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COMMON BOTTLENOSE DOLPHIN *(Tursiops truncatus truncatus)* Southern North Carolina Estuarine System Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The coastal morphotype of common bottlenose dolphins is continuously distributed along the Atlantic coast south of Long Island, New York, to the Florida peninsula, including inshore waters of the bays, sounds and estuaries. Several lines of evidence support a distinction between dolphins inhabiting primarily coastal waters near the shore and those present primarily in the inshore waters of the bays, sounds and estuaries. Photo-identification (photo-ID) and genetic studies support the existence of resident estuarine animals in several areas (e.g., Caldwell 2001; Gubbins 2002; Zolman 2002; Gubbins *et al.* 2003; Mazzoil *et al.* 2005; Litz *et al.* 2012), and similar patterns have been observed in bays and estuaries along the Gulf of Mexico coast (e.g., Wells *et al.* 1987). Recent genetic analyses using both mitochondrial DNA and nuclear microsatellite markers found significant differentiation between animals biopsied in coastal and estuarine areas along the Atlantic coast (Rosel *et al.* 2009), and between those biopsied in coastal and estuarine waters at the same latitude (NMFS unpublished data). Similar results have been found off the west coast of Florida (Sellas *et al.* 2005; Balmer *et al.* 2008).

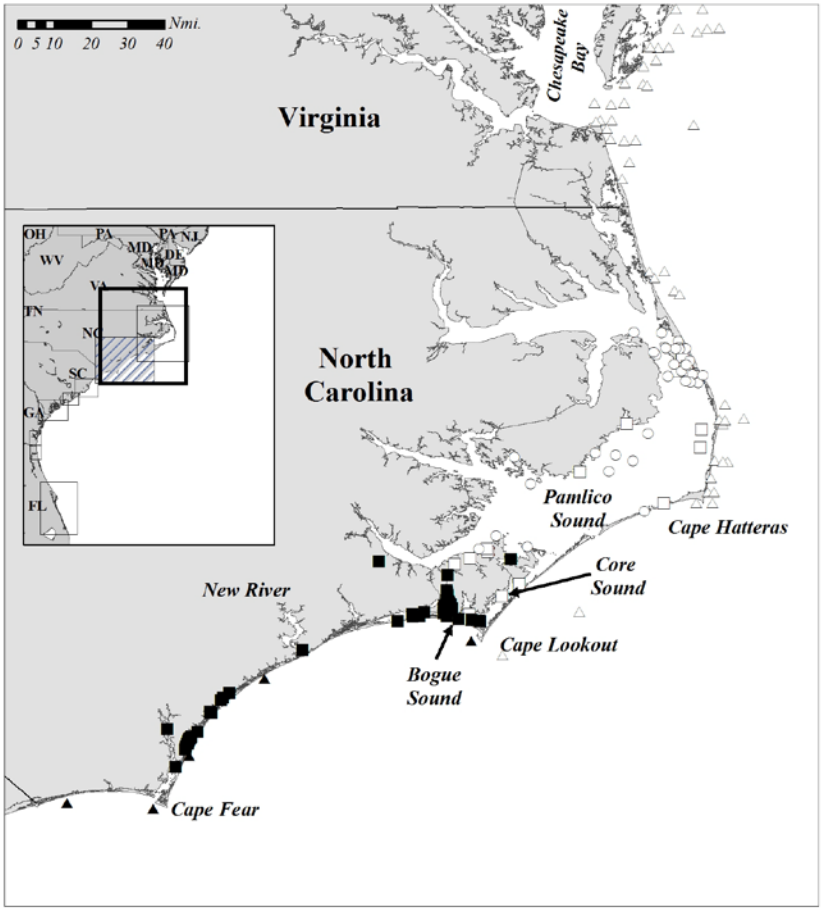

Figure 1. *The distribution of bottlenose dolphins occupying coastal and estuarine waters in North Carolina and Virginia during the period July-September. Locations are shown from aerial surveys (triangles), satellite telemetry (circles) and photo-identification studies (squares). Sightings assigned to the Southern North Carolina Estuarine System stock are shown with filled symbols (all fall within hatched box in inset map). Photo-identification data are courtesy of Duke University and the University of North Carolina at Wilmington.*

The Southern North Carolina Estuarine System (SNCES) Stock is best defined as animals occupying estuarine and nearshore coastal waters (< 3 km from shore) between the Little River Inlet Estuary, inclusive of the estuary (near the North Carolina/South Carolina border), and the New River during cold water months. Members of this stock do not undertake large-scale migratory movements. Instead, they expand their range only slightly northward during warmer months into estuarine waters and nearshore waters (< 3 km) of southern North Carolina as far as central Core Sound, and possibly southern Pamlico Sound.

