COMMON BOTTLENOSE DOLPHIN (*Tursiops truncatus truncatus*) Central Georgia 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 of the bays, sounds and estuaries. Photo-identification (photo-ID) and genetic studies support the existence of resident estuarine animals in several inshore areas of the southeastern United States (Caldwell 2001; Gubbins 2002; Zolman 2002; Mazzoil *et al.* 2005; 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coast (Rosel *et al.* 2009), and between those biopsied in coastal and estuarine waters at the same latitude (NMFS unpublished data).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).

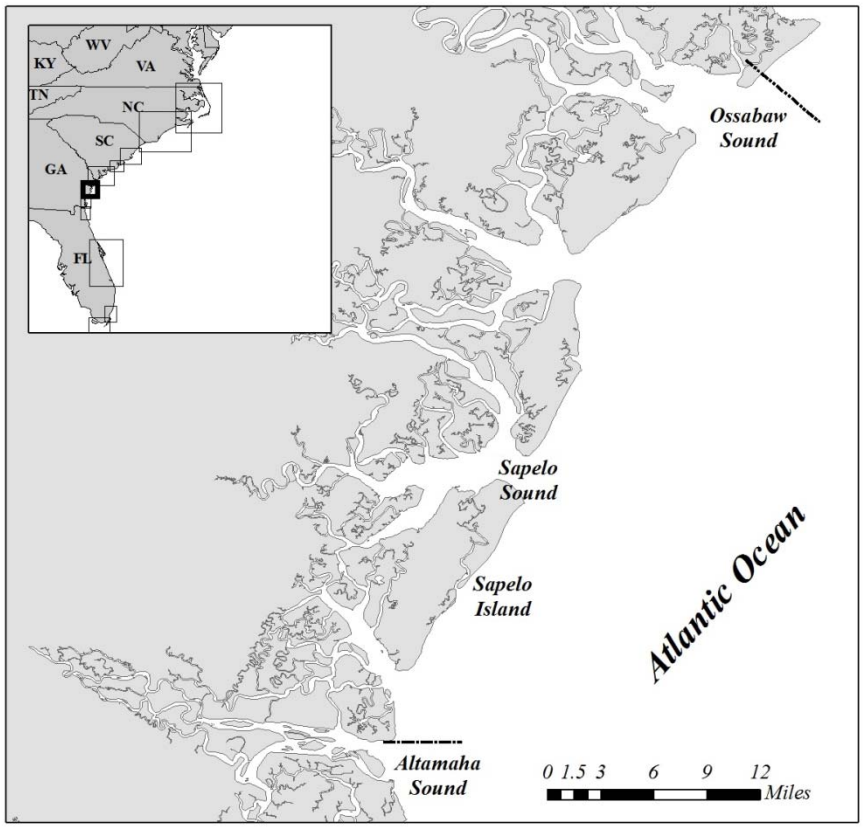

Figure 1. *Geographic extent of the Central Georgia Estuarine System (CGES) Stock. Dashed lines denote the boundaries.*

Coastal central and northern Georgia contains an extensive estuarine tidal marsh system in which bottlenose dolphins are documented. The primary river drainages in this region are the Altamaha in central Georgia and the Savannah River at the Georgia-South Carolina border. Much of the coastal marsh and islands in the area have been privately owned since the early 19th century and have therefore experienced little development and the marshes and coastal region are therefore relatively undisturbed. The Sapelo Island National Estuarine Research Reserve, part of NOAA's Estuarine Reserve System, lies in this section of the Georgia coast and includes 4,000 acres of tidal salt marsh.

The Central Georgia Estuarine System Stock (CGES) is delineated in the estuarine waters of central Georgia (Figure 1). It extends from the northern extent of Ossabaw Sound, where it meets the border with the Northern Georgia/Southern South Carolina Estuarine System Stock, south to the Altamaha River, which provides the border between the CGES and the Southern Georgia Estuarine System Stock. Nearshore (≤ 1km from shore) coastal waters are also included in the CGES Stock boundaries.

The boundaries of this stock are supported by photo-ID and genetic data. Balmer *et al.* (2011) conducted photo-ID studies between 2004 and 2009 in the Turtle/Brunswick River estuary (TBRE) in southern Georgia and in estuarine habitats north of the Altamaha Sound to Sapelo Sound. Photo-ID data revealed strong site fidelity to the

two regions and supported Altamaha Sound as an appropriate boundary between the two sites as 85.4% of animals identified did not cross Altamaha Sound (Balmer *et al.* 2013). Just over half the animals that did range across Altamaha Sound had low site fidelity and were believed to be members of the South Carolina/Georgia Coastal Stock. Genetic analysis of mitochondrial DNA control region sequences and microsatellite markers of dolphins biopsied in southern Georgia showed significant genetic differentiation from animals biopsied in northern Georgia and southern South Carolina estuaries as well as from animals biopsied in coastal waters >1 km from shore at the same latitude (NMFS unpublished data). In addition, bottlenose dolphins sampled within the Sapelo Island area exhibited contaminant burdens significantly lower than those sampled to the south in the TBRE (Balmer *et al.* 2011; Kucklick *et al.* 2011) consistent with long-term fidelity to these separate areas.

