

BOTTLENOSE DOLPHIN (*Tursiops truncatus truncatus*): Gulf of Mexico Northern Coastal Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Bottlenose dolphins inhabit coastal waters throughout the northern Gulf of Mexico (i.e., U.S. Gulf of Mexico) (Mullin *et al.* 1990). Northern Gulf of Mexico coastal waters have been divided for management purposes into 3 bottlenose dolphin stocks: eastern, northern and western. As a working hypothesis, it is assumed that the dolphins occupying habitats with dissimilar climatic, coastal and oceanographic characteristics might be restricted in their movements between habitats, and thus constitute separate stocks. Coastal waters are defined as those from shore, barrier islands or presumed outer bay boundaries to the 20m isobath (Figure 1). The Northern Coastal bottlenose dolphin stock area extends from 84°W longitude to the Mississippi River Delta. The Northern Coastal Stock area is characterized by a temperate climate, barrier islands, sand beaches, coastal marshes and marsh islands, and has a relatively high level of freshwater input. It is bordered on the east by an extensive area of coastal marsh and marsh islands typical of Florida's Apalachee Bay.

Portions of the coastal stocks may co-occur with the northern Gulf of Mexico Continental Shelf Stock and bay, sound and estuary stocks. The seaward boundary for coastal stocks, the 20m isobath, generally corresponds to survey strata (Scott 1990; Blaylock and Hoggard 1994; Fulling *et al.* 2003), and thus represents a management boundary rather than an ecological boundary. Both "coastal" and "offshore" ecotypes of bottlenose dolphins (Hersh and Duffield 1990) occur in the Gulf of Mexico (Vollmer 2011), and both could potentially occur in coastal waters. The offshore and coastal ecotypes are genetically distinct using both mitochondrial and nuclear markers (Hoelzel *et al.*

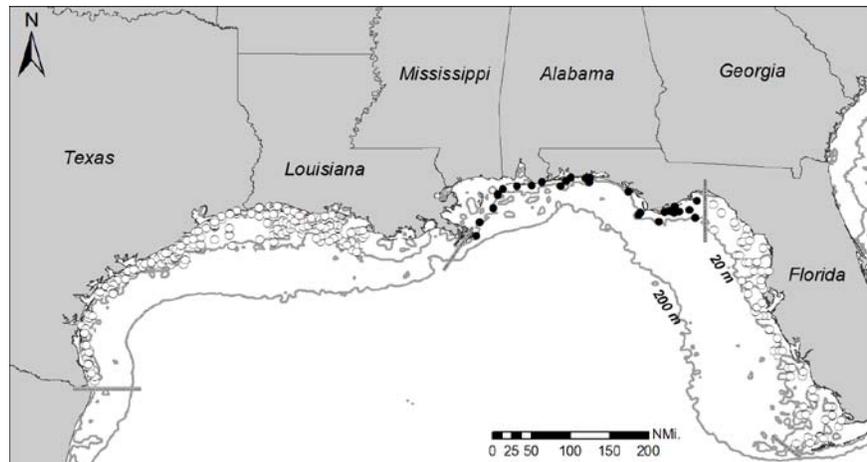


Figure 1. Locations (circles) of bottlenose dolphin groups sighted in coastal waters during aerial surveys conducted in the Western Coastal Stock area in 1992 and 1996, and in the Northern Coastal Stock and Eastern Coastal Stock areas in 2007. Dark circles indicate groups within the boundaries of the Northern Coastal Stock. The 20 and 200-m isobaths are shown.

1998; Rosel *et al.* 2009). In the northwestern Atlantic Ocean, Torres *et al.* (2003) found a statistically significant break in the distribution of the ecotypes at 34km from shore. The offshore ecotype was found exclusively seaward of 34km and in waters deeper than 34m. Within 7.5km of shore, all animals were of the coastal ecotype. The distance of the 20m isobath ranges from 4 to 90km from shore in the northern Gulf. Because the continental shelf is much wider in the Gulf, results from the Atlantic may not apply.

