

## BOTTLENOSE DOLPHIN (*Tursiops truncatus*) Northern Georgia/Southern South Carolina Estuarine System Stock

### STOCK DEFINITION AND GEOGRAPHIC RANGE

The coastal morphotype of bottlenose dolphin 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. Except for animals residing within the Southern North Carolina and Northern North Carolina Estuarine Systems (e.g., Waring *et al.* 2007), estuarine dolphins along the U.S. east coast have not previously been included in stock assessment reports. Several lines of evidence support a distinction between dolphins inhabiting coastal waters near the shore and those present 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 (Caldwell 2001; Gubbins 2002a; Zolman 2002; Gubbins *et al.* 2003; Mazzoil *et al.* 2005; Litz 2007), 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between animals biopsied along the coast and those biopsied within the estuarine systems at the same latitude (NMFS unpublished data). Similar results have been found off the west coast of Florida (Sellas *et al.* 2005).

The Northern Georgia/Southern South Carolina Estuarine System (NGSSCES) stock is bounded in the north by the southern border of the Charleston Estuarine System stock at the southern extent of the North Edisto River and extends southwestward to the northern extent of Ossabaw Sound. It includes St. Helena, Port Royal, Calibogue and Wassaw Sounds as well as the estuarine waters of the rivers and creeks that lie within this area (Figure 1). Photo-ID matches of estuarine animals from the NGSSCES region and the estuarine stocks to the north and south have not been made (Urian *et al.* 1999). The borders are based primarily on results of photo-ID studies conducted by Gubbins (2002a,b,c) in this region, and photo-ID and telemetry research carried out north of this region (Zolman 2002; Speakman *et al.* 2006), and are subject to change upon further study of dolphin residency patterns in estuarine waters of South Carolina and Georgia.

From 1994 to 1998, Gubbins (2002a,b,c) surveyed an area bordered on the north by the May River, on the south by the Calibogue Sound, on the west by Savage Creek and on the east by Hilton Head Island. Broad Creek, which bisects Hilton Head Island, and nearshore ocean waters out to 2 km at the mouth of Calibogue Sound were included and were regularly surveyed. Occasional surveys were made around the perimeter of Hilton Head Island.

Gubbins (2002b) categorized each dolphin identified in the Hilton Head area as a year-round resident or a seasonal transient based on overall resighting patterns. Residents were seen in all 4 seasons whereas transients were seen only in 1 or 2 seasons. Resident dolphins were observed from 10 to 116 times, whereas transients were observed less than 9 times (Gubbins 2002b). Sixty-four percent of the dolphins photographically identified were resighted only once between 1994 and 1998. Both resident and transient dolphins occurred in waters of Calibogue

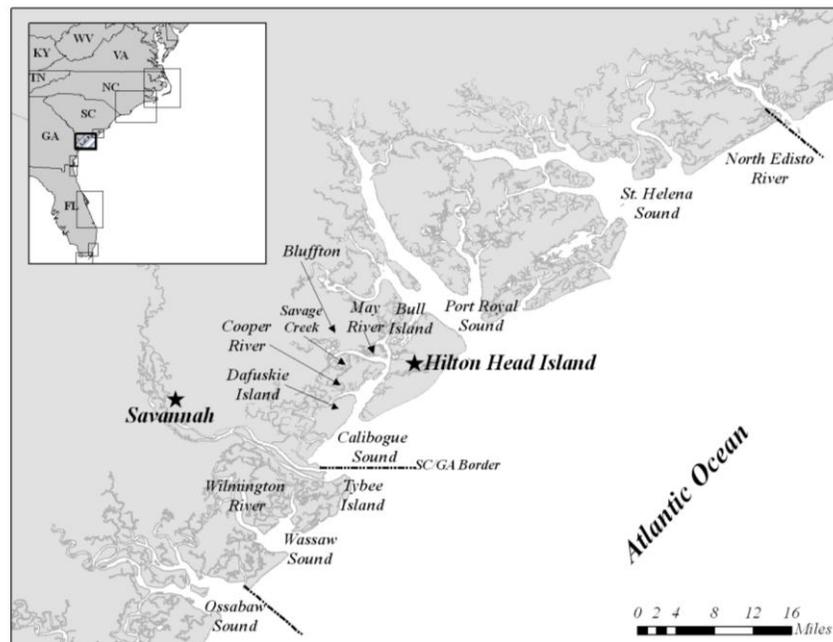


Figure 1. Geographic extent of the Northern Georgia/Southern South Carolina Estuarine System (NGSSCES) stock. The borders are denoted by dashed lines.