The movements and range of this stock have been inferred from a combination of photo-ID, tag telemetry and genetic data. Two animals were tagged at Holden Beach, just south of Cape Fear during November 2004, and they remained within waters of southern and central North Carolina throughout the 9-month period when their tags were operational (NMFS unpublished data). Animals captured and released near Beaufort, North Carolina, were fitted

with satellite-linked transmitters and/or freeze-branded during July 1995 (30 animals; Hansen and Wells 1996), November 1999 (11 animals), April 2000 (12 animals) and April 2006 (19 animals) (Hohn and Hansen, NMFS unpublished data). Long-term photo-ID studies that have been conducted in waters of North Carolina include records of some of these animals (Read *et al.* 2003; NMFS 2001; Urian *et al*. unpublished manuscript; Duke University unpublished data; University of North Carolina at Wilmington unpublished data; NMFS unpublished data). Of these tagged or freeze-branded animals, at least 8 have been documented to have moved south and occupied estuarine and coastal waters near Cape Fear, south of the New River during cold water months. In addition, genetic analysis of samples from animals in waters of southern North Carolina (between Cape Lookout and the North Carolina/South Carolina border) demonstrate significant genetic differentiation from animals occupying waters from Virginia and further north and waters of South Carolina (Rosel *et al.* 2009).

The movements of animals from the SNCES Stock are distinct from those of the Northern North Carolina Estuarine System Stock (NNCES). During warm water months, NNCES animals occupy waters of central and northern Pamlico Sound and nearshore coastal waters (< 1 km from shore) perhaps as far north as the Chesapeake Bay. It is probable that there is spatial overlap between these two estuarine stocks during this time in the waters near Beaufort, North Carolina. However, SNCES Stock animals were not observed to move north of Cape Lookout in coastal waters nor into the main portion of Pamlico Sound during summer (NMFS unpublished data; Duke University unpublished data; University of North Carolina at Wilmington unpublished data). These movement patterns are consistent with resights of individual dolphins during a photo-ID study that sampled much of the estuarine waters of North Carolina (Read *et al.* 2003). Read *et al.* (2003) suggested that movement patterns, differences in group sizes, and habitats are consistent with 2 stocks of animals occupying estuarine waters of North Carolina.

In summary, during warm water months the SNCES Stock occupies estuarine and nearshore coastal waters (< 3 km from shore) between the Little River at the North Carolina/South Carolina border and Core Sound, including Bogue Sound and southern Pamlico Sound (Figure 1). In the northern portion of its range during these months, it likely overlaps with the NNCES Stock. During cold water months this stock is found only within the southern portion of this range, from the Little River Inlet estuary at the North Carolina/South Carolina border to the New River. In coastal waters (< 3 km from shore), it may overlap with the Southern Migratory Stock during this period. The timing of the seasonal contraction of the range (and expansion) likely occurs with some inter-annual variability related to seasonal changes in water temperatures and/or prey availability.

In prior stock assessment reports, the animals within this region were referred to as the "Southern North Carolina" coastal stock during summer months, and were part of the winter "mixed" North Carolina management unit of coastal bottlenose dolphins (Waring *et al.* 2009). However, they are now recognized as a distinct stock based upon these differences in seasonal ranging patterns and genetic analyses.

POPULATION SIZE

The best available abundance estimate for the SNCES Stock is 188 animals (CV=0.19, 95% Confidence Interval=118-257) based upon photo-ID mark-recapture surveys in 2006 (Urian *et al*., unpublished manuscript). This estimate is potentially negatively biased as the survey area covered waters out to 1km from shore but the stock boundary includes waters out to 3 km from shore.

Earlier abundance estimates

Read *et al.* (2003) provided the first abundance estimate for bottlenose dolphins that occur within the boundaries of the SNCES Stock. This estimate was based on a photographic mark-recapture survey of North Carolina waters inshore of the barrier islands, conducted during July 2000. Read *et al.* (2003) estimated the number of animals in the inshore waters of North Carolina occupied by the SNCES Stock at 141 (95% CI 112 - 200, CV=0.15). However, this estimate is more than 8 years old, and hence cannot be used to calculate N_{min} or PBR.

