DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 226

[Docket No. 150817733–6237–01]

RIN 0648–BF32

Endangered and Threatened Species; Critical Habitat for the Endangered Carolina and South Atlantic Distinct Population Segments of Atlantic Sturgeon

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Proposed rule; request for comments.

SUMMARY: We, the NMFS, propose to designate critical habitat for the endangered Carolina distinct population segment of the Atlantic sturgeon (Carolina DPS of Atlantic sturgeon) and the endangered South Atlantic distinct population segment of the Atlantic sturgeon (South Atlantic DPS of Atlantic sturgeon) pursuant to section 4 of the Endangered Species Act (ESA). Specific occupied areas proposed for designation as critical habitat for the Carolina DPS of Atlantic sturgeon contain approximately 1,997 kilometers (km; 1,241 miles) of aquatic habitat within the following rivers: Roanoke, Tar-Pamlico, Neuse, Cape Fear, Northeast Cape Fear, Waccamaw, Pee Dee, Black, Santee, North Santee, South Santee, and Cooper, and the following other water body: Bull Creek. In addition, we propose to designate unoccupied areas for the Carolina DPS totaling 383 km (238 miles) of aquatic habitat within the Cape Fear, Santee, Wateree, Congaree, and Broad Rivers, and within Lake Marion, Lake Moultrie, rediversion canal, and diversion canal. Specific occupied areas proposed for designation as critical habitat for the South Atlantic DPS of Atlantic sturgeon contain approximately 2,911 km (1,809 miles) of aquatic habitat within the Edisto, Combahee-Salkehatchie, Savannah, Ogeechee, Altamaha, Ocmulgee, Oconee, Satilla, and St. Marys Rivers. In addition, we propose to designate an unoccupied area within the Savannah River for the South Atlantic DPS that contains 33 km (21 miles) of aquatic habitat. We have considered positive and negative economic, national security, and other relevant impacts of the proposed critical habitat. We do not propose to exclude any particular area from the proposed critical habitat.

We are soliciting comments from the public on all aspects of the proposal, including our identification and consideration of impacts of the proposed action.

DATES: Comments on this proposal must be received by September 1, 2016.

Public hearing meetings: We will hold three public hearings on this proposed rule from 7 to 9 p.m. in the following locations: Brunswick, Georgia on Monday, June 20; Charleston, South Carolina on Tuesday, June 21; and, Morehead City, North Carolina, Thursday, June 23 (see **ADDRESSES**).

ADDRESSES: You may submit comments, identified by the docket number NOAA–NMFS–2015–0157, by any of the following methods:

- Electronic Submissions: Submit all electronic public comments via the Federal eRulemaking Portal. Go to *www.regulations.gov/#!docketDetail;D=NOAA-NMFS-2015-0157* click the ''Comment Now'' icon, complete the required fields, and enter or attach your comments.
- Mail: Assistant Regional Administrator, Protected Resources Division, NMFS, Southeast Regional Office, 263 13th Avenue South, St. Petersburg, FL 33701.

Instructions: You must submit comments by one of the above methods to ensure that we receive, document, and consider them. Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered. All comments received are a part of the public record and will generally be posted to *http://www.regulations.gov* without change. All Personal Identifying Information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information.

NMFS will accept anonymous comments (enter ''N/A'' in the required fields if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word, Excel, WordPerfect, or Adobe PDF file formats only.

Public hearings: The June 20, 2016, public hearing will be held at the Georgia Department of Natural Resources, Coastal Regional Headquarters, 1 Conservation Way, Brunswick, Georgia 31520. The June 21, 2016, public hearing will be held at the South Carolina Department of Natural Resources, Marine Resources Office, 217 Ft. Johnson Road, Charleston, SC 29412. The June 23, 2016, public hearing will be held at the Crystal Coast Civic Center, 2nd Floor, 3505 Arendell St, Morehead City, NC 28557. People needing reasonable accommodations in order to attend and participate or who have questions about the public hearings should contact Andrew Herndon, NMFS, Southeast Regional Office (SERO), as soon as possible (see **FOR FURTHER INFORMATION CONTACT**).

FOR FURTHER INFORMATION CONTACT: Jason Rueter, NMFS, Southeast Regional Office, 727–824–5312, *Jason.Rueter@noaa.gov;* Andrew Herndon, Southeast Regional Office, 727–824–5312, *Andrew.Herndon@noaa.gov;* Lisa Manning, NMFS, Office of Protected Resources, 301–427–8466, *Lisa.Manning@noaa.gov.*

SUPPLEMENTARY INFORMATION: In accordance with section 4(b)(2) of the ESA and our implementing regulations (50 CFR 424.12), this proposed rule is based on the best scientific information available concerning the range, biology, habitat, threats to the habitat, and conservation objectives for the Carolina and South Atlantic DPSs of Atlantic sturgeon. We have reviewed the information (*e.g.,* provided in reports, peer-reviewed literature, and technical documents) and have used it to identify physical features essential to the conservation of each DPS, the specific areas within the occupied areas that contain the essential physical features that may require special management considerations or protections, unoccupied areas that are essential to the DPSs' conservation, the federal activities that may impact the essential features or areas, and the potential impacts of designating critical habitat for each DPS. The economic, national security, and other relevant impacts of the proposed critical habitat designations for each DPS are described in the draft document titled, Impact Analysis of Critical Habitat Designation for the Carolina and South Atlantic Distinct Population Segments of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*). This supporting document is available at *http://sero.nmfs.noaa.gov/protected_resources/sturgeon/index.html* or upon request (see **ADDRESSES**).

Background

In 2012, we listed five DPSs of Atlantic sturgeon under the ESA: four were listed as endangered and one as threatened (77 FR 5880 and 5914; February 6, 2012). Two DPSs of Atlantic sturgeon, both endangered, occur within the southeastern United States (Carolina DPS and the South Atlantic DPS; 77 FR 5914; February 6, 2012); and three DPSs

of Atlantic sturgeon (the endangered New York Bight DPS and Chesapeake Bay DPS, and the threatened Gulf of Maine DPS; 77 FR 5880, February 6, 2012) occur in the northeast United States. On March 18, 2014, two non-governmental organizations filed a lawsuit alleging NMFS had violated the ESA by failing to issue proposed and final rules designating critical habitat for Atlantic sturgeon DPSs. Pursuant to a court-ordered settlement agreement, as modified, NMFS agreed to submit proposed rules designating critical habitat for all distinct population segments of Atlantic sturgeon to the **Federal Register** by May 30, 2016. This rule proposing to designate critical habitat for the Carolina and South Atlantic DPSs of Atlantic sturgeon is complemented by a concurrent rule proposing to designate critical habitat for the Gulf of Maine, New York Bight, and Chesapeake Bay DPSs of Atlantic sturgeon.

