

COMMON BOTTLENOSE DOLPHIN (*Tursiops truncatus truncatus*) Northern South Carolina Estuarine System Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

In the western North Atlantic, the coastal morphotype of common bottlenose dolphins is continuously distributed in nearshore coastal and estuarine waters along the U.S. Atlantic coast south of Long Island, New York, to the Florida peninsula. Several lines of evidence support a distinction between dolphins inhabiting coastal waters near the shore and those present in the inshore waters. Photo-identification (photo-ID) studies support the existence of resident estuarine animals in several areas (Caldwell 2001; Gubbins 2002; Zolman 2002; Gubbins *et al.* 2003; Mazzoil *et al.* 2005; Sloan 2006; Litz *et al.* 2012), and similar patterns have been observed in bays and estuaries along the Gulf of Mexico coast (Wells *et al.* 1987; Balmer *et al.* 2008). 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coast (Rosel *et al.* 2009), and between those biopsied in coastal and estuarine waters at the same latitude (NMFS unpublished data).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).

Estuarine waters of central South Carolina are characterized by tidal salt marsh around Bulls Bay and the Cape Romain National Wildlife Refuge, and inlets leading to smaller marsh systems, such as at Murrells Inlet. This region has minimal industrial development. Much of the habitat is a shallow, meso-tidal (2-4 m tidal range) estuary consisting of deep channels, creeks, bays and inlets with tidal mud flats and oyster reefs navigable only at high tide (Petricig 1995; Dame *et al.* 2000; Young and Phillips 2002; Sloan 2006).

Sloan (2006) analyzed photo-ID data collected between April-September 2002, July-August 2003 and September 2003 through August 2005 in the Cape Romain National Wildlife Refuge. In total, 1,900 bottlenose dolphins were recorded during 445 sightings, with 121 individuals identified. Only 36% of individuals had dorsal fins that were considered identifiable. Twenty-two year-round residents (sighted 4-20 times and in all 4 water temperature classes: <13°C (cool), 13-19°C (cool transitional), 20-27°C (warm transitional) and >27°C (warm)), 49 seasonal residents (sighted in 1-3 temperature classes over multiple years or 3 temperature classes in the same year), and 50 transients were identified. Sloan (2006) noted that 3 of the 49 seasonal residents were sighted 10-19 times each, and may be residents missed during months with less survey effort. All year-round residents were sighted exclusively within the salt marsh and never in the coastal waters. Twelve year-round residents showed long-term site-fidelity, with 10 individuals sighted over 3 years and 2 individuals sighted over 4 years. Seasonal shifts in abundance were seen and were attributed to shifts in abundance and behavior of prey species (Sloan 2006).

More recently, Brusa (2012) conducted photo-ID surveys in Winyah Bay and North Inlet, South Carolina, to the