POPULATION SIZE

During 2008-2009, seasonal, mark-recapture photo-ID surveys were conducted to estimate abundance in a portion of the CGES area from Altamaha Sound north to Sapelo Sound. Estimates from winter were chosen as the best representation of the resident estuarine stock in the area surveyed, and a Markovian emigration model was chosen as the best fit based on the lowest Akaike's Information Criterion value. The estimated average abundance, based on winter 2008 and winter 2009 surveys, was 192 (CV=0.04; Balmer *et al.* 2013). Estimates were adjusted to include the 'unmarked' (not distinctive) as well as 'marked' (distinctive) portion of the population for each winter survey. It is important to note this estimate covered approximately half of the entire range of the CGES Stock, and therefore, the abundance estimate is negatively biased.

Minimum Population Estimate

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normal distributed abundance estimate. This is equivalent to the 20th percentile of the log-normal distributed abundance estimate as specified by Wade and Angliss (1997). Though negatively biased, the best estimate for the CGES Stock is 192 (CV=0.04). The resulting minimum population estimate is 185.

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 CGES Stock of bottlenose dolphins is 185. 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 this stock of bottlenose dolphins is 1.9.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

The total annual human-caused mortality and serious injury within the CGES Stock of bottlenose dolphins during 2008-2012 is unknown. One interaction with commercial crab trap/pot gear was documented; however, it is not possible to estimate the total number of interactions or mortalities associated with crab pots 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 a potential for the CGES Stock to interact with the Category II Atlantic blue crab trap/pot fishery (Appendix III).

Crab Pots

During 2008-2012 there was 1 documented interaction with crab trap/pot gear in the CGES area. This interaction occurred during 2011 and involved an animal that was disentangled from commercial crab trap/pot gear, likely blue crab, and released alive without serious injury (Maze-Foley and Garrison in prep). This animal was included in the stranding database and in the totals in Table 1 (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 13 September 2012 [for 2008-2011 data] and 15 April 2013 [for 2012 data]). Since there is no systematic observer program, it is not possible to estimate the total number of interactions or mortalities associated with crab pots.

Other Mortality

From 2008 to 2012, 15 bottlenose dolphins were reported stranded within the CGES (NOAA National Marine Mammal Health and Stranding Response Database unpublished data, 13 September 2012 and 15 April 2013). It was not possible to make any determination of possible human interaction for 13 of these strandings due to most (80%) were in a state of moderate or advanced decomposition when first observed. For 1 dolphin, no evidence of human interactions was detected. The remaining stranding was a fishery interaction with commercial crab trap/pot gear, described above. Stranding data probably 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.

Illegal feeding or provisioning of wild bottlenose dolphins has been documented in Georgia, particularly near Brunswick and Savannah (Kovacs and Cox 2014; Perrtree *et al.* 2014; Wu 2013). Feeding wild dolphins is defined under the MMPA as a form of 'take' because it can alter the natural behavior and increase the risk of injury or death to wild dolphins.

Table 1. Bottlenose dolphin strandings occurring in the Central Georgia Estuarine System Stock area during 2008 to 2012, as well as number of strandings for which evidence of human interactions (HI) was detected and number of strandings for which it could not be determined (CBD) if there was evidence of human interactions. Data are from the NOAA National Marine Mammal Health and Stranding Response Database (unpublished data, accessed 13 September 2012 [for 2008-2011 data] and 15 April 2013 [for 2012 data]). Please note human interaction does not necessarily mean the interaction caused the animal's death.

Stock	Category	2008	2009	2010	2011	2012	Total
Central Georgia Estuarine System Stock	Total Stranded	3	1	1	5	5	15
	Human Interaction						
	---Yes	0	0	0	1[a]	0	1
	---No	0	0	0	0	1	1
	---CBD	3	1	1	4	4	13

[a] This HI was an animal disentangled from commercial crab pot gear and released alive without serious injury.

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 CGES Stock is 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. PBR for this stock is 1.9, and the zero mortality rate goal, 10% of PBR, is 0.2. There were no documented human-caused mortalities to this stock during 2008 – 2012. However, a recent entanglement and entanglements in prior years in both commercial and recreational crab trap/pot fisheries have been documented. While the impact of crab trap/pot fisheries on estuarine bottlenose dolphins is currently unknown, it has been shown previously to be considerable in the similar Charleston Estuarine System Stock area (Burdett and McFee 2004). Therefore, 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 is unknown. There are insufficient data to determine the population trends for this stock.

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