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COMMON BOTTLENOSE DOLPHIN (*Tursiops truncatus truncatus*) Northern South 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 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coast (Rosel *et al.* 2009), and between those biopsied in coastal and estuarine waters at the same latitude (NMFS unpublished data).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).

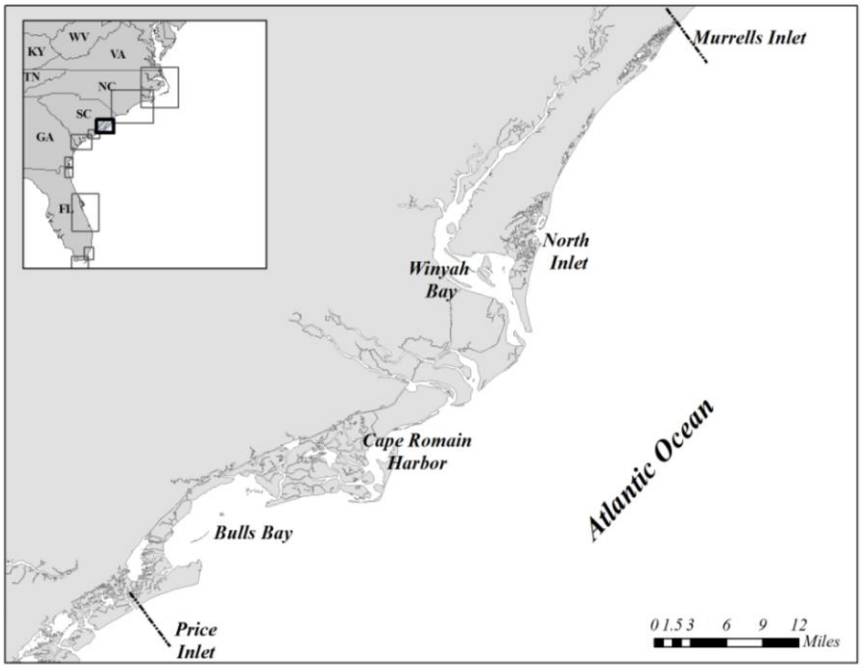

Figure 1. *Geographic extent of the Northern South Carolina Estuarine System (NSCES) Stock. The borders are denoted by dashed lines.*

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 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 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 (Sloan 2006), which included 22 year round residents, 49 seasonal residents and 50 transient dolphins. Some of the dolphins classified as seasonal residents may actually be year round residents that were missed in one temperature class during the surveys, as they were observed repeatedly over multiple years. Sloan (2006) observed relative abundance to increase with sea surface temperature (higher during March-November), and to decrease during months of lowest sea surface temperature (December-February). Based on photo-ID data collected during May 2011-February 2012, 71 warm-season (May-October) residents, 2 cold-season (December-February) residents, and 11 warm- and cold-season residents were observed in Winyah Bay and North Inlet (Brusa 2012). As in Cape Romain, relative abundance in Winyah Bay/North Inlet was higher during warmer months. It is important to note that survey effort from each study, in Cape Romain and in Winyah Bay/North Inlet, only covered a small portion of the entire geographic range of this stock.

Minimum Population Estimate

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

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 for the NSCES Stock is unknown. 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 is unknown for this stock of bottlenose dolphins.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

The total estimated annual human-caused mortality and serious injury within the NSCES during 2007-2011 is unknown. One mortality occurred during 2011 due to an interaction with the Southeast Atlantic inshore gillnet fishery; however, it is not possible to estimate the total number of interactions or mortalities associated with the inshore gillnet fishery since there is no systematic observer program.

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

There is the potential for the NSCES Stock to interact with the Category II Southeast Atlantic inshore gillnet and Atlantic blue crab trap/pot fisheries (Appendix III).

Gillnet Gear

One mortality occurred during 2011 due to an interaction with the Southeast Atlantic inshore gillnet fishery. Another mortality occurred during 2008 as the result of an incidental take in a monofilament gillnet during a research project on coastal sharks. Both of these mortalities were included in the stranding database (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, 13 September 2012) .

Crab Pots

One of the largest commercial fisheries in South Carolina's coastal waters is the Atlantic blue crab (*Callinectes sapidus*) fishery, which operates year round with the predominant fishing occurring from August to November. Burdett and McFee (2004) reviewed 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 2007-2011 there were no documented interactions with crab pots in the NSCES area. It should be noted that there is no systematic observer program for the blue crab fishery.

Other Mortality

From 2007 to 2011, 7 stranded bottlenose dolphins were reported within the NSCES area, including the above mentioned 2 fisheries interactions with gillnet gear (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, 13 September 2012). Of the 5 remaining strandings, for 1 dolphin, there was no evidence of human interactions, and for 4 dolphins, it was not possible to make a determination of human interactions. Stranding data underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals that die or are seriously injured in fishery interactions are discovered, reported or investigated, nor will all of those that are found necessarily show signs of entanglement or other fishery interaction. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interactions.

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 is still under investigation.

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 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 annual average human-caused mortality for this stock for 2007 – 2011 is 0.2. However, there are several 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 mortalities must be considered minimum estimates 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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