Atlantic Sturgeon Natural History and Status

There are two subspecies of Atlantic sturgeon—the Gulf sturgeon (*Acipenser oxyrinchus desotoi*) and the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Historically, the Gulf sturgeon occurred from the Mississippi River east to Tampa Bay in Florida. Its present range extends from Lake Pontchartrain and the Pearl River system in Louisiana and Mississippi east to the Suwannee River in Florida. The Gulf sturgeon was listed as threatened under the ESA in 1991. This proposed rule addresses the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), which is distributed along the eastern coast of North America. Historically, sightings of Atlantic sturgeon have been reported from Hamilton Inlet, Labrador, Canada, south to the St. Johns River, Florida. Reported occurrences south of the St. Johns River, Florida, have been rare but have increased recently with the evolution of acoustic telemetry coupled with increased receiver arrays.

Although there is considerable variability among species, all sturgeon species (order *Acipenseriformes*) have some common life history traits. They all: (1) Occur within the Northern Hemisphere; (2) spawn in freshwater over hard bottom substrates; (3) generally do not spawn annually; (4) are benthic foragers; (5) mature relatively late and are relatively long lived; and, (6) are relatively sensitive to low dissolved oxygen levels (Dees, 1961; Sulak and Clugston, 1999; Billard and Lecointre, 2001; Secor and Niklitschek, 2002; Pikitch *et al.,* 2005).

Atlantic sturgeon have all of the above traits. They occur along the eastern coast of North America from Hamilton Inlet, Labrador, Canada to Cape Canaveral, Florida, USA (Bigelow and Welsh, 1924; Dees, 1961; Vladykov and Greeley, 1963; NMFS and USFWS, 2007; T. Savoy, CT DEEP, pers. comm.). Atlantic sturgeon are a long-lived, late-maturing, estuarine-dependent, anadromous species with a maximum lifespan of up to 60 years, although the typical lifespan is probably much shorter (Sulak and Randall, 2002; Balazik *et al.,* 2010). Atlantic sturgeon reach lengths up to 14 feet (ft) (4.27 meters [m]), and weigh over 800 pounds (363 kilograms). Many datasets demonstrate clinal variation in vital parameters of Atlantic sturgeon populations, with faster growth and earlier age at maturation in more southern systems. Atlantic sturgeon mature between the ages of 5 and 19 years in South Carolina (Smith *et al.,* 1982), between 11 and 21 years in the Hudson River (Young *et al.,* 1988), and between 22 and 34 years in the St. Lawrence River (Scott and Crossman, 1973). Atlantic sturgeon likely do not spawn every year. Multiple studies have shown that spawning intervals range from 1 to 5 years for males (Smith, 1985; Collins *et al.,* 2000; Caron *et al.* 2002) and 2 to 5 years for females (Vladykov and Greeley, 1963; Van Eenennaam *et al.,* 1996; Stevenson and Secor, 1999). Fecundity of Atlantic sturgeon has been correlated with age and body size, with egg production ranging from 400,000 to 8 million eggs per year (Smith *et al.,* 1982; Van Eenennaam and Doroshov, 1998; Dadswell, 2006). The average age at which 50 percent of maximum lifetime egg production is achieved is estimated to be 29 years, approximately 3 to 10 times longer than for other bony fish species examined (Boreman, 1997).

Analysis of stomach contents for adults, subadults (*i.e.,* sexually immature Atlantic sturgeon that have emigrated from the natal estuary), and juveniles (*i.e.,* sexually immature Atlantic sturgeon that have not yet emigrated from the natal estuary) confirms that Atlantic sturgeon are benthic foragers (Ryder, 1888; Bigelow and Schroeder, 1953; Johnson *et al.,* 1997; Secor *et al.,* 2000; NMFS and USFWS, 2007; Guilbard *et al.,* 2007; Hatin *et al.,* 2007; Savoy, 2007; Dzaugis, 2013; McLean *et al.,* 2013).

An anadromous species, Atlantic sturgeon spawn in freshwater of rivers that flow into a coastal estuary. Spawning adults migrate upriver in the spring, typically during February and March in southern systems, April and May in mid-Atlantic systems, and May and July in Canadian systems (Murawski and Pacheco, 1977; Smith, 1985; Bain, 1997; Smith and Clugston, 1997; Caron *et al.,* 2002). A fall spawning migration has been hypothesized for many years (Rogers and Weber, 1995; Weber and Jennings, 1996; Moser *et al.,* 1998) and was recently verified in the Roanoke River, North Carolina, and the Altamaha River, Georgia (Smith et. al., 2015; Ingram and Peterson in Post *et al.,* 2014). There is also a growing body of evidence that some Atlantic sturgeon river populations have two spawning seasons comprised of different spawning adults (Darden in Post *et al.,* 2014; Balazik and Musick, 2015).

Spawning typically occurs in flowing water upriver of the salt front of estuaries and below the fall line of large rivers (Borodin, 1925; Leland, 1968; Scott and Crossman, 1973; Crance, 1987; Bain *et al.,* 2000). The fall line is the boundary between an upland region of continental bedrock and an alluvial coastal plain, sometimes characterized by waterfalls or rapids. Spawning sites are well-oxygenated areas with flowing water ranging in temperature from 13 °Celsius (C; 55 °F (F)) to 26 °C (79 °F), and hard bottom substrate such as cobble, coarse sand, hard clay, and bedrock (Ryder, 1888; Dees, 1961; Vladykov and Greeley, 1963; Scott and Crossman, 1973; Gilbert, 1989; Smith and Clugston, 1997; Bain *et al.* 2000; Collins *et al.,* 2000; Balazik *et al.* 2012; Hager *et al.* 2014). Depth at which fish spawn and water depth leading to spawning sites may be highly variable. Atlantic sturgeon in spawning condition have been tracked and captured at depths up to 27m (Borodin 1925; Dees 1961; Hatin *et al.,* 2002; Balazik *et al.,* 2012; Hager *et al.,* 2014).

Within minutes of being fertilized, the eggs become sticky and adhere to the substrate for the relatively short and temperature-dependent period of larval development (Ryder, 1888; Vladykov and Greeley, 1963; Murawski and Pacheco, 1977; Smith *et al.,* 1980; Van den Avyle, 1984; Mohler, 2003). Hatching occurs approximately 94 to 140 hours after egg deposition at temperatures of 68.0 °F to 64.4 °F (20 to 18 °C), respectively. The newly emerged larvae assume a demersal existence (Smith *et al.,* 1980). The yolk sac larval stage is completed in about 8 to 12 days, during which time the larvae move downstream to rearing grounds (Kynard and Horgan, 2002). During the first half of their migration downstream, movement occurs only at night. During the day, larvae use benthic structure (*e.g.,* gravel matrix) as refuge (Kynard and Horgan, 2002). During the latter half

of migration, when larvae are more fully developed, movement to rearing grounds occurs during both the day and night.