Sound (Gubbins 2002b,c; Gubbins *et al.* 2003), whereas in the tidal creeks and rivers, primarily small, tight groups of resident dolphins were seen, with only an occasional transient dolphin observed in these estuarine areas. Two dolphins were resighted between Hilton Head and Jacksonville, which likely represent transients or seasonal residents (Gubbins 2002b). Gubbins *et al.* (2003) reported dolphin abundance in the Hilton Head area was lowest from February to April, with 2 peaks in abundance observed in May and July. Some dolphins were sighted for short periods of time in the summer, indicating transients or seasonal residents may move inshore to this area during the summer months.

Dolphins residing within estuaries south of this stock down to the northern boundary of the Southern Georgia Estuarine System (SGES) stock are currently not included in any Stock Assessment Report. There are insufficient data to determine whether animals south of the NGSSCES stock exhibit affiliation to the NGSSCES stock, to the SGES stock to the south or are deserving of their own stock status. Further research is needed to establish affinities of dolphins in this region. It should be noted, however, that in this intervening region during 2003-2007, 7 dead stranded dolphins were reported. It could not be determined if there was evidence of human interactions for 6 of these stranded animals and for 1 animal no evidence of human interactions was detected.

## **POPULATION SIZE**

The total number of bottlenose dolphins residing within the NGSSCES stock is unknown. Data collected by Gubbins (2002b) were incorporated into a larger study that used mark-recapture analyses to calculate abundance in 4 estuarine areas along the eastern U.S. coast (Gubbins *et al.* 2003). Sighting records collected only from May through October were used. Based on photo-ID data from 1994 to 1998, 234 individually identified dolphins were observed (Gubbins *et al.* 2003), which included 52 year-round residents and an unspecified number of seasonal residents and transients. Mark-recapture analyses included all the 234 individually identifiable dolphins and the population size for the Hilton Head area was calculated to be 525 dolphins (CV=0.16; Gubbins *et al.* 2003). This is an overestimate of the stock abundance within the study area covered by Gubbins *et al.* (2003) because it includes non-resident and seasonally resident dolphins. In addition, the study area did not encompass the entire area occupied by the NGSSCES stock and therefore this population size cannot be considered a reliable estimate of abundance for this stock.

### **Minimum Population Estimate**

The minimum population estimate for this stock of bottlenose dolphins is unknown.

### **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 NGSSCES 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 for the NGSSCES stock of bottlenose dolphins is unknown.

## **ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY**

The total annual human-caused mortality and serious injury within the NGSSCES stock during 2003-2007 is unknown. It is not possible to estimate the total number of interactions or mortalities associated with crab pots since there is no systematic observer program. However, it is clear that this interaction occurs elsewhere within estuarine habitats of the southeastern U.S. coast and does result in mortalities of estuarine bottlenose dolphins (Burdett and McFee 2004).

## **Fishery Information**

### **Crab Pots**

Between 2003 and 2007, 4 bottlenose dolphins were reported entangled in crab pot gear in the NGSSCES (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 10 November 2008). All 4 dolphins were released alive. One entanglement occurred in August 2005 in the northern reaches of the Wilmington River and 3 crab pot entanglements occurred in 2006 (1 in March in Wassaw Sound, 1 live dolphin was reported in May on Hilton Head Island and 1 entanglement occurred in June on Daufuskie Island).