Research on coastal stocks is limited. Fazioli *et al.* (2006) conducted photo-identification surveys of coastal waters off Tampa Bay, Sarasota Bay and Lemon Bay, Florida, over 14 months. They found coastal waters were inhabited by both 'inshore' and 'Gulf' dolphins but that the 2 types used coastal waters differently. Dolphins from the inshore communities were observed occasionally in Gulf near-shore waters adjacent to their inshore range, whereas 'Gulf' dolphins were found primarily in open Gulf of Mexico waters with some displaying seasonal variations in their use of the study area. The 'Gulf' dolphins did not show a preference for waters near passes as was seen for 'inshore' dolphins, but moved throughout the study area and made greater use of waters offshore of waters used by 'inshore' dolphins. During winter months abundance of 'Gulf' groups decreased while abundance for 'inshore' groups increased. These findings support an earlier report by Irvine *et al.* (1981) of increased use of pass and coastal waters by

Sarasota Bay dolphins in winter. Seasonal movements of identified individuals and abundance indices suggest that part of the ‘Gulf’ dolphin community moves out of the study area during winter, but their destination is unknown. Sellas *et al.* (2005) examined population subdivision among Sarasota Bay, Tampa Bay, Charlotte Harbor, and the coastal Gulf of Mexico (1-12km offshore) from just outside Tampa Bay to the south end of Lemon Bay, and found evidence of significant population structure among all areas on the basis of both mitochondrial DNA control region sequence data and 9 nuclear microsatellite loci. The Sellas *et al.* (2005) findings support the separate identification of bay, sound and estuary stocks from those occurring in adjacent Gulf coastal waters, as suggested by Wells (1986).

Off Galveston, Texas, Beier (2001) reported an open population of individual dolphins in coastal waters, but several individual dolphins had been sighted previously by other researchers over a 10-year period. Some coastal animals may move relatively long distances alongshore. Two bottlenose dolphins previously seen in the South Padre Island area in Texas were seen in Matagorda Bay, 285km north, in May 1992 and May 1993 (Lynn and Würsig 2002).

POPULATION SIZE

The best abundance estimate available for the northern Gulf of Mexico Northern Coastal Stock of bottlenose dolphins is 2,473 (CV=0.25), and is a result of aerial surveys conducted during summer 2007.

Earlier abundance estimates

Previous estimates of abundance were derived using distance sampling analysis (Buckland *et al.* 1993) and the computer program DISTANCE (Laake *et al.* 1993) with sighting data collected during aerial line-transect surveys conducted during autumn from 1992-1994 (Blaylock and Hoggard 1994; NMFS unpublished data). Systematic sampling transects, placed randomly with respect to the bottlenose dolphin distribution, extended orthogonally from shore out to approximately 9km past the 18m isobath. Approximately 5% of the total survey area was visually searched. The previous bottlenose dolphin abundance estimate for the Northern Coastal Stock based on the 1993 survey was 4,191 (CV=0.21).

Recent surveys and abundance estimates

Current abundance estimates for the Northern and Eastern Coastal Stocks were derived from aerial surveys conducted during 17 July to 8 August 2007. Survey effort covered waters from the shoreline to 200m depth and was stratified such that the majority of effort was expended in the 0-20m depth range of the coastal stocks. The survey team consisted of an observer stationed at each of two forward bubble windows and a third observer stationed at a belly window that monitored the trackline. Surveys were typically flown during favorable sighting conditions at Beaufort sea state less than or equal to 3 (surface winds <10 knots). Abundance estimates were derived using Distance analysis including environmental covariates that had a significant influence on sighting probability (Buckland *et al.*, 2001), but these estimates were not corrected for $g(0)$ and are thus negatively biased. The resulting abundance estimate for the Northern Coastal Stock was 2,473 (CV = 0.25).

Minimum Population Estimate

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normally distributed abundance estimate. This is equivalent to the 20th percentile of the log-normal distribution as specified by Wade and Angliss (1997). The best estimate of abundance for the Northern Coastal Stock of bottlenose dolphins is 2,473 (CV=0.25). The minimum population estimate for the Northern Coastal Stock is 2,004 bottlenose dolphins.

Current Population Trend

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

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are not known 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 minimum population size, one-half the maximum productivity rate and a recovery factor (Wade and Angliss 1997). The minimum population size is 2,004. 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 the stock is of unknown status. PBR for the northern Gulf of Mexico Northern Coastal Stock of bottlenose dolphins is 20.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

The total annual human-caused mortality and serious injury of the Northern Coastal Stock of bottlenose dolphins during 2006–2010 is unknown.

Fisheries Information

The commercial fisheries which potentially could interact with the Northern Coastal Stock in the northern Gulf of Mexico are the shrimp trawl, blue crab trap/pot, stone crab trap/pot, menhaden purse seine, gillnet, shark bottom longline, and Atlantic Ocean commercial passenger fishing vessel (hook and line) fisheries (Appendix III).