Since both tag-telemetry studies and photo-ID records indicate that some portion of the SNCES Stock occurs in coastal waters between the North Carolina/South Carolina border and Cape Lookout during summer months, it is appropriate to include animals from summer aerial surveys of these areas in the abundance estimate. Aerial surveys to estimate the abundance of coastal bottlenose dolphins in the Atlantic were conducted during winter (January-February) and summer (July-August) of 2002. Survey tracklines were set perpendicular to the shoreline and included coastal waters to depths of 40 m. The surveys employed a stratified design so that most effort was expended in waters shallower than 20 m deep where a high proportion of observed bottlenose dolphins were expected to be of the coastal morphotype. The surveys employed two observer teams operating independently on the same aircraft to derive a correction for visibility bias. Abundance estimates were calculated using line-transect methods and distance analysis (Buckland *et al.* 2001). The independent and joint estimates from the two survey

teams were used to quantify the probability that animals available to the survey on the trackline were missed by the observer teams, or perception bias, using the direct-duplicate estimator (Palka 1995).

During the summer 2002 aerial survey, 6,734 km of trackline were completed between Sandy Hook, New Jersey, and Ft. Pierce, Florida. All tracklines in the 0-20 m stratum were completed throughout the survey range while offshore lines were completed only as far south as the Georgia/Florida state line. A total of 185 bottlenose dolphin groups were sighted during summer including 2,544 individual animals.

In summer 2004, an aerial survey was conducted between central Florida and New Jersey. As with the 2002 survey, effort was stratified into 0-20 m and 20-40 m strata with the majority of effort in the shallow depth stratum. The survey was conducted between 16 July and 31 August and covered 7,189 km of trackline. There were a total of 140 sightings of bottlenose dolphin groups including 3,093 individual animals. During the summer of 2004, water temperatures were significantly cooler than those during 2002 and earlier surveys conducted in 1995, and animals were distributed farther south. Therefore, it is probable that both the Northern Migratory and Southern Migratory Stocks occurred in waters of northern North Carolina during the summer of 2004.

The best abundance estimate for the Southern North Carolina Estuarine System Stock in coastal waters is considered to be from the summer 2002 survey when there was less overlap among stocks. Survey data were post-stratified to estimate the abundance of dolphins within a strip extending from the shoreline to 3km from shore between the North Carolina/South Carolina border and Cape Lookout, North Carolina. Tag-telemetry records indicated that SNCES animals rarely ventured further away from shore. The resulting abundance estimate for the Southern North Carolina Estuarine System Stock in coastal waters was 2,454 (CV=0.53). However, animals from the Southern Migratory Coastal Stock may occur within this 3-km strip during summer months. Therefore, the estimate of abundance within this strip likely included both SNCES animals and Southern Migratory Coastal animals and hence overestimated the abundance of the SNCES Stock.

Recent surveys and abundance estimates

A photo-ID mark-recapture study was conducted in 2006 using similar methods to those in Read *et al.* (2003) and included estuarine waters of North Carolina from the North Carolina/South Carolina border to Albemarle Sound. The survey also included coastal waters extending up to 1km from shore. A boundary line between the NNCES Stock and the neighboring SNCES Stock was identified at 34°46' N Latitude in central Core Sound, and this boundary is consistent with the descriptions of the ranges of the 2 stocks during summer months. The resulting abundance estimate included a correction for the proportion of dolphins with non-distinct fins in the population. The abundance estimate for the SNCES Stock based upon photo-ID mark-recapture surveys in 2006 was 188 animals (CV=0.19, 95% Confidence Interval=118-257; Urian *et al.*, unpublished manuscript). This is the best available abundance estimate for the SNCES Stock, but is probably negatively biased as the survey covered waters only to 1km from shore.

Minimum Population Estimate

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normally distributed best abundance estimate. This is equivalent to the 20^{th} percentile of the log-normal distribution as specified by Wade and Angliss (1997). The best estimate for the Southern North Carolina Estuarine System stock of bottlenose dolphins is 188 (CV=0.19). The resulting minimum population estimate is 160.