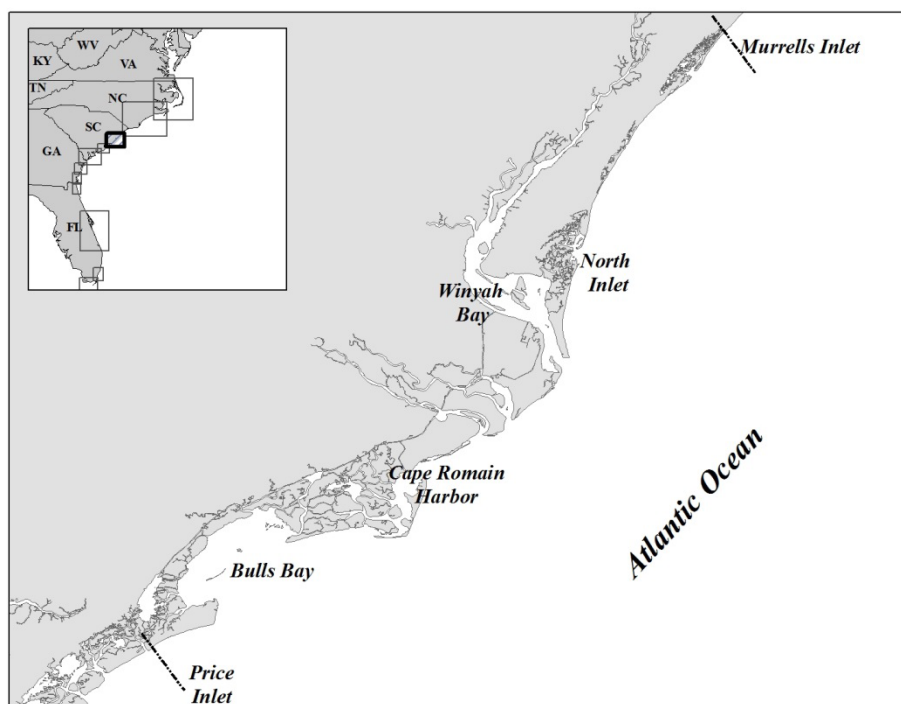


Figure 1. Geographic extent of the Northern South Carolina Estuarine System (NSCES) Stock. The borders are denoted by dashed lines.

north of Cape Romain, to examine distribution and home ranges. During May 2011 - February 2012, Brusa (2012) identified 84 dolphins sighted 3 or more times on non-consecutive days, with 71 of those sighted during the warm season (May-October), 2 during the cold season (December-February), and 11 during warm and cold seasons. Similar to Cape Romain, dolphins were present in warm and cold seasons, but found to be less abundant during the cold season. During the warm season, 3 dolphins were sighted in North Inlet only, 38 dolphins in Winyah Bay only, and 41 dolphins were sighted in both North Inlet and Winyah Bay.

Six dolphins identified in the Cape Romain area were matched via the mid-Atlantic Bottlenose Dolphin Catalog (Urian *et al.* 1999) to animals seen in estuarine waters of Winyah Bay and/or North Inlet, one of which had an extensive year-round sighting history in these northern estuarine waters (Sloan 2006). One dolphin seen in the Cape Romain area was also sighted in Murrells Inlet, South Carolina, north of North Inlet (Sloan 2006). However, this animal was sighted only once and so it is difficult to know whether it was an estuarine animal or simply a coastal dolphin that explored these two areas.

Given the results of these photo-ID studies, the Northern South Carolina Estuarine System (NSCES) Stock is delimited as dolphins inhabiting estuarine waters from Murrells Inlet, South Carolina, southwest to Price Inlet, South Carolina, the northern boundary of Charleston Estuarine System Stock (Figure 1). Dolphins may be present as far inland as the Intracoastal Waterway and the stock boundary also includes coastal waters up to 1 km offshore. Murrells Inlet is a small estuarine area and likely does not support its own stock of bottlenose dolphins, but could be utilized by estuarine dolphins from further south. As a result, the stock boundaries for the NSCES Stock include the North Inlet estuary north to Murrells Inlet. North of Murrells Inlet, South Carolina, there is a long stretch of sandy beach with few inlets and no significant estuarine waters. However, these boundaries are subject to change upon further study of dolphin residency patterns in estuarine waters of South Carolina.

POPULATION SIZE

The total number of common bottlenose dolphins residing within the NSCES is unknown. Based on photo-ID data from April-September 2002, July-August 2003, and September 2003-August 2005, 121 individually identified dolphins were observed in the Cape Romain National Wildlife Refuge, and some were identified as year-round residents (Sloan 2006).

Minimum Population Estimate

Present data are insufficient to calculate a minimum population estimate for the NSCES Stock of common bottlenose dolphins.

Current Population Trend

No abundance estimate is available for this stock, and therefore there are insufficient data to assess population trends.