Shrimp Trawl Fishery

A voluntary observer program for the shrimp trawl fishery began in 1992 and became mandatory in 2007. Four bottlenose dolphin mortalities were observed in the shrimp trawl fishery during 2003, 2007, 2008 and 2010. The 2003 mortality occurred off the coast of Alabama and could have belonged to the Northern Coastal Stock or a bay, sound and estuary stock (Mobile Bay, Bonsecour Bay Stock or Mississippi Sound, Lake Borgne, Bay Boudreau Stock). During 1992-2008 the observer program recorded an additional 6 unidentified dolphins caught in a lazy line or turtle excluder device, and 1 or more of these animals may have belonged to the Eastern or Northern Coastal Stocks, and it is likely that 3-4 of the animals belonged to the Continental Shelf Stock or the Atlantic spotted dolphin (*Stenella frontalis*) stock. In 2 of the 6 cases, an observer report indicated the animal may have already been decomposed, but this could not be confirmed because there was no necropsy.

Blue and Stone Crab Trap/Pot Fisheries

Bottlenose dolphins have been reported stranded with polypropylene rope around their flukes (NMFS 1991; McFee and Brooks, Jr. 1998; NMFS unpublished data), indicating the possibility of entanglement with crab pot lines. Since there is no systematic observer program, it is not possible to estimate the total number of interactions or mortalities associated with crab traps/pots. There have been no reported mortalities for the Northern Coastal Stock to date. However, mortalities have been reported for the Eastern Coastal Stock, Western Coastal Stock, and bay, sound and estuary stocks.

Menhaden Purse Seine Fishery

There are no recent observer program data for the Gulf of Mexico menhaden purse seine fishery but incidental mortality of bottlenose dolphins has been reported for this fishery (Reynolds 1985). Through the Marine Mammal Authorization Program, there have been 11 self-reported incidental takes (all mortalities) of bottlenose dolphins in northern Gulf of Mexico coastal and estuarine waters by the menhaden purse seine fishery. These takes likely affected the following stocks: Western Coastal Stock; Northern Coastal Stock; Mississippi Sound, Lake Borgne, Bay Boudreau Stock; Mississippi River Delta Stock; and Barataria Bay Estuarine System Stock. One take of a single bottlenose dolphin was reported in Louisiana waters during 2001 (likely belonged to Mississippi River Delta Stock or Northern Coastal Stock). Three takes were reported in 2000, 2 of which were for single dolphins (1 bottlenose, 1 unidentified) in Louisiana waters (likely belonged to Western Coastal Stock and either Mississippi River Delta Stock or Northern Coastal Stock), and the third was for 3 bottlenose dolphins in a single purse seine in Mississippi waters (likely belonged to Mississippi Sound, Lake Borgne, Bay Boudreau Stock). The menhaden purse seine fishery was observed to take 9 bottlenose dolphins (3 fatally) between 1992 and 1995 (NMFS unpublished data). During that period, there were 1,366 sets observed out of 26,097 total sets, which if extrapolated for all years suggests that as many as 172 bottlenose dolphins could have been taken in this fishery with up to 57 animals killed. Without an observer program it is not possible to obtain statistically reliable information for this fishery on the number of sets annually, the incidental take and mortality rates, and the communities from which bottlenose dolphins are being taken.

Gillnet Fishery

No marine mammal mortalities associated with gillnet fisheries have been reported for the Northern Coastal Stock, but stranding data suggest that gillnet and marine mammal interaction does occur in the Gulf of Mexico, causing mortality and serious injury. Four research-related gillnet mortalities occurred between 2003 and 2007 in

Texas and Louisiana. Additionally, in 2008, 1 dolphin was entangled in a fisheries research gillnet in Texas. All of these animals likely belonged to bay, sound and estuary stocks. In 1995, a Florida state constitutional amendment banned gillnets and large nets from bay, sounds, estuaries and other inshore waters.

Shark Bottom Longline Fishery

The shark bottom longline fishery has been observed since 1994, and no interactions have been reported for the Northern Coastal Stock. However, 3 interactions with bottlenose dolphins were recorded during 1999, 2002 and 2003 (Burgess and Morgan 2003a,b) which likely involved animals from the Eastern Coastal and Continental Shelf Stocks. No interactions with any bottlenose dolphin stock were observed during 2004-2010 (Hale and Carlson 2007; Hale *et al.* 2007; Richards 2007; Hale *et al.* 2009; 2010; 2011).