Current Population Trend

There are insufficient data to determine the population trends for this stock.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are unknown 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 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). The minimum population size of the SNCES Stock of bottlenose dolphins is 160. The maximum productivity rate is 0.04, the default value for cetaceans. The recovery factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP), is assumed to be 0.5 because this stock is of unknown status. PBR for the SNCES Stock is therefore 1.6.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

The total estimated average annual fishery mortality of the SNCES Stock ranges between a minimum of 0.2 and a maximum of 0.8 animals per year. This range reflects the uncertainty in assigning observed or reported mortalities to a particular stock.

New Serious Injury Guidelines

NMFS updated its serious injury designation and reporting process, which uses guidance from previous serious injury workshops, expert opinion, and analysis of historic injury cases to develop new criteria for distinguishing serious from non-serious injury (Angliss and DeMaster 1998; Andersen *et al*. 2008; NOAA 2012). NMFS defines serious injury as an "*injury that is more likely than not to result in mortality*". Injury determinations for stock assessments revised in 2013 or later incorporate the new serious injury guidelines, based on the most recent 5-year period for which data are available.

Fishery Information

The SNCES Stock has the potential to interact with 1 Category I fishery and 4 Category II fisheries: the mid-Atlantic gillnet fishery (Category I), Atlantic blue crab trap/pot fishery, North Carolina long haul seine fishery, North Carolina roe mullet stop net, and North Carolina inshore gillnet fishery. The SNCES Stock may also interact with 1 Category III fishery: the Atlantic Ocean commercial passenger fishing vessel (hook and line) fishery. The magnitude of the interactions with these fisheries is unknown because of both uncertainty in the movement patterns of the stock and the spatial overlap between the SNCES Stock and other bottlenose dolphin stocks in coastal waters. Observer coverage is also limited or non-existent for most of these fisheries, thus stranding data are used as an indicator of fishery-related interactions.

Mid-Atlantic Gillnet

This fishery has the highest documented level of mortality of coastal morphotype bottlenose dolphins, and sink gillnet gear in North Carolina is its largest component in terms of fishing effort and observed takes. Of 12 observed mortalities between 1995 and 2000, 5 occurred in sets targeting spiny or smooth dogfish, 1 was in a set targeting "shark" species, 2 occurred in striped bass sets, 2 occurred in Spanish mackerel sets, and the remainder were in sets targeting kingfish, weakfish or finfish generically (Palka and Rossman 2001). From 2001 to 2008, 7 additional bottlenose dolphin mortalities were observed in the mid-Atlantic gillnet fishery. Three mortalities were observed in 2001 with 1 occurring off of northern North Carolina during April and 2 occurring off of Virginia during November. Four additional mortalities were observed along the North Carolina coast near Cape Hatteras: 1 in May 2003, 1 in September 2005, 1 in September 2006 and 1 in October 2006. Because the Northern Migratory, Southern Migratory, Northern North Carolina Estuarine System, and Southern North Carolina Estuarine System bottlenose dolphin stocks all occur in waters off of North Carolina, it is not possible to definitively assign all observed mortalities, or extrapolated bycatch estimates, to a specific stock. In addition, the Bottlenose Dolphin Take Reduction Plan (BDTRP) was implemented in May 2006 resulting in changes in the gear configurations and other characteristics of the fishery.

To estimate the mortality of bottlenose dolphins in the mid-Atlantic gillnet fishery, the available data were divided into the period from 2002 through April 2006 (pre-BDTRP) and from May 2006–2008 (post-BDTRP). Three alternative approaches were used to estimate bycatch rates. First, a generalized linear model (GLM) approach was used similar to that described in Palka and Rossman (2001). This approach included all observed mortalities from 1995 to 2008 where the fishing gear was still in use during the period from 2002 to 2008. Second, a simple ratio estimator of catch per unit effort (CPUE = observed catch / observed effort) was used based directly upon the observed data. Finally, a ratio estimator pooled across years was used to estimate different CPUE values for the pre-BDTRP and post-BDTRP periods. In each case, the annual reported fishery effort (represented as reported landings) was multiplied by the estimated bycatch rate to develop annual estimates of fishery-related mortality, again similar to the approach in Palka and Rossman (2001). To account for the uncertainty in the most appropriate of these 3 alternative approaches, the average of the 3 model estimates (and the associated uncertainty) are used to estimate the mortality of bottlenose dolphins for this fishery (Table 1).

