and Southeast Atlantic Gillnet**

There have been no documented mortalities or serious injuries of common bottlenose dolphins associated with the Southeastern U.S. Atlantic Shark Gillnet or Southeast Atlantic Gillnet fisheries during 2011–2015 that could be ascribed to the Northern Florida Coastal Stock (Gulak *et al.* 2012; Mathers *et al.* 2013; 2014; 2015; 2016). These fisheries target sharks and finfish in waters between North Carolina and southern Florida. The majority of fishing effort occurs in federal waters because Florida, Georgia, and South Carolina, with limited exception, prohibit the use of gillnets in state waters. These fisheries use gillnets set in a sink (anchored), stab, set, strike, or drift fashion. The Southeast Gillnet Observer Program observes these fisheries year-round (e.g., Mathers *et al.* 2016).

**Shrimp Trawl**

During 2011–2015, there were no documented mortalities or serious injuries in association with the shrimp trawl fishery that could be ascribed to the Northern Florida Coastal Stock. While no interactions have been reported thus far, the potential for interactions exists in this area. Caldwell (2016) reported that bottlenose dolphins were regularly sighted behind trawling shrimp boats in coastal waters of northern Florida, and that the shrimp trawl fishing industry may influence movements of coastal dolphins. There has been very little systematic observer coverage of this fishery during the last decade, so it is not possible to estimate the total number of interactions or mortalities associated with the shrimp trawl fishery.

**Atlantic Blue Crab Trap/Pot**

During 2011–2015, there were no documented mortalities or serious injuries in crab trap/pot gear that could be ascribed to the Northern Florida Coastal Stock. The most recent documented interaction with this fishery was from 2009. Because there is no systematic observer program, it is not possible to estimate the total number of interactions or mortalities associated with crab traps/pots. Stranding data indicate that interactions with trap/pot gear occur at some unknown level in North Carolina (Byrd *et al*. 2014) and other regions of the southeast U.S. (Noke and Odell 2002; Burdett and McFee 2004).

**Hook and Line (Rod and Reel)**

During 2011–2015, there were no documented mortalities or serious injuries of common bottlenose dolphins involving hook and line gear entanglement or ingestion that could be ascribed to the Northern Florida Coastal Stock. The most recent documented interaction with hook and line gear was from 2010. 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 systematic observer program.

**Other Mortality**

During 2011-2015, there was one common bottlenose dolphin mortality ascribed to the Northern Florida Coastal Stock that occurred incidental to fishery research. This mortality occurred in 2014 and resulted from an entanglement in the lazy line of a research trawl. Two additional mortalities occurred in 2013, likely as a result of entanglements. One entanglement involved green, braided rope of unknown origin that was bridled through the mouth of a dolphin, and the second involved conductor wire wrapped tightly around and cutting into the peduncle and flukes of a dolphin. These three mortalities were included in the stranding database and in the annual human-caused mortality and serious injury total for this stock (Table 2). All mortalities and serious injuries from known sources for the Northern Florida Coastal Stock are summarized in Table 2.

Table 2. Summary of the incidental mortality and serious injury of common bottlenose dolphins of the Northern Florida Coastal Stock. For fisheries with an ongoing, systematic, federal observer program, the years sampled (Years), the type of data used (Data Type), the annual observer coverage (Observer Coverage), the observed mortality and serious injury recorded by on-board observers, and mean annual mortality and serious injury are provided. For fisheries that do not have an ongoing, systematic, federal observer program, minimum counts of mortality and serious injury based on stranding data or fisherman self-reported takes via the Marine Mammal Authorization Program (MMAP) are given. See the Annual Human-Caused Mortality and Serious Injury section for biases and limitations of mortality estimates. NA = not applicable.

| Fishery | Years | Data Type | Observer Coverage | Observed Mortality and Serious Injury | Mean Annual Mortality and Serious Injury Based on Observer Data | 5-year Count Based on Stranding and/or MMAP Data |
|---|---|---|---|---|---|---|
| Southeastern U.S. Atlantic Shark Gillnet | 2011–2015 | Obs. Data Logbook | NA due to uncertainty in reported effort | 0,0,0,0,0 | Not estimated | NA |
| Southeast Atlantic Gillnet | 2011–2015 | Obs. Data Logbook | NA due to uncertainty in reported effort | 0,0,0,0,0 | Not estimated | NA |
| Shrimp Trawl | 2011–2015 | Limited Observer and MMAP fisherman self-reported takes | NA | NA | NA | 0 |
| Atlantic Blue Crab Trap/Pot | 2011–2015 | Stranding Data | NA | NA | NA | 0 |
| Hook and Line | 2011–2015 | Stranding Data | NA | NA | NA | 0 |
| **Mean Annual Mortality due to commercial fisheries (2011–2015)** | | | | | **0** | **0** |
| Research Takes (5-year Count) | | | | | 1 | |
| Other takes (entanglements in unidentified gear and conductor wire; 5-year Count) | | | | | 2 | |
| **Mean Annual Mortality due to research and other takes (2011–2015)** | | | | | **0.6** | |
| **Minimum Total Mean Annual Human-Caused Mortality and Serious Injury (2011–2015)** | | | | | **0.6** | |