Hook and Line Fisheries

There have been no recent documented interactions between hook and line fisheries and the Northern Coastal Stock. However, mortalities and entanglements have been documented for the Eastern Coastal Stock, Western Coastal Stock, and bay, sound and estuary stocks.

Strandings

A total of 75 bottlenose dolphins were found stranded in Northern Coastal Stock waters of the Gulf of Mexico from 2006 through 2010 (Table 1; NOAA National Marine Mammal Health and Stranding Response Database unpublished data, accessed 16 November 2011). Evidence of human interactions (e.g., gear entanglement, mutilation, gunshot wounds) was detected for 4 of these dolphins. Bottlenose dolphins are known to become entangled in, or ingest recreational and commercial fishing gear (Wells and Scott 1994; Gorzelany 1998; Wells *et al.* 1998; Wells *et al.* 2008), and some are struck by vessels (Wells and Scott 1997; Wells *et al.* 2008).

There are a number of difficulties associated with the interpretation of stranding data. It is possible that some or all of the stranded dolphins may have been from a nearby bay, sound and estuary stock; however, the proportion of stranded dolphins belonging to another stock cannot be determined because of the difficulty of determining from where the stranded carcass originated. Stranding data probably underestimate the extent of human-related mortality and serious injury because not all of the dolphins which die or are seriously injured due to human interactions wash ashore, nor will all of those that do wash ashore necessarily show signs of fishery-interaction or other human interactions. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of human interaction, and the condition of the carcass if badly decomposed can inhibit the interpretation of cause of death.

Since 1990, there have been 12 bottlenose dolphin die-offs or Unusual Mortality Events (UMEs) in the northern Gulf of Mexico, and 7 of these have occurred within the boundaries of the Northern Coastal Stock and may have affected the stock. 1) From January through May 1990, a total of 367 bottlenose dolphins stranded in the northern Gulf of Mexico. Overall this represented a two-fold increase in the prior maximum recorded strandings for the same period, but in some locations (i.e., Alabama) strandings were 10 times the average number. The cause of the 1990 mortality event could not be determined (Hansen 1992). 2) In 1993-1994 an UME of bottlenose dolphins likely caused by morbillivirus started in the Florida Panhandle and spread west with most of the mortalities occurring in Texas (Lipscomb 1993; Lipscomb *et al.* 1994). From February through April 1994, 220 bottlenose dolphins were found dead on Texas beaches, of which 67 occurred in a single 10-day period. 3) In 1996 an UME was declared for bottlenose dolphins in Mississippi when 27 bottlenose dolphins stranded during November and December. The cause was not determined, but a *Karenia brevis* (red tide) bloom was suspected to be responsible. 4) Between August 1999 and May 2000, 152 bottlenose dolphins died coincident with *K. brevis* blooms and fish kills in the Florida Panhandle (additional strandings included 3 Atlantic spotted dolphins, *Stenella frontalis*, 1 Risso's dolphin, *Grampus griseus*, 2 Blainville's beaked whales, *Mesoplodon densirostris*, and 4 unidentified dolphins). 5) In March and April 2004, in another Florida Panhandle UME possibly related to *K. brevis* blooms, 105 bottlenose dolphins and 2 unidentified dolphins stranded dead (NMFS 2004). Although there was no indication of a *K. brevis* bloom at the time, high levels of brevetoxin were found in the stomach contents of the stranded dolphins (Flewelling *et al.* 2005). 6) A separate UME was declared in the Florida Panhandle after elevated numbers of dolphin strandings occurred in association with a *K. brevis* bloom in September 2005. Dolphin strandings remained elevated through the spring of 2006 and brevetoxin was again detected in the tissues of some of the stranded dolphins. Between September 2005 and April 2006 when the event was officially declared over, a total of 90 bottlenose dolphin strandings occurred (plus strandings of 3 unidentified dolphins). 7) An UME was declared for cetaceans in the northern Gulf of Mexico beginning 1 February 2010; and, as of early 2012, the

event is still ongoing. It includes cetaceans that stranded prior to the Deepwater Horizon oil spill (see “Habitat Issues” below), during the spill, and after. During 2010, 14 animals from this stock were considered to be part of the UME.