Table 1. Summary of the 2002-2008 incidental mortality of bottlenose dolphins (*Tursiops truncatus truncatus*) in the Southern North Carolina Estuarine System Stock in the commercial mid-Atlantic gillnet fisheries. The estimated annual and average mortality estimates are shown for the period prior to the implementation of the Bottlenose Dolphin Take Reduction Plan (pre-BDTRP) and after the implementation of the plan (post-BDTRP). Three alternative modeling approaches were used, and the average of the 3 was used to represent mortality estimates. The minimum and maximum estimates indicate the range of uncertainty in assigning observed bycatch to stock. Observer coverage is measured as a proportion of reported landings (tons of fish landed). Data are derived from the Northeast Observer program, NER dealer data and NCDMF dealer data. Values in parentheses indicated the CV of the estimate.

Period	Year	Observer Coverage[a]	Min Annual Ratio	Min Pooled Ratio	Min GLM	Max Annual Ratio	Max Pooled Ratio	Max GLM
pre-BDTRP	2002	0.01	0	0	1.77 (0.35)	0	0	4.36 (0.30)
	2003	0.01	0	0	3.12 (0.42)	0	0	4.71 (0.34)
	2004	0.02	0	0	2.77 (0.43)	0	0	6.51 (0.36)
	2005	0.03	0	0	1.43 (0.41)	0	0	2.34 (0.30)
	Jan-Apr 2006	0.03	0	0	0.01 (0.70)	0	0	0.32 (0.42)
Annual Avg. pre-BDTRP			Minimum: 0.61 (CV=0.22)			Maximum: 1.22 (CV=0.18)		
post-BDTRP	May-Dec 2006	0.03	0	0	2.23 (0.51)	0	0	2.83 (0.41)
	2007	0.03	0	0	1.88 (0.52)	0	0	2.88 (0.37)
	2008	0.01	0	0	1.42 (0.48)	0	0	2.56 (0.32)
Annual Avg. post-BDTRP			Minimum: 0.61 (CV=0.30)			Maximum: 0.92 (CV=0.21)		

[a] Observer coverage is reported on an annual basis for the entire fishery as a proportion of the reported tons of fish landed.

During 2001-2008 there were no observed mortalities in the mid-Atlantic gillnet fishery that could potentially be assigned to the Southern North Carolina Estuarine System Stock. Hence, both the annual and pooled ratio estimators of bycatch rate were equal to 0 in both the pre-BDTRP and post-BDTRP periods. Since the GLM approach includes information from prior to 2002, positive bycatch rates for the SNCES Stock were estimated (Table 1). Since observed mortalities (and effort) cannot be definitively assigned to a particular stock within certain regions and times of year, the minimum and maximum possible mortality of the SNCES Stock are presented for comparison to PBR (Table 1).

Based upon these analyses, the minimum mortality estimate for the SNCES Stock for the pre-BDTRP period was 0.61 (CV=0.22) animals per year, and that for the post-BDTRP period was also 0.61 (CV=0.30) animals per year. The maximum estimates were 1.22 (CV=0.18) for the pre-BDTRP period and 0.92 (CV=0.21) for the post-BDTRP period (Table 1).

During the last five years (2007-2011), no bottlenose dolphin takes were observed by the Northeast Fishery Observer Program (NEFOP) attributable to the mid-Atlantic gillnet fishery. The average percent federal observer coverage (measured in trips) for this fishery by the NEFOP from 2007-2011 was less than 1% in internal waters (bays, sounds, estuaries), 2.74% in state waters (0-3 miles) and 6.30% in federal waters (3-200 miles). These low levels of coverage are likely insufficient to detect bycatch of coastal bottlenose dolphins in the mid-Atlantic commercial gillnet fishery. Due to a lack of observed takes, no new estimates of mortality in this fishery could be generated, as indicated by the "no estimate" in Table 2 for years 2009-2011. However, serious injury and mortality from this fishery are still occurring based on other documented interactions (see Table 2). Specifically, in 2011 the stranding network recovered a dead dolphin from a fisherman who had incidentally caught it in a small-mesh gillnet targeting spot in North Carolina. This animal could have belonged to the SNCES or Southern Migratory Coastal Stock. This documented interaction in commercial gear represents a minimum known count of interactions with this fishery in the last 5 years, absent sufficient observer coverage to generate mortality estimates (see Table 2).