Larval Atlantic sturgeon (*i.e.,* less than 4 weeks old, with total lengths (TL) less than 30 mm; Van Eenennaam *et al.,* 1996) are assumed to inhabit the same areas where they were spawned and live at or near the bottom (Ryder, 1888; Smith *et al.,* 1980; Bain *et al.,* 2000; Kynard and Horgan, 2002; Greene *et al.,* 2009). The best available information for behavior of larval Atlantic sturgeon is described from hatchery studies. Upon hatching, larvae are nourished by the yolk sac, are mostly pelagic (*e.g.,* exhibit a ''swim-up and drift-down'' behavior in hatchery tanks; Mohler, 2003), and move away from light (*i.e.,* negative photo-taxis; Kynard and Horgan, 2002; Mohler, 2003). Within days, larvae exhibit more benthic behavior until the yolk sac is absorbed at about 8 to 10 days post-hatching (Kynard and Horgan, 2002; Mohler, 2003). Post-yolk sac larvae occur in the water column but feed at the bottom of the water column (Mohler, 2003; Richardson *et al.,* 2007).

The next phase of development, referred to as the juvenile stage, lasts months to years in brackish waters of the natal estuary (Holland and Yelverton, 1973; Dovel and Berggen, 1983; Waldman *et al.,* 1996; Shirey *et al.,* 1997; Collins *et al.,* 2000; Secor *et al.,* 2000; Dadswell, 2006; Hatin *et al.,* 2007; NMFS and USFWS, 2007; Calvo *et al.,* 2010; Schueller and Peterson, 2010). Juveniles occur in oligohaline waters (salinity of 0.5 to 5 parts per thousand [ppt]) and mesohaline waters (salinity of 5 to 18 ppt) of the natal estuary during growth and development. They will eventually move into polyhaline waters (salinity of 18–30 ppt) before emigrating to the marine environment. Larger, presumably older, juveniles occur across a broader salinity range than smaller, presumably younger, juveniles (Bain, 1997; Shirey *et al.,* 1997; Haley, 1999; Bain *et al.,* 2000; Collins *et al.,* 2000; Secor *et al.,* 2000; Hatin *et al.,* 2007; McCord *et al.,* 2007; Munro *et al.,* 2007; Sweka *et al.,* 2007; Calvo *et al.,* 2010).

The distribution of Atlantic sturgeon juveniles in the natal estuary is a function of physiological development and habitat selection based on water quality factors of temperature, salinity, and dissolved oxygen (DO), which are inter-related environmental variables. In laboratory studies with salinities of 8 to 15 ppt and temperatures of 12 °C and 20 °C, juveniles less than a year old (also known as young-of-year [YOY]) had reduced growth at 40 percent dissolved oxygen saturation, grew best at 70 percent dissolved oxygen saturation, and selected conditions that supported growth (Niklitschek and Secor, 2009 I; Niklitschek and Secor, 2009 II). Similar results were obtained for age-1 juveniles (*i.e.,* greater than 1 year old and less than 2 years old), which have been shown to tolerate salinities of 33 ppt (*e.g.,* a salinity level associated with seawater), but grow faster in lower salinity waters (Niklitschek and Secor, 2009; Allen *et al.,* 2014). The best growth for both age groups occurred at DO concentrations greater than 6.5 milligrams per liter (mg/L). While specific DO concentrations at temperatures considered stressful for Atlantic sturgeon are not available, instantaneous minimum DO concentrations of 4.3 mg/L protect survival of shortnose sturgeon at temperatures greater than 29 °C (EPA, 2003). However, data from Secor and Niklitschek (2001) show that shortnose sturgeon are more tolerant of higher temperatures than Atlantic sturgeon, and the ''high temperature'' for Atlantic sturgeon is actually considered 26 °C (Secor and Gunderson, 1998).

Once suitably developed, Atlantic sturgeon leave the natal estuary and enter marine waters (*i.e.,* waters with salinity greater than 30 ppt) which marks the beginning of the subadult life stage. In the marine environment, subadults mix with adults and subadults from other river systems (Bowen and Avise, 1990; Wirgin *et al.,* 2012; Waldman *et al.,* 2013; O'Leary *et al.,* 2014). Atlantic sturgeon travel long distances in marine waters, aggregate in both ocean and estuarine areas at certain times of the year, and exhibit seasonal coastal movements in the spring and fall (Vladykov and Greeley, 1963; Oliver *et al.,* 2013).

The exact spawning locations for Carolina and South Atlantic DPS Atlantic sturgeon are unknown but inferred based on the location of freshwater, hard substrate, water depth, tracking of adults to upriver locations and the behavior of adults at those locations, historical accounts of where the caviar fishery occurred, capture of young-of-year and, in limited cases, capture of larvae and eggs. Spawning sites at multiple locations within the tidal-affected river likely help to ensure successful spawning given annual changes in the location of the salt wedge.

Critical Habitat Identification and Designation

Critical habitat represents the habitat essential for the species' recovery and provides for the conservation of listed species in several ways (78 FR 53058, August 28, 2013). For example, specifying the geographic location of critical habitat facilitates implementation of Section 7(a)(1) of the ESA by identifying areas where Federal agencies can focus their conservation programs and use their authorities to further the purposes of the ESA. Designating critical habitat also provides a significant regulatory protection by ensuring that the Federal Government considers the effects of its actions in accordance with Section 7(a)(2) of the ESA and avoids or modifies those actions that are likely to destroy or adversely modify critical habitat. This requirement is in addition to the Section 7 requirement that Federal agencies ensure that their actions are not likely to jeopardize the continued existence of ESA-listed species. Critical habitat requirements do not apply to citizens engaged in activities on private land that do not involve a Federal agency. However, designating critical habitat can help focus the efforts of other conservation partners (*e.g.,* State and local governments, individuals and nongovernmental organizations).

Section 3(5)(A) of the ESA defines critical habitat as (i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of Section 4 of the ESA, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protections; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of Section 4 of the ESA, upon a determination by the Secretary that such areas are essential for the conservation of the species (16 U.S.C. 1532[5][A]). Conservation is defined in Section 3 of the ESA as ''to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary'' (16 U.S.C. 1532[3]). Therefore, critical habitat is the habitat essential for the species' recovery. However, Section 3(5)(C) of the ESA clarifies that except in those circumstances determined by the Secretary, critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species.

To identify and designate critical habitat, we considered information on the distribution of Atlantic sturgeon, the major life stages, habitat requirements of

those life stages, and conservation objectives that can be supported by identifiable physical or biological features (hereafter also referred to as ''PBFs'' or ''essential features''). In the final rule listing the Carolina and South Atlantic DPSs of Atlantic sturgeon (77 FR 5978, February 6, 2012), habitat curtailment and alteration, bycatch in commercial fisheries, and inadequacy of existing regulatory mechanisms were found to be the threats contributing to the endangered status of both DPSs. The Carolina and South Atlantic DPSs were found to be at 3% and 6% of their historical abundances, respectively, due to these threats. Therefore, we evaluated physical and biological features of the marine, estuarine, and riverine habitats of Atlantic sturgeon to determine what features are essential to the conservation of each DPS.

Accordingly, our step-wise approach for identifying potential critical habitat areas for the Carolina and South Atlantic DPSs was to determine: the geographical area occupied by each DPS at the time of listing; the physical or biological features essential to the conservation of the DPSs; whether those features require special management considerations or protection; the specific areas of the occupied geographical area where these features occur; and, whether any unoccupied areas are essential to the conservation of either DPS.