Table 1. Bottlenose dolphin strandings occurring in Northern Coastal Stock waters of the northern Gulf of Mexico from 2006 to 2010, as well as number of strandings for which evidence of human interaction was detected and number of strandings for which it could not be determined (CBD) if there was evidence of human interaction. Data are from the NOAA National Marine Mammal Health and Stranding Response Database (unpublished data, accessed 16 November 2011). Please note human interaction does not necessarily mean the interaction caused the animal’s death. Please also note that strandings in coastal waters have been separated by coastal stock and separated from bay, sound and estuary stocks; therefore, the annual totals below will differ from those reported previously. Finally, there were an additional 24 dolphins not included in this or any other table that stranded either in bay, sound and estuary waters or in coastal waters that could not be assigned definitively to a stock due to bad location data. If/when the location data are resolved, the numbers below could increase.

Stock	Category	2006	2007	2008	2009	2010	Total
Northern Coastal Stock	Total Stranded	27 ^a	18	7	8	15 ^b	75
	Human Interaction						
	---Yes	1	1	0	1	1	4
	---No	3	3	1	3	3	13
	---CBD	23	14	6	4	11	58

^aThis total includes 15 animals that were part of the 2005-2006 UME
^bThis total includes 14 animals that are part of the ongoing UME in the northern Gulf of Mexico

Other Mortality

The problem of dolphin depredation of fishing gear is increasing in the Gulf of Mexico. There have been 3 recent cases of fishermen illegally “taking” dolphins due to dolphin depredation of recreational and commercial fishing gear. In 2006 a charter boat fishing captain was charged under the MMPA for shooting at a dolphin that was swimming around his catch in the Gulf of Mexico, off Panama City, Florida. In 2007 a second charter fishing boat captain was fined under the MMPA for shooting at a bottlenose dolphin that was attempting to remove a fish from his line in the Gulf of Mexico, off Orange Beach, Alabama. A commercial fisherman was indicted in November 2008 for throwing pipe bombs at dolphins off Panama City, Florida, and charged in March 2009 for “taking” dolphins with an explosive device.

Feeding or provisioning of wild bottlenose dolphins has been documented in Florida, particularly near Panama City Beach in the Panhandle (Samuels and Bejder 2004) and south of Sarasota Bay (Cunningham-Smith *et al.* 2006; Powell and Wells 2011), and also in Texas near Corpus Christi (Bryant 1994). Feeding wild dolphins is defined under the MMPA as a form of ‘take’ because it can alter their natural behavior and increase their risk of injury or death. Nevertheless, a high rate of uncontrolled provisioning was observed near Panama City Beach in 1998 (Samuels and Bejder 2004), and provisioning has been observed south of Sarasota Bay since 1990 (Cunningham-Smith *et al.* 2006; Powell and Wells 2011). There are emerging questions regarding potential linkages between provisioning and depredation of recreational fishing gear and associated entanglement and ingestion of gear, which is increasing through much of Florida. During 2006, an estimated 2% of the long-term resident dolphins of Sarasota Bay died from ingestion of recreational fishing gear (Powell and Wells 2011). Swimming with wild bottlenose dolphins has also been documented. Near Panama City Beach, Samuels and Bejder (2004) concluded that dolphins were amenable to swimmers due to provisioning. Swimming with wild dolphins may cause harassment, and harassment is illegal under the MMPA.

HABITAT ISSUES

The Deepwater Horizon (DWH) MC252 drilling platform, located approximately 50 miles southeast of the Mississippi River Delta in waters about 1500m deep, exploded on 20 April 2010. The rig sank, and for 87 days millions of barrels of oil and gas were discharged from the wellhead until it was capped on 15 July 2010. During the response effort dispersants were applied extensively at the seafloor and at the sea surface (Lehr *et al.* 2010; OSAT

2010). In-situ burning, or controlled burning of oil at the surface, was also used extensively as a response tool (Lehr *et al.* 2010). The oil, dispersant and burn residue compounds present ecological concerns. The magnitude of this oil spill was unprecedented in U.S. history, causing impacts to wildlife, natural habitats and human communities along coastal areas from western Louisiana to the Florida Panhandle (NOAA 2011). It could be years before the entire scope of damage is ascertained (NOAA 2011).

A substantial number of beaches and wetlands along the Louisiana coast experienced heavy or moderate oiling (OSAT-2 2011). The heaviest oiling in Louisiana occurred west of the Mississippi River on the Mississippi Delta and in Barataria and Terrebonne Bays, and to the east of the river on the Chandeleur Islands. Some heavy to moderate oiling occurred on Alabama and Florida beaches, with the heaviest stretch occurring from Dauphin Island, Alabama, to Gulf Breeze, Florida. Light to trace oil was reported along the majority of Mississippi barrier islands, from Gulf Breeze to Panama City, Florida, and outside of Atchafalaya and Vermilion Bays in western Louisiana (OSAT-2 2011).