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 for the NSCES Stock is unknown. The maximum productivity rate is 0.04, the default value for cetaceans. The recovery factor is 0.5 because this stock is of unknown status. PBR is unknown for this stock of common bottlenose dolphins.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

The total annual human-caused mortality and serious injury for the NSCES Stock during 2009–2013 is unknown because this stock is known to interact with unobserved fisheries (see below). The mean annual fishery-related mortality and serious injury for strandings identified as fishery-caused was 0.2. No additional mortality or serious injury was documented from other human-caused actions. The minimum total mean annual human-caused mortality and serious injury for this stock during 2009–2013 was 0.2.

Fishery Information

The commercial fisheries that interact, or that potentially could interact, with this stock are the Category II Southeast Atlantic inshore gillnet fishery and the Atlantic blue crab trap/pot fishery (Appendix III).

Gillnet

During 2009–2013, 1 mortality occurred in 2011 due to an interaction with the Southeast Atlantic inshore gillnet fishery. This mortality was included in the stranding database (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, 11 June 2014). It should be noted that there is no systematic observer program for this fishery, so it is not possible to estimate the total number of interactions or mortalities associated with gillnets.

Atlantic Blue Crab Trap/Pot

One of the largest commercial fisheries in South Carolina's coastal waters is the Atlantic blue crab (*Callinectes sapidus*) trap/pot fishery, which operates year round with the predominant fishing occurring from August to November. Burdett and McFee (2004) reviewed common bottlenose dolphin strandings in South Carolina from 1992 to 2003 and found that 24% of the 42 entanglements of dolphins were associated with crab pots with an additional 19% of known entanglements deemed as probable interactions with crab pots.

During 2009–2013 there were no documented interactions with crab trap/pot gear in the NSCES area. It should be noted that there is no systematic observer program for the blue crab fishery.

Other Mortality

From 2009 to 2013, 11 stranded common bottlenose dolphins were reported within the NSCES area, including the 1 above mentioned fisheries interaction with gillnet gear (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, 11 June 2014). Of the 10 remaining strandings, for 2 dolphins, there was no evidence of human interaction, and for 8 dolphins, it could not be determined if there was evidence of human interaction. 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.

An Unusual Mortality Event (UME) was declared in South Carolina during February-May 2011. One stranding assigned to the NSCES Stock was considered to be part of the UME. The cause of this UME was undetermined. A UME was declared in the summer of 2013 for the mid-Atlantic coast from New York to Brevard County, Florida. Beginning in July 2013, bottlenose dolphins have been stranding at elevated rates. The total number of stranded bottlenose dolphins from New York through North Florida (Brevard County) as of mid-October 2014 (1 July 2013 - 19 October 2014) was ~1546. Morbillivirus has been determined to be the cause of the event. Most strandings and morbillivirus positive animals have been recovered from the ocean side beaches rather than from within the estuaries, suggesting that at least so far coastal stocks have been more impacted by this UME than estuarine stocks. However, the UME is still ongoing as of December 2014 when this report was drafted, and work continues to determine the effect of this event on all bottlenose dolphin stocks in the Atlantic.

STATUS OF STOCK

Common bottlenose dolphins in the western North Atlantic are not listed as threatened or endangered under the Endangered Species Act. However, because the abundance of the NSCES stock is currently unknown, but likely small and relatively few mortalities and serious injuries would exceed PBR, NMFS considers this to be a strategic stock under the Marine Mammal Protection Act. The documented mean annual human-caused mortality for this stock for 2009 – 2013 is 0.2. However, there are commercial fisheries, including crab trap/pot fisheries, operating within this stock's boundaries and these fisheries have little to no observer coverage. The impact of crab trap/pot fisheries on estuarine bottlenose dolphins is currently unknown, but has been shown previously to be considerable in the similar Charleston Estuarine System Stock area (Burdett and McFee 2004). Therefore, the documented mortality must be considered a minimum estimate of total fishery-related mortality. There is insufficient information available to determine whether the total fishery-related mortality and serious injury for this stock is insignificant and approaching a zero mortality and serious injury rate. The status of this stock relative to OSP in the U.S. Atlantic EEZ is unknown. There are insufficient data to determine the population trends for this stock.

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