Geographical Area Occupied by the Species

''Geographical area occupied'' in the definition of critical habitat is interpreted to mean the entire range of the species at the time it was listed, inclusive of all areas they use and move through seasonally (81 FR 7413; February 11, 2016). The marine ranges of the Carolina and South Atlantic DPSs of Atlantic sturgeon extend from the Hamilton Inlet, Labrador, Canada, to Cape Canaveral, Florida (77 FR 5880, February 6, 2012). We did not consider geographical areas within Canadian jurisdiction (*e.g.,* Minas Basin, Bay of Fundy), because we cannot designate critical habitat areas outside of U.S. jurisdiction (50 CFR 424.12(g)).

The listing rule identified the known spawning rivers for each of the Atlantic sturgeon DPSs but did not describe the in-river ranges for the DPSs. The river ranges of each DPS consist of all areas downstream of either the fall line or the first obstacle to upstream migration (*e.g.,* the lowest hydropower dam without fish passage for sturgeon) on each river within the range of the DPS. We identified the Carolina DPS freshwater range as occurring in the watersheds from the Roanoke River southward along North Carolina and South Carolina coastal areas to the Cooper River, South Carolina. The South Atlantic DPS freshwater range occurs from the Ashepoo-Combahee-Edisto (ACE) Basin in South Carolina to the St. Johns River, Florida.

Physical or Biological Features Essential for Conservation That May Require Special Management or Protection

Within the geographical area occupied, critical habitat consists of specific areas on which are found those PBFs essential to the conservation of the species and that may require special management considerations or protection. PBFs are defined as the features that support the life-history needs of the species, including water characteristics, soil type, geological features, sites, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic, or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity. 50 CFR 424.02.

Within the area occupied by Atlantic sturgeon, we considered the various types of habitat utilized by the DPSs for various life functions. Atlantic sturgeon spend the majority of their adult lives in offshore marine waters. They are known to travel extensively up and down the East Coast. As summarized in a number of summary documents including the Atlantic Sturgeon Status Review (NMFS and USFWS, 2007) and the Atlantic States Marine Fisheries Commission's (ASMFC) review of Atlantic coast diadromous fish habitat (Green *et al.,* 2009), Atlantic sturgeon are benthic foragers and prey upon a variety of species in marine and estuarine environments (Bigelow and Schroeder, 1953; Scott and Crossman, 1973; Johnson *et al.,* 1997; Guilbard *et al.,* 2007; Savoy, 2007; Dzaugis, 2013; McLean *et al.,* 2013). In the ocean, Atlantic sturgeon typically occur in waters less than 50 m deep, travel long distances, exhibit seasonal coastal movements, and aggregate in estuarine and ocean waters at certain times of the year (Vladykov and Greeley, 1963; Holland and Yelverton 1973; Dovel and Berggren, 1983; Dadswell *et al.,* 1984; Gilbert, 1989; Johnson *et al.,* 1997; Rochard *et al.,* 1997; Kynard *et al.,* 2000; Savoy and Pacileo, 2003; Eyler *et al.,* 2004; Stein *et al.,* 2004; Dadswell, 2006; Eyler, 2006; Laney *et al.,* 2007; NMFS and USFWS, 2007; Dunton *et al.,* 2010; Erickson *et al.,* 2011; Dunton *et al.,* 2012; Oliver *et al.,* 2013; Wirgin *et al.,* 2015). Several winter congregations of Atlantic sturgeon in the marine environment are known to occur, though the exact location and importance of those areas in the southeast is not known, nor whether Atlantic sturgeon are drawn to particular areas based on physical or biological features of the habitat. While we can identify general movement patterns and behavior in the marine environment (*e.g.,* aggregating behavior), due to the paucity of data on the DPSs' offshore needs and specific habitat utilization, we could not at this time identify PBFs essential to conservation in the marine environment for the Carolina or South Atlantic DPSs.

Atlantic sturgeon utilize estuarine areas for foraging, growth, and movement. Atlantic sturgeon subadults and adults in non-spawning condition use estuarine waters seasonally, presumably for foraging opportunities, although evidence in the form of stomach content collection and analysis is limited (Savoy and Pacileo, 2007; Dzaugis, 2013). We considered all studies that have collected Atlantic sturgeon stomach contents. All of the prey species identified are indicative of benthic foraging, but different types of prey were consumed and different substrates were identified for the areas where Atlantic sturgeon were foraging (Bigelow and Schroeder, 1953; Johnson *et al.,* 1997; NMFS and USFWS, 2007; Guilbard *et al.,* 2007; Savoy, 2007; Dzaugis, 2013; McLean *et al.,* 2013). Adding to our uncertainty of the essential features that support successful foraging for growth and survival of subadults and adults, Atlantic sturgeon move between estuarine environments in the spring through fall and can occur in estuarine environments during the winter as well (Savoy and Pacileo, 2003; Simpson, 2008; Collins *et al.,* 2000; Balazik *et al.,* 2012). Subadult Atlantic sturgeon spawned in one riverine system may utilize multiple estuaries for foraging and growth, including those not directly connected to their natal river. The benthic invertebrates that comprise the diet of Atlantic sturgeon are found in soft substrates that are common and widespread in most estuaries. Limited data are available to differentiate areas of preferred prey items or higher prey abundance within or across estuaries. Due to the paucity of data on specific habitat or resource utilization, we could not at this time identify any specific

PBFs essential for the conservation of the Carolina and South Atlantic DPSs that support adult and subadult foraging in estuarine or marine environments.

Atlantic sturgeon spawning behavior and early life history have been extensively studied and are fairly well understood, though the exact location of spawning sites on many rivers (particularly in the Southeast) is not known, or can change from time to time as water depth and substrate availability changes. However, there is substantial information in the scientific literature indicating the physical characteristics of Atlantic sturgeon spawning and early life history habitat. Therefore, to evaluate potential critical habitat, we focused on identifying the physical or biological features that support Atlantic sturgeon reproduction and survival of early life stages.

The scientific literature indicates that Atlantic sturgeon spawning occurs well upstream, at or near the fall line of rivers, over hard substrate consisting of rock, pebbles, gravel, cobble, limestone, or boulders (Gilbert, 1989; Smith and Clugston, 1997). Hard substrate is required so that highly adhesive Atlantic sturgeon eggs have a surface to adhere to during their initial development and young fry can utilize the interstitial spaces between rocks, pebbles, cobble, etc., to hide from predators during downstream movement and maturation (Gilbert, 1989; Smith and Clugston, 1997).