**Strandings**

During 2011–2015, 142 stranded common bottlenose dolphins were recovered within the range of the Northern Florida Coastal Stock (Table 3; NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 18 May 2016). It could not be determined whether there was evidence of human interaction for 117 of these strandings, and for 19 it was determined there was no evidence of human interaction. The remaining six showed evidence of human interactions, one of which was an entanglement in research trawling gear, as mentioned above. Stranding data probably 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). 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.

It is worth noting that during winter months, the Northern Florida Coastal Stock likely overlaps with the Southern Migratory Coastal Stock and it is currently not possible to distinguish between them. Therefore, the counts in Table 3 likely include some animals from the Southern Migratory Coastal Stock and overestimate the total number of strandings for the Northern Florida Coastal Stock. Of the 142 strandings ascribed to the Northern Florida Coastal Stock, 122 were ascribed solely to this stock.

This stock has also been impacted by two unusual mortality events (UMEs), one in 1987–1988 and one in 2013–2015. Both UMEs have been attributed to morbillivirus epidemics (Lipscomb *et al.* 1994; Morris *et al.* 2015) and both included deaths of dolphins in spatio-temporal locations that apply to the Northern Florida Coastal Stock. When the impacts of the 1987–1988 UME were being assessed, only a single coastal stock of common bottlenose dolphins was thought to exist along the U.S. eastern seaboard from New York to Florida (Scott *et al.* 1988), so impacts to the Northern Florida Coastal Stock alone are not known. However, it was estimated that between 10 and 50% of the coast-wide stock died as a result of this UME (Scott *et al.* 1988; Eguchi 2002). The total number of stranded bottlenose dolphins from New York through central Florida (Brevard County) during the 2013–2015 UME was ~1827, including 319 from northern and central Florida (http://www.nmfs.noaa.gov/pr/health/mmume/midatldolphins2013.html, accessed 8 November 2016). Most strandings and morbillivirus positive animals have been recovered from the ocean side beaches rather than from within the estuaries, suggesting that coastal stocks have been more impacted by this UME than estuarine stocks (Morris *et al.* 2015). An analysis of trends in abundance for common bottlenose dolphins coast-wide (New Jersey to Florida) indicated a statistically significant decline in population size between 2011 and 2016 (Garrison *et al.* 2017a). A weighted generalized linear model was used to evaluate trends in coast-wide population size based on aerial surveys conducted between 2002 and 2016 (see Population Size above for survey descriptions). The model included a linear term for survey year and an interaction term to test for a difference in slope between 2002–2011 and 2011–2016. Estimates were weighted by the inverse of their standard error to reduce the influence of less certain estimates. There was no significant trend in population size between 2002 and 2011; however, there was a statistically significant (p=0.0308) change in slope between 2011 and 2016, indicating a decline in population size. The coast-wide inverse-variance weighted average estimate for coastal common bottlenose dolphins during 2011 was 41,456 (CV=0.30) while the estimate during 2016 was 19,470 (CV=0.23; Garrison *et al.* 2017a). It is possible that this apparent decline in common bottlenose dolphin abundance in coastal waters along the eastern seaboard is a result of the 2013–2015 UME. An assessment of the impacts of the 2013–2015 UME on common bottlenose dolphin stocks in the wNA is ongoing.