North Carolina Inshore Gillnet fishery

Information about interactions with bottlenose dolphins and the North Carolina inshore gillnet fishery is based on stranding data. Historically, there was no systematic Federal observer coverage of this fishery. However, from May 2010 through March 2012, the NMFS allocated sea days and observed this fishery for the first time, but future NMFS coverage is uncertain due to funding. No bycatch was recorded by observers. Because of sea turtle bycatch in inshore gillnets, the North Carolina Division of Marine Fisheries (NCDMF) has been operating their own observer program of the inshore gillnet fishery. Since 2000, the NCDMF has operated systematic coverage of the fall (September-December) flounder gillnet fishery (> 5" mesh) in Pamlico Sound as a part of their Incidental Take Permit under the ESA (Byrd *et al.* 2011). In May 2010, NCDMF expanded the observer coverage to include gillnet effort using nets $\geq$ 4" mesh in most internal state waters and throughout the year, with a goal of 7-10% coverage. No bycatch of bottlenose dolphins has been recorded by observers, although stranding data continue to indicate interactions with this fishery occur.

Crab Pots and Other Pots

During 2007-2011, there was 1 reported mortality, in 2009, of a bottlenose dolphin entangled in blue crab pot gear that could have belonged to the SNCES or Southern Migratory Coastal Stock. Since there is no systematic observer program, it is not possible to estimate the total number of interactions or mortalities associated with crab pots. However, based on stranding data, it is clear that interactions with pot gear are a common occurrence and result in mortalities of coastal morphotype bottlenose dolphins in some regions (Burdett and McFee 2004).

Other Mortality

There have been occasional mortalities of bottlenose dolphins during research activities including directed live capture studies, turtle relocation trawls and fisheries surveys. From 2002 to 2009, there have been 15 reported interactions during research activities resulting in 13 documented mortalities of bottlenose dolphins. One mortality was reported from October 2006 in a fishery research trawl that was most likely from the SNCES Stock.

Three bottlenose dolphins that were captured, tagged with satellite-linked transmitters, and released near Beaufort, North Carolina, during April 2006 by NMFS as part of a long-term stock delineation research project were believed to have died shortly thereafter as a result of the capture or tagging (NMFS unpublished data). Two of the animals were recovered stranded but because of advanced decomposition of the carcasses cause of death could not be determined. One of these two animals was known from long-term photo-ID and was likely of the Southern North Carolina Estuarine System Stock. The third animal has not been observed subsequent to release, but patterns in the data received from its satellite tag were similar to that of the other two and indicated the fates were similar. These last two animals were, based on satellite-derived locations, most likely from the NNCES Stock. All known human-caused mortalities including both commercial fisheries and research related mortalities are summarized in Table 2.

This stock inhabits areas with significant drainage from agricultural, industrial and urban sources, and as such is exposed to contaminants in runoff from those sources. The blubber of 47 bottlenose dolphins captured and released in and around Beaufort, North Carolina, contained contaminants of some level, and 7 had unusually high levels of the pesticide methoxychlor (Hansen *et al.* 2004). While there are no estimates of indirect human-caused mortality from pollution or habitat degradation, Schwacke *et al.* (2002) found that the levels of polychlorinated biphenyls (PCBs) observed in Beaufort female bottlenose dolphins would likely impair reproductive success, especially of primiparous females.

Table 2. Summary of annual reported and estimated mortality of bottlenose dolphins from the Southern North Carolina Estuarine System Stock during 2007-2011 from observer and stranding data. Where minimum and maximum values are reported, there is uncertainty in the assignment of mortalities to this particular stock due to spatial overlap with other bottlenose dolphin stocks in certain areas and seasons. This is especially the case for strandings where the maximum number reported may truly be a minimum because not all strandings are detected. They are therefore reported as the maximum greater than or equal to what was recovered.

Year	Mid-Atlantic Gillnet		NC Inshore Gillnet (strandings)	Blue Crab Pot (strandings)	Other Pot (strandings)	Research (incidental takes)	Total
	Min/Max estimate extrapolated from observer data (only through 2008)	Additional interactions known from stranding data					
2007	Min = 0.6 Max = 1.0	0	0	0	0	0	Min = 0.6 Max ≥ 1.0
2008	Min = 0.5 Max = 0.9	0	0	0	0	0	Min = 0.5 Max ≥ 0.9
2009	No estimate	0	0	Min = 0 Max = 1	0	0	Min = 0 Max ≥ 1
2010	No estimate	0	0	0	0	0	0
2011	No estimate	Min = 0 Max = 1	0	0	0	0	Min = 0 Max ≥ 1
Annual Average Mortality (2007-2011)				Minimum Estimated = 0.2 Maximum Estimated ≥ 0.8			