Very low salinity (*i.e.,* 0.0–0.5 ppt) is another important feature of Atlantic sturgeon spawning habitat. Exposure to even low levels of salinity can kill Atlantic sturgeon during their first few weeks of life, thus their downstream movement is limited until they can endure brackish waters (Bain *et al.,* 2000). Shortnose sturgeon tend to spawn 200–300 km upriver, preventing the youngest life stages from salt exposure too early in their development (Parker and Kynard, 2005; Kynard, 1997). Parker and Kynard (2005) also noted that long larval/early juvenile downstream movement is common in both shortnose sturgeon from the Savannah River and Gulf sturgeon (a sub-species of Atlantic sturgeon), and that this may be a widespread adaptation of sturgeon inhabiting river systems in the southern United States. Due to their similar life history, Atlantic sturgeon most likely adapted a similar spawning strategy. Therefore, it is essential that the spawning area has low salinity, and that the spawning location is far enough upstream to allow newly-spawned Atlantic sturgeon to develop and mature on their downstream movement before encountering saline water. During their downstream movement, it is important for developing fish to forage in areas of soft substrate and to encounter transitional salinity zones to allow physiological adaptations to higher salinity waters.

Minimum water depths for Atlantic sturgeon spawning are necessary to: (1) Allow adult fish to access spawning substrate, (2) adequately hydrate and aerate newly deposited eggs, and (3) facilitate successful development and downstream movement of newly spawned Atlantic sturgeon. However, water depth at these important spawning areas in the Southeast can be dynamic and portions of rivers may be dry or have little water at times due to natural seasonal river fluctuations, temporary drought conditions, and/or regulation by manmade structures such as dams; thus, these sites require protection to provide consistent services for sturgeon. The scientific literature indicates that Atlantic sturgeon spawn in water depths from 3–27 m (9.8–88.6 ft) (Borodin, 1925; Leland, 1968; Scott and Crossman, 1973; Crance, 1987; Bain *et al.,* 2000). However, much of this information is derived from studies of Atlantic sturgeon in northern United States and Canadian river systems. Atlantic sturgeon in the Southeast are likely spawning in much shallower water depths based on repeated observations by biologists of sturgeon with lacerations on their undersides from moving into extremely shallow water to spawn on hard substrate. In the Southeast, water depths no less than 1.2 m (4 ft) are deep enough to accommodate the body depth and spawning behavior of adult Atlantic sturgeon.

We considered fluid dynamic features as another potential essential feature of Atlantic sturgeon spawning critical habitat. The scientific literature provides information on the importance of appropriate water velocity within Atlantic sturgeon spawning habitat and provides optimal flows for some rivers. Atlantic sturgeon spawn directly on top of gravel in fast flowing sections often containing eddies or other current breaks. Eddies promote position holding between spawning individuals, trap gametes facilitating fertilization, and diminish the probability of egg dislocation by currents—facilitating immediate adhesion of eggs to the gravel substrate (Sulak and Clugston, 1999). However, velocity data are lacking for many rivers, and where data are available, the wide fluctuations in velocity rates on a daily, monthly, seasonal, and annual basis make it difficult to identify a range of water velocity necessary for the conservation of the species. However, we do know that water flow must be continuous.

Adult Atlantic sturgeon must be able to safely and efficiently move from downstream areas into upstream spawning habitats in order to successfully spawn. In addition, larvae and juvenile Atlantic sturgeon must be able to safely and efficiently travel from the upstream spawning areas downstream to nursery and foraging habitat. Therefore, an essential feature for Atlantic sturgeon spawning is unobstructed migratory pathways for safe movement of adults to and from upstream spawning areas as well as providing safe movement for the larvae and juveniles moving downstream. An unobstructed migratory pathway means an unobstructed river or a dammed river that still allows for passage.

Water quality can be a critically limiting factor to Atlantic sturgeon in the shallow, warm, poorly oxygenated rivers of the southeast United States. Conditions in these river systems can change rapidly, particularly in rivers managed for hydropower production, and conditions can quickly become suboptimal or lethal for sturgeon. We considered essential water quality features that support movement and spawning of adults and growth and development of juvenile Atlantic sturgeon. The distribution of Atlantic sturgeon juveniles in the natal estuary is a function of physiological development and habitat selection based on water quality factors of temperature, salinity, and dissolved oxygen, which are inter-related environmental variables. In laboratory studies with salinities of 8 to 15 parts per thousand and temperatures of 12 °C and 20 °C, juveniles less than a year old (YOY) had reduced growth at 40 percent dissolved oxygen saturation, grew best at 70 percent dissolved oxygen saturation, and selected conditions that supported growth (Niklitschek and Secor, 2009 I; Niklitschek and Secor, 2009 II). Results obtained for age-1 juveniles (*i.e.,* greater than 1 year old and less than 2 years old) indicated that they can tolerate salinities of 33 parts per thousand (*i.e.,* a salinity level associated with seawater), but grow faster in lower salinity waters (Niklitschek and Secor, 2009; Allen *et al.,* 2014). The best growth for both age groups occurred at dissolved oxygen concentrations greater than 6.5 mg/L. While specific dissolved concentrations at temperatures considered stressful for Atlantic sturgeon are not available, instantaneous minimum concentrations of 4.3 mg/L protect survival of shortnose sturgeon at temperatures greater than 29 °C (EPA, 2003). However, data from

Secor and Niklitschek (2001) show that shortnose sturgeon are more tolerant of higher temperatures than Atlantic sturgeon, thus the ''stressful temperature'' for Atlantic sturgeon is considered 26 °C (Secor and Gunderson, 1998).

In summary, within the area occupied by Atlantic sturgeon, we considered the various types of habitat utilized by the species for various life functions. We determined that Atlantic sturgeon spend the majority of their adult lives in offshore marine waters where they are known to travel extensively up and down the East Coast. However, we could not identify any PBFs in marine waters essential for the conservation of the species. We also determined Atlantic sturgeon utilize estuarine areas for foraging, growth, and movement. The ability of subadults to find and access food is necessary for continued survival, growth, and physiological development to the adult life stage. Likewise, given that Atlantic sturgeon mature late and do not necessarily spawn annually, increased adult survival would improve the chances that adult Atlantic sturgeon spawn more than once. Therefore, we determined a conservation objective for the Carolina and South Atlantic DPSs is to increase the abundance of each DPS by facilitating increased survival of all life stages. After examining the information available on spawning and early life history behavior and habitat, we also concluded that facilitating adult reproduction and juvenile and subadult recruitment into the adult population are other conservation objectives for the Carolina and South Atlantic DPSs of Atlantic sturgeon. We could not identify any specific PBFs essential for the conservation of the species that support adult and subadult foraging in estuarine or marine environments. We determined that protecting spawning areas, juvenile development habitat, the migratory corridors that allow adults to reach the spawning areas and newly spawned sturgeon to make a safe downstream migration, and water quality to support all life stages, will facilitate meeting the conservation objectives discussed above.