Table 3. Strandings of common bottlenose dolphins during 2011–2015 that were ascribed to the Northern Florida Coastal Stock, 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. Assignments to stock were based upon the understanding of the seasonal movements of the coastal stocks. However, there is overlap between this stock and the Southern Migratory Coastal Stock during winter months, and it is currently not possible to distinguish between them. Data are from the NOAA National Marine Mammal Health and Stranding Response Database (unpublished data, accessed 18 May 2016). Please note HI does not necessarily mean the interaction caused the animal's death.

| State | 2011 | | | 2012 | | | 2013 | | | 2014 | | | 2015 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | HI Yes | HI No | CBD | HI Yes | HI No | CBD | HI Yes | HI No | CBD | HI Yes | HI No | CBD | HI Yes | HI No | CBD |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northern Florida Coastal Stock | 2 | 4 | 13 | 0 | 1 | 15 | 3[a] | 9 | 62 | 1[b] | 4 | 23 | 0 | 1 | 4 |
| Annual Total | 19 | | | 16 | | | 74 | | | 28 | | | 5 | | |

[a] Includes 2 HIs (mortalities) involving severe entanglements, one in unidentified gear and the other in conductor wire.

[b] This HI was an incidental take (mortality) in research trawl gear.

**HABITAT ISSUES**

The nearshore and estuarine habitats occupied by the coastal morphotype are adjacent to areas of high human population and some are highly industrialized. Studies that have examined persistent organic pollutant concentrations in bottlenose dolphins inhabiting estuaries along the Atlantic coast found evidence of high blubber concentrations, particularly near Brunswick, Georgia, Charleston, South Carolina, and Beaufort, North Carolina (Hansen *et al.* 2004; Balmer *et al.* 2011; Kucklick *et al.* 2011). The concentrations found in male dolphins from these sites exceeded toxic threshold values that may result in adverse effects on health or reproductive rates (Schwacke *et al.* 2002; Hansen *et al.* 2004; Balmer *et al.* 2011). Studies of contaminant concentrations relative to life history parameters showed higher levels of mortality in first-born offspring and higher contaminant concentrations in these calves and in primiparous females (Wells *et al.* 2005). Balmer *et al.* (2011) reported extremely high levels of total PCBs in dolphins sampled in estuarine waters near Brunswick, Georgia, where there is a point source Superfund site. Dolphins that were sighted exclusively in estuarine waters 40 km north of Brunswick, near Sapelo Island, Georgia, also exhibited elevated PCB levels (Balmer *et al.* 2011). Movement of contaminated prey may be the source of exposure for the dolphins in Sapelo Island (Balmer *et al.* 2011), and, if those prey enter the coastal environment, the Northern Florida Coastal Stock could also be exposed to these unusually high contaminant levels, as the northern boundary of the stock is approximately 50 km from Brunswick, Georgia. In fact, Watanabe *et al.* (2000) reported high levels of the PCB congeners associated with the signature PCB formulation from this Superfund site in one stranded dolphin from northern Florida. The exposure to environmental pollutants and subsequent effects on population health is an area of concern and active research.

**STATUS OF STOCK**

Common bottlenose dolphins in the western North Atlantic are not listed as threatened or endangered under the Endangered Species Act, but the Northern Florida Coastal Stock is a strategic stock due to its designation as depleted under the MMPA. In addition, the total fishery-related mortality and serious injury for this stock is not less than 10% of the calculated PBR and therefore, cannot be considered to be insignificant and approaching a zero mortality and serious injury rate. From 1995 to 2001, NMFS recognized only the western North Atlantic Coastal Stock of bottlenose dolphins in the western North Atlantic, and this stock was listed as depleted as a result of a UME in 1988–1989 (64 FR 17789, April 6, 1993). The stock structure was revised in 2008, 2009, and 2010, to recognize resident estuarine stocks and migratory and resident coastal stocks. The Northern Florida Coastal Stock retains the depleted designation as a result of its origin from the western North Atlantic Coastal Stock. This stock is presumed to be below OSP due to its designation as depleted. PBR for the Northern Florida Coastal Stock is 6.0 and so the zero mortality rate goal, 10% of PBR, is 0.6. The documented total mean annual human-caused mortality for this stock for 2011–2015 was 0.6. However, this estimate is biased low for the following reasons: 1) there are several commercial fisheries operating within this stock's boundaries that have little to no observer coverage, and 2) this mortality estimate incorporates a count of verified human-caused deaths and serious injuries and should be considered a minimum (NMFS 2016). Given these biases and uncertainties, there is insufficient information to determine whether or not the total fishery-related mortality and serious injury is approaching a zero mortality and serious injury rate. The stock may have been negatively impacted by the large 2013–2015 UME and some dolphins in the stock could contain high levels of PCBs from a Superfund site in Georgia. Both of these factors could influence the recovery of this stock. Analysis of trends in abundance suggest a probable decline in stock size between 2010–2011, and 2016; however, there is limited power to evaluate trends given uncertainty in stock distribution, lack of precision in abundance estimates, and a limited number of surveys.

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