Strandings

Between 2004 and 2008, Between 2007 and 2011, 58 bottlenose dolphins stranded in coastal and estuarine waters of North Carolina that could be assigned to the SNCES Stock (Table 3; Northeast Regional Marine Mammal Stranding Network, Southeast Regional Marine Mammal Stranding Network; NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 13 September 2012). It was not possible to determine whether or not there was evidence of human interaction for 24 of these strandings, and for 16 it was determined there was no evidence of human interaction. The remaining 18 showed evidence of human interactions, including 15 fisheries interactions (FI) and 1 mutilation. One FI was a 2009 mortality resulting from entanglement in blue crab pot gear. Another FI was a 2011 mortality resulting from a gillnet entanglement. The gillnet was targeting spot, and falls under the mid-Atlantic gillnet fishery. The remaining FIs could not be assigned to a specific fishery. It should be recognized that evidence of human interaction does not indicate cause of death, but rather only that there was evidence of interaction with a fishery (e.g., line marks, net marks) or evidence of a boat strike, gunshot wound, mutilation, etc., at some point.

The assignment of animals to a particular stock is impossible in some seasons and regions. In particular, there is overlap between the SNCES Stock and the Southern Migratory Coastal Stock in coastal waters of southern North Carolina during fall and spring. There is also overlap in southern Pamlico Sound and waters of Bogue Sound with the NNCES Stock during late summer and early fall. Therefore, it is likely that the counts below include some animals from either the Southern Migratory Coastal or NNCES Stock, and some of the strandings below were also included in the counts for the Southern Migratory Coastal and NNCES Stocks. Within estuarine waters of southern North Carolina, where the probability is very high that strandings are from the SNCES Stock, there were a total of 14 strandings in this 5 year period. In addition, stranded carcasses are not routinely identified to either the offshore

or coastal morphotype of bottlenose dolphin, therefore it is possible that some of the reported strandings were of the offshore form.

Table 3. Strandings of bottlenose dolphins from North Carolina that can possibly be assigned to the Southern North Carolina Estuarine System Stock. Strandings observed in North Carolina are separated into those occurring within estuaries vs. coastal waters. Assignments to stock were based upon the understanding of the seasonal movements of this stock. However, particularly in coastal waters, there is likely overlap between the SNCES Stock and other bottlenose dolphin stocks. HI = Evidence of Human Interaction, CBD = Cannot Be Determined whether an HI occurred or not. NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 13 September 2012.

State	**2007**			**2008**			**2009**			**2010**			**2011**		
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
North Carolina - Coastal	2[a]	1	5	3[b]	3	4	3[c]	2	1	3[d]	3	2	5[e]	4	3
North Carolina - Estuary	0	1	2	0	0	2	0	0	2	2[f]	1	2	0	1	1
Annual Total	11			12			8			13			14		

[a] Includes 2 fisheries interactions (FI).
[b] Includes 3 FIs.
[c] Includes 3 FIs, 1 of which was an entanglement interaction (mortality) with blue crab pot gear.
[d] Includes 1 FI and 1 mutilation.
[e] Includes 4 FIs, 1 of which was a gillnet entanglement mortality from the mid-Atlantic gillnet fishery.
[f] Includes 2 FIs, 1 of which was also mutilated.

STATUS OF STOCK

Bottlenose dolphins in the western North Atlantic are not listed as threatened or endangered under the Endangered Species Act. However, because the total human-caused mortality and serious injury is equal to or greater than 10% of PBR and may exceed PBR, NMFS considers the SNCES Stock to be a strategic stock under the Marine Mammal Protection Act. PBR for the SNCES Stock is 1.6 and so the zero mortality rate goal, 10% of PBR, is 0.2. The documented annual average human-caused mortality for this stock for 2007 – 2011 ranges between 0.2 and 0.8. However, the total U.S. human-caused mortality and serious injury for this stock cannot be directly estimated because of the spatial overlap of several stocks of bottlenose dolphins in this area. In addition, there are several commercial fisheries operating within this stock's boundaries and these fisheries have little to no observer coverage. Therefore, the documented mortalities must be considered minimum estimates of total fishery-related mortality, and the total fishery-related mortality and serious injury for this stock is unlikely to be less than 10% of the calculated PBR and cannot be considered to be insignificant and approaching a zero mortality and serious injury rate. The status of this stock relative to OSP is unknown. There are insufficient data to determine the population trends for this stock.

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