Given the biological needs and tolerances, and environmental conditions for Atlantic sturgeon in southeast rivers as summarized above, and the habitat-based conservation objectives, the physical features essential for conservation are:

- Suitable hard bottom substrate (*e.g.,* rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (*i.e.,* 0.0–0.5 ppt range) for settlement of fertilized eggs and refuge, growth, and development of early life stages;
- Transitional salinity zones inclusive of waters with a gradual downstream gradient of 0.5–30 ppt and soft substrate (*e.g.,* sand, mud) downstream of spawning sites for juvenile foraging and physiological development;
- Water of appropriate depth and absent physical barriers to passage (*e.g.,* locks, dams, reservoirs, gear, etc.) between the river mouth and spawning sites necessary to support: (1) Unimpeded movement of adults to and from spawning sites; (2) seasonal and physiologically dependent movement of juvenile Atlantic sturgeon to appropriate salinity zones within the river estuary; and (3) staging, resting, or holding of subadults and spawning condition adults. Water depths in main river channels must be deep enough to ensure continuous flow in the main channel at all times when any sturgeon life stage would be in the river. Water depths of at least 1.2 m are generally deep enough to facilitate effective adult migration and spawning behavior.
- Water quality conditions, especially in the bottom meter of the water column, with temperature and oxygen values that support: (1) Spawning; (2) annual and inter-annual adult, subadult, larval, and juvenile survival; and (3) larval, juvenile, and subadult growth, development, and recruitment. Appropriate temperature and oxygen values will vary interdependently, and depending on salinity in a particular habitat. For example, 6.0 mg/L D.O. for juvenile rearing habitat is considered optimal, whereas D.O. less than 5.0 mg/L for longer than 30 days is considered suboptimal when water temperature is greater than 25 °C. In temperatures greater than 26 °C, D.O. greater than 4.3 mg/L is needed to protect survival and growth. Temperatures of 13 °C to 26 °C for spawning habitat are considered optimal.

Need for Special Management Considerations or Protection

We concluded that each of the essential features defined above may require special management considerations or protection. Barriers (*e.g.,* dams, tidal turbines) to generate power or control water flow in rivers used by Atlantic sturgeon can damage or destroy bottom habitat needed for spawning and rearing of juveniles, restrict movement of adults to and from spawning grounds, prevent juveniles from accessing the full range of salinity exposure in the natal estuary, and alter water quality parameters, including water depth, temperature and dissolved oxygen, to the detriment of sturgeon reproduction, growth, and survival. Water withdrawals can similarly adversely impact water quality for Atlantic sturgeon spawning, recruitment, and development. Land development and commercial and recreational activities on a river can contribute to sediment deposition that affects water quality necessary for successful spawning and recruitment. A build-up of fine sediments may, for example, reduce the suitability of hard spawning substrate for Atlantic sturgeon egg adherence and reduce the interstitial spaces used by larvae for refuge from predators. Dredging to remove sediment build-up, to deepen harbors and facilitate vessel traffic, or to mine construction materials, may remove or alter hard substrate that is necessary for egg adherence and as refuge for larvae or soft substrate needed for juvenile foraging, and may change the water depth resulting in shifts in the salt wedge within the estuary or change other characteristics of the water quality (*e.g.,* temperature, dissolved oxygen) necessary for the developing eggs, larvae, and juveniles.

The features essential for successful Atlantic sturgeon reproduction and recruitment may also require special management considerations or protection as a result of global climate change. Conditions in Southeast rivers used by sturgeon already threaten the species' survival and recovery due to exceedances of temperature tolerances and the sensitivity of sturgeon to low dissolved oxygen levels; these impacts will worsen as a result of global climate change and predicted warming of the southeast region. Many communities and commercial facilities withdraw water from the rivers containing the features essential to Atlantic sturgeon reproduction. Water withdrawals during drought events can affect flows, depths, and the position of the salt wedge, further impacting the water flow necessary for successful sturgeon reproduction and affect dissolved oxygen levels. Attempts by communities to control water during floods (*e.g.,* spilling water from dams upriver of Atlantic sturgeon spawning and rearing habitat) can similarly alter flows to the point of dislodging fertilized eggs, washing early life stages downstream into more saline habitat before being developmentally ready, and create barriers (*e.g.,* from debris) to upstream and downstream passage of adults and juveniles. We therefore conclude that the physical features essential to the conservation of the Carolina and South Atlantic DPSs may require special

management considerations or protections.

Specific Areas Containing the Essential Features Within the Geographical Area Occupied by the Species

To identify where the essential features occur within areas occupied by Atlantic sturgeon, we reviewed the best available scientific information, including the 2007 Atlantic sturgeon status review (ASSRT, 2007), the ESA listing rules (77 FR 5914; February 6, 2012), scientific research reports, information and data gathered during the peer-review process, and a database developed by the U.S. Geological Survey for mapping environmental parameters within East Coast Rivers to identify sturgeon habitat. We also considered information on the location of sturgeon spawning activity from scientific reports, as active spawning in an area would indicate that the essential features necessary for spawning are likely present. Information on documented spawning in specific areas in the Southeast is rare, but some does exist. For example, large sections of the Altamaha River have been found to support Atlantic sturgeon spawning activities for many years (Peterson *et al.,* 2006; Peterson *et al.,* 2008). We reviewed reports from a NMFS-funded multi-year, multi-state research project on movement and migration of Atlantic sturgeon (Species Recovery Grant number NA10NMF4720036, Post *et al.,* 2014). In these reports, researchers determined which portions of Southeastern rivers support spawning activities by looking at the upriver extent of sturgeon movements during spawning season.

There are large areas of most rivers where data are still lacking. The available data also represent a snapshot in time, while the exact location of a habitat feature may change over time (*e.g.,* water depth fluctuates seasonally, as well as annually, and even hard substrate may shift position). For example, some data indicate a change in substrate type with in a given location from year to year (*e.g.,* from sand to gravel). It is not always clear whether such changes are due to an actual shift in substrate sediments or if the substrate sample was collected in a slightly different location between samplings. Although the habitat features may vary even at the same location, if any of the available data regarding a particular feature fell within the suitable range (*i.e.,* salinity of 0–0.5 ppt, water depths from 1.2–27 m, or hard substrate [gravel, cobble, etc.]), we considered that the essential feature is present in the area.

When data were not available for certain rivers or portions of occupied rivers, we used our general knowledge of Atlantic sturgeon spawning and applied river-specific information to determine the location of features essential to spawning. We considered salinity tolerance during the earliest life stages to determine appropriate habitat for larvae to develop as they mature. Available telemetry data suggest that most Atlantic sturgeon spawning activity in the Savannah and Altamaha start around river kilometer (RKM) 100 (Post *et al.,* 2014). Similar evidence from the Edisto, Neuse, and Tar-Pamlico rivers indicates spawning activity starts around RKM 80. Peer review comments on the Draft Economic and Biological Information to Inform Atlantic Sturgeon Critical Habitat Designation indicated that Atlantic sturgeon spawn below the fall line, unlike shortnose sturgeon that may spawn well above the fall line.