Shortly after the oil spill, the Natural Resource Damage Assessment (NRDA) process was initiated under the Oil Pollution Act of 1990. A variety of NRDA research studies are being conducted to determine potential impacts of the spill on marine mammals. These studies have focused on identifying the type, magnitude, severity, length and impact of oil exposure to oceanic, coastal and estuarine marine mammals. The research is ongoing. For coastal and estuarine dolphins, the NOAA-led efforts include: active surveillance to detect stranded animals in remote locations; aerial surveys to document the distribution, abundance, species and exposure of marine mammals and sea turtles relative to oil from DWH spill; assessment of sublethal and chronic health impacts on coastal and estuarine bottlenose dolphins in Barataria Bay, Louisiana, and a reference site in Sarasota Bay, Florida; and assessment of injuries to dolphin stocks in Barataria Bay and Chandeleur Sound, Louisiana, Mississippi Sound, and as a reference site, St. Joseph Bay, Florida.

Coastal dolphins have been observed with tar balls attached to them and seen swimming through oil slicks close to shore and inland bays (NOAA 2010a). The effects of oil exposure on marine mammals depend on a number of factors including the type and mixture of chemicals involved, the amount, frequency and duration of exposure, the route of exposure (inhaled, ingested, absorbed, or external) and biomedical risk factors of the particular animal (Geraci 1990; NOAA 2010b). In general, direct external contact with petroleum compounds or dispersants with skin may cause skin irritation, chemical burns and infections. Inhalation of volatile petroleum compounds or dispersants may irritate or injure the respiratory tract, which could lead to pneumonia or inflammation. Ingestion of petroleum compounds may cause injury to the gastrointestinal tract, which could affect an animal's ability to digest or absorb food. Absorption of petroleum compounds or dispersants may damage kidney, liver and brain function in addition to causing immune suppression and anemia. Long term chronic effects such as lowered reproductive success and decreased survival may occur (Geraci 1990; NOAA 2010b).

The nearshore habitat occupied by the 3 coastal stocks is adjacent to areas of high human population and in some areas, such as Tampa Bay, Florida, Galveston, Texas, and Mobile, Alabama, is highly industrialized. Concentrations of anthropogenic chemicals such as PCBs and DDT and its metabolites vary from site to site, and can reach levels of concern for bottlenose dolphin health and reproduction in the southeastern U.S. (Schwacke *et al.* 2002). PCB concentrations in 3 stranded dolphins sampled from the Eastern Coastal Stock area ranged from 16-46 μ g/g wet weight. Two stranded dolphins from the Northern Coastal Stock area had the highest levels of DDT derivatives of any of the bottlenose dolphin liver samples analyzed in conjunction with a 1990 mortality investigation conducted by NMFS (Varanasi *et al.* 1992). The significance of these findings is unclear, but there is some evidence that increased exposure to anthropogenic compounds may reduce immune function in bottlenose dolphins (Lahvis *et al.* 1995), or impact reproduction through increased first-born calf mortality (Wells *et al.* 2005). Concentrations of chlorinated hydrocarbons and metals were relatively low in most of the bottlenose dolphins examined in conjunction with an anomalous mortality event in Texas bays in 1990; however, some had concentrations at levels of possible toxicological concern (Varanasi *et al.* 1992). Agricultural runoff following periods of high rainfall in 1992 was implicated in a high level of bottlenose dolphin mortalities in Matagorda Bay, which is adjacent to the Western Coastal Stock area (NMFS unpublished data).

The Mississippi River, which drains about two-thirds of the continental U.S., flows into the north-central Gulf of Mexico and deposits its nutrient load which is linked to the formation of one of the world's largest areas of seasonal hypoxia (Rabalais *et al.* 1999). This area is located in Louisiana coastal waters west of the Mississippi River delta. How it affects bottlenose dolphins is not known.

STATUS OF STOCK

The status of the Northern Coastal Stock relative to OSP is not known and population trends cannot be determined due to insufficient data. This species is not listed as threatened or endangered under the Endangered Species Act.

There are insufficient data to determine population trends for this stock. 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 is insignificant and approaching zero mortality and serious injury rate. Additionally, there is no systematic monitoring of all fisheries that may take this stock. The potential impact, if any, of coastal pollution may be an issue for this species in portions of its habitat, though little is known on this to date. Because an UME of unprecedented size and duration (began 1 February 2010 and is ongoing) has impacted the Northern Coastal Stock area, NMFS considers this stock to be strategic.

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