### **Other Mortality**

From 2003 to 2007, 51 additional bottlenose dolphins were reported stranded within the NGSSCES area (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 10 November 2008). It could not be determined if there was evidence of human interactions for 34 of these strandings, and no evidence of human interaction was detected for 15. One dolphin which stranded in September 2006 showed evidence of human interaction, but not fishery interaction (propeller wounds), and an additional dolphin stranded in March 2006 in Tybee Creek at Morgan Cut with signs of net entanglement noted on the dorsal fin. Finally, there have been occasional mortalities of bottlenose dolphins during research activities. Three dolphins were killed in fishery research trammel nets, including a mother/calf pair in March 2004 in Tybee Creek, Georgia, and 1 dolphin in House Creek (Little Tybee Island) in November 2004.

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.

This stock inhabits areas with significant drainage from urban and agricultural areas and as such is exposed to contaminants in runoff from those sources. There is no estimate of indirect human-caused mortality from pollution or habitat degradation for this stock. However, high tissue concentrations of anthropogenic contaminants are likely to have an effect on reproduction and population health (Hansen *et al.* 2004; Schwacke *et al.* 2004; Reif *et al.* 2008).

Blubber samples were collected from 7 bottlenose dolphins in the Turtle/Brunswick River Estuary (TBRE) and dolphins stranded in Wassaw, Ossabaw and St. Catherine's Sounds (Pulser and Maruya 2008). Total PCB concentrations were 10 times higher in dolphins from the TBRE compared to the stranded animals from the Savannah area. The signature of Aroclor 1268, a PCB used in roofing and caulking compounds, was distinct between the TBRE and Savannah area dolphins and closely resembled those of local prey fish species (Pulser and Maruya 2008).

Gubbins (2002c) speculated that the most serious threat to Hilton Head dolphins is handouts of food, as provisioned dolphins spend more time alone and in smaller groups leaving them vulnerable to shark attacks, more aggressive with each other in an attempt to get free food, and less wary of humans, leaving them open to injury or death from boat propellers, spoiled fish or even shooting. There are emerging questions regarding potential linkages between provisioning wild dolphins, dolphin depredation of recreational fishing gear, and associated entanglement and ingestion of gear. High boat activity in the Hilton Head area could result in a change in movement patterns, alteration of behavior of both dolphins and their prey, disruption of echolocation and masking of communication, physical damage to ears, collisions with vessels and degradation of habitat quality (Richardson *et al.* 1995; Ketten 1998; Gubbins 2002b; Gubbins *et al.* 2003; Mattson *et al.* 2005). The effect of boat activity was investigated by Mattson *et al.* (2005) during the summer of 1998 along Hilton Head Island. Dolphins changed behavior more often when boats were present, and group size was significantly larger in the presence of 1 boat and was largest when multiple boats were present. Jet skis elicited a strong and immediate reaction with dolphins remaining below the surface for long periods of time. Dolphins always changed behavior and direction of movement in the presence of shrimp boats, while ships and ferries elicited little to no obvious response. One documented impact from boats was recorded in September 2006 when a dolphin stranded at Bluffton with propeller wounds on its back, as reported above (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 10 November 2008).

## **STATUS OF STOCK**

From 1995 to 2001, NMFS recognized only a single migratory stock of coastal bottlenose dolphins in the western North Atlantic, and the entire stock was listed as depleted as a result of the 1987-1988 mortality event. Scott *et al.*

(1988) suggested that dolphins residing in the bays, sounds and estuaries adjacent to these coastal waters were not affected by the mortality event and these animals were explicitly excluded from the depleted listing (Federal Register: 54(195), 41654-41657; 56(158), 40594-40596; 58(64), 17789-17791).

The status of the NGSSCES stock relative to OSP is unknown. The species is not listed as threatened or endangered under the Endangered Species Act. There are insufficient data to determine population trends for this stock. The total human-caused mortality and serious injury for this stock is not known and there is insufficient information available to determine whether the total fishery-related mortality and serious injury for this stock is insignificant and approaching zero mortality and serious injury rate. The impact of crab pots on estuarine bottlenose dolphins is currently unknown, but has been shown to be considerable in the Charleston Estuarine System stock (Burdett and McFee 2004). Because the stock size is currently unknown, but likely small and relatively few mortalities and serious injuries would exceed PBR, the NMFS considers this stock to be a strategic stock.

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