In order to encompass all areas important for Atlantic sturgeon spawning, reproduction, and recruitment within rivers where spawning is believed to occur or may occur, we identified specific areas of critical habitat from the mouth (RKM 0) of each spawning river to the upstream extent of the spawning habitat. Other than an unexplained report of an Atlantic sturgeon carcass upstream of dams in the Santee Cooper system, we have no evidence that Atlantic sturgeon can pass upstream of dams (*i.e.,* through turbines or fishways for shad and herring) and thus we are considering those upstream areas as unoccupied for the purpose of this rulemaking. Manmade barriers currently restrict upstream movement of Atlantic sturgeon in the Cape Fear, Santee-Cooper, and Savannah River systems. In other rivers, either the fall line, or for those rivers that do not reach the fall line, an easily identifiable landmark (*e.g.,* a bridge) near the headwaters is considered the upstream extent of spawning habitat.

To identify specific habitats used by an Atlantic sturgeon DPS in occupied rivers, we considered available information that described: (1) Capture location and/or tracking locations of Atlantic sturgeon identified to its DPS by genetic analysis; (2) capture location and/or tracking locations of adult Atlantic sturgeon identified to its DPS based on the presence of a tag that was applied when the sturgeon was captured as a juvenile in its natal estuary; (3) capture or detection location of adults in spawning condition (*i.e.,* extruding eggs or milt) or post-spawning condition (*e.g.,* concave abdomen for females); (4) capture or detection of YOY and other juvenile age classes; and, (5) collection of eggs or larvae.

Large Coastal Rivers that Lack Essential Features

Several large coastal rivers within the geographic area occupied by the Carolina and South Atlantic DPSs of Atlantic sturgeon do not appear to support spawning and juvenile recruitment or to contain suitable habitat features to support spawning. These rivers are the Chowan and New Rivers in North Carolina; the Waccamaw (above its confluence with Bull Creek which links it to the Pee Dee River), Sampit, Ashley, Ashepoo, and Broad-Coosawhatchie Rivers in South Carolina; and the St. Johns River, Florida. We have no information, current or historic, of Atlantic sturgeon using the Chowan and New Rivers in North Carolina. Recent telemetry work by Post *et al.* (2014) indicates that Atlantic sturgeon do not utilize the Sampit, Ashley, Ashepoo, and Broad-Coosawhatchie Rivers in South Carolina. These rivers are short, coastal plains rivers that most likely do not contain suitable habitat for Atlantic sturgeon. Post *et al.* (2014) also found Atlantic sturgeon only use the portion of the Waccamaw River downstream of Bull Creek. Due to man-made structures and alterations, spawning areas in the St. Johns River are not accessible and therefore do not support a reproducing population. For these reasons, we are not designating these coastal rivers, or portions of the rivers, as critical habitat. For rivers we are proposing to designate as critical habitat, we have historical or current information that they support spawning and juvenile recruitment as described below.

Roanoke River

The Roanoke River was identified as a spawning river for Atlantic sturgeon based on the capture of juveniles, the collection of eggs, and the tracking location of adults. Further, there was information indicating the historical use of the Roanoke River by Atlantic sturgeon.

Atlantic sturgeon were historically abundant in the Roanoke River and Albemarle Sound, but declined dramatically in response to intense fishing effort in the late 1800's (Armstrong and Hightower, 2002). There is still a population present in the Albemarle Sound and Roanoke River (Armstrong and Hightower, 2002; Smith *et al.,* 2014). DNA analyses of juveniles captured in Albemarle Sound indicate that these fish are genetically distinct from Atlantic sturgeon collected in

other systems (Wirgin *et al.,* 2000; King *et al.,* 2001).

Historical records and recent research provide accounts of Atlantic Sturgeon spawning within the fall zone (RKM 204–242) of the Roanoke River (Yarrow, 1874; Worth, 1904; Armstrong and Hightower, 2002; Smith *et al.,* 2014). Atlantic sturgeon remains from archaeological sites on the Roanoke River have been found as far upstream as RKM 261, approximately 19 miles above the upper end of the fall zone (Armstrong and Hightower, 2002; VanDerwarker, 2001); however, that was prior to the construction of dams now located throughout the river. The farthest downstream dam, the Roanoke Rapids Dam, is located near the fall line at RKM 221. No fish passage exists at this dam, so all Atlantic sturgeon are restricted to the lower 17 RKM of fall zone habitat, which extends from the Roanoke Rapids Dam to Weldon, North Carolina at RKM 204 (Armstrong and Hightower, 2002; Smith *et al.,* 2014).

Historic and current data indicate that spawning occurs in the Roanoke River, where both adults and small juveniles have been captured. Since 1990, the North Carolina Division of Marine Fisheries (NCDMF) has conducted the Albemarle Sound Independent Gill Net Survey (IGNS). From 1990 to 2006, 842 sturgeon were captured ranging from 15.3 to 100 centimeters (cm) fork length (FL), averaging 47.2 cm FL. One hundred and thirty-three (16%) of the 842 sturgeon captured were classified as YOY (41 cm TL, 35 cm FL); the others were subadults (ASSRT, 2007). A recent study by Smith *et al.* (2014), using acoustic telemetry data and egg collection during the fall of 2013, identified a spawning location near Weldon, North Carolina (RKM 204). The location contains the first shoals encountered by Atlantic sturgeon as they move upstream to spawn (Smith *et al.,* 2014). The channel in this area is approximately 100 m wide and the substrate is primarily bedrock, along with fine gravel and coarse sediments in low-flow areas (Smith *et al.,* 2014). During the study, 38 eggs were collected during 21 days that spawning pads were deployed (Smith *et al.,* 2014).

A scientific survey also shows the presence of adult Atlantic sturgeon in the Roanoke River. Using side-scan sonar, Flowers and Hightower (2015) conducted surveys near the freshwater-saltwater interface with repeated surveys performed over 3 days. The surveys detected 4 Atlantic sturgeon greater than 1 m total length. Based on these detections, an abundance estimate for riverine Atlantic sturgeon of 10.9 (95% confidence interval 3–36) fish greater than 1 m was calculated for the Roanoke River. This estimate does not account for fish less than 1 m total length, occurring in riverine reaches not surveyed, or in marine waters.

Tar-Pamlico River

The Tar-Pamlico River was identified as a spawning river for Atlantic sturgeon based on the evidence of spawning and the capture of juveniles. The Tar-Pamlico River, one of two major tributaries to Pamlico Sound, is dammed. However, all riverine habitat is accessible to Atlantic sturgeon in the Tar-Pamlico River, because the lowermost dam, the Rocky Mount Mill Pond Dam (RKM199), is located at the fall line.

Evidence of spawning was reported by Hoff (1980), after the capture of very young juveniles in the Tar River. Two juveniles were observed dead on the bank of Banjo Creek, a tributary to the Pamlico System (ASSRT, 2007). A sampling program similar to the Albemarle Sound IGNS collected 14 Atlantic sturgeon in 2004. These fish ranged in size from 460 to 802 mm FL and averaged 575 mm FL. The NCDMF Observer Program reported the capture of 12 Atlantic sturgeon in the Pamlico Sound from April 2004 to December 2005; these fish averaged 600 mm TL(ASSRT, 2007).

Neuse River

The Neuse River was identified as a spawning river for Atlantic sturgeon based on the evidence of spawning and the capture of juveniles. Evidence of spawning was reported by Hoff (1980), who noted captures of very young juveniles in the Neuse River. An independent gill net survey was initiated in 2001 following the Albemarle Sound IGNS methodology. Collections were low during the periods of 2001–2003, ranging from zero to one fish/year. However, in 2004, this survey collected 14 Atlantic sturgeon ranging from 460 to 802 mm FL, and averaging 575 mm FL. During the same time period (2002–2003), four Atlantic sturgeon (561–992 mm FL) were captured by North Carolina State University personnel sampling in the Neuse River (Oakley, 2003). Similarly, the NCDMF Observer Program documented the capture of 12 Atlantic sturgeon in the Pamlico Sound from April 2004 to December 2005; none of these were YOY or spawning adults, averaging approximately 600 mm TL (ASSRT, 2007).

Cape Fear River System

The Cape Fear and Northeast Cape Fear Rivers were identified as spawning rivers for Atlantic sturgeon based on the capture of juveniles, the capture of adults in spawning condition, and the tracking location of adults, and information indicating the historical use by Atlantic sturgeon. In the late 1800's, the Cape Fear River had the largest landings of sturgeon in the southeastern United States (Moser and Ross, 1995). While species identification (*i.e.,* shortnose or Atlantic sturgeon) is not possible, these landings suggest large populations of both species. The Cape Fear River is tidally influenced by diurnal tides up to at least RKM 96. The River is also dredged extensively to maintain a depth of 12 m up to RKM 49 and then a depth of 4 m up to Lock and Dam 1. There are numerous deep holes (>10 m) throughout this extent.

A gill net survey for adult shortnose and juvenile Atlantic sturgeon was conducted in the Cape Fear River drainage from 1990 to 1992, and replicated from 1997 to 2005. Each sampling period included two overnight sets. The 1990–1992 survey captured 100 Atlantic sturgeon below Lock and Dam #1 (RKM 95). In 1997, 16 Atlantic sturgeon were captured below Lock and Dam #1, an additional 60 Atlantic sturgeon were caught in the Brunswick (a tributary of the Cape Fear River), and 12 were caught in the Northeast Cape River (Moser *et al.* 1998). Additionally, Ross *et al.* (1988 in Moser and Ross, 1995) reported the capture of a gravid female in the Cape Fear River.

Recent telemetry work conducted in the Cape Fear and Northeast Cape Fear River showed that subadult Atlantic sturgeon movement and distribution followed seasonal patterns (Loeffler and Collier in Post *et al.,* 2014). During summer months, Atlantic sturgeon distribution was shifted upriver with limited large-scale movements; during the coldest time of year, subadult fish were absent from the rivers and had migrated to the estuary or ocean (Loeffler and Collier in Post *et al.,* 2014). The high inter-annual return rates of tagged fish to the system demonstrate that Atlantic sturgeon have fidelity to these rivers; this implies that the Cape Fear River system may be the natal system for these fish (Loeffler and Collier in Post *et al.,* 2014).

Further evidence of the importance of this system is demonstrated by the movement patterns of one of five adult Atlantic sturgeon tagged during the study that has shown site fidelity. This individual fish was in ripe and running condition at the time of tagging. This fish subsequently returned to the Cape Fear system each of the following years (2013 and 2014) and has been detected farther upstream in both the Cape Fear

(RKM 95) and Northeast Cape Fear (RKM 132) rivers than any tagged subadult fish during this study. This fish did not use the fish passage rock arch ramp at Lock and Dam #1; however, at the time when it was present at the base of the dam, the rock arch ramp structure was only partially complete. In all years of the study this fish had movement patterns that are consistent with spawning behavior and demonstrate that both the Northeast Cape Fear and Cape Fear Rivers may be important spawning areas. While telemetry data have not indicated Atlantic sturgeon presence above Lock and Dam #1, we believe the fish passage present at the dam is successful or that fish pass through the lock. We base this determination on reports of Atlantic sturgeon above Lock and Dam #1 (J. Hightower, NCSU, pers. comm. To J. Rueter, NMFS, July 21, 2015).

Pee Dee River System

The Pee Dee River System was identified as providing spawning habitat used by Atlantic sturgeon based on the capture of juveniles, the capture of adults in spawning condition, and the tracking location of adults. Captures of age-1 juveniles from the Waccamaw River during the early 1980s suggest that a reproducing population of Atlantic sturgeon existed in that river, although the fish could have been from the nearby Pee Dee River (Collins and Smith1997). In 2003 and 2004, nine Atlantic sturgeon (48.4–112.2 cm FL) were captured in the Waccamaw River during the South Carolina Department of Natural Resources annual American shad gill net survey. While these fish were not considered YOY, Collins *et al.* (1996) note that unlike northern populations, in South Carolina, YOY are considered to be less than 50 cm TL or 42.5 cm FL, because growth rates are greater in the warmer southern waters compared to cooler northern waters. Therefore, the capture of a 48.4 cm FL sturgeon provides some evidence that YOY may be present in the Waccamaw River. Based on telemetry data, these YOY were thought to have been spawned in the Pee Dee River, and then traveled downstream through Bull Creek, and into the Waccamaw River. (B. Post, SCDNR, pers. comm. to J. Rueter, NMFS, July 9, 2015).

Based on preliminary analyses of sturgeon detections during their study, Post *et al.* (2014) concluded the Pee Dee River system appears to be utilized by Atlantic sturgeon for summer/winter seasonal habitat as well as for spawning. From 2011 to 2014, 41 sturgeon were detected in upstream areas of the Pee Dee River that considered spawning areas. All 10 Atlantic sturgeon that were originally implanted with transmitters in the Pee Dee System were later detected displaying upstream and downstream movement. Distinct movement patterns were evident for these fish as similar patterns were observed each year of the study period. Two of the 10 fish originally tagged in the Pee Dee System and many tagged fish from other systems made spawning runs in the Pee Dee River (Post *et al.,* 2014).

Black River, South Carolina

The Black River was identified as a spawning river for Atlantic sturgeon based on the capture of juveniles and the tracking location of adults. During a telemetry study from 2011 to 2014, Post *et al.* (2014) detected 10 juveniles and 10 adults utilizing the Black River. An adult male was detected at the last receiver station in the river one year (RKM 70.4) and the next to last receiver station in a subsequent year. While the receiver stations were not at the fall line, they were very far upriver, and it is likely that the only reason this fish traveled so far upriver was to spawn (B. Post, SCDNR, pers. comm. to J. Rueter, NMFS PRD, July 9, 2015). Juveniles were located as far upstream as RKM 42.1, suggesting the Black River is also an important foraging/refuge habitat.

Santee and Cooper Rivers

The Santee-Cooper River system was identified as a spawning river system for Atlantic sturgeon based on the capture of YOY. The Santee River basin is the second largest watershed on the Atlantic Coast of the United States; however with the completion of Wilson Dam in the 1940s, upstream fish migrations were restricted to the lowermost 145 RKMs of the Santee River. Following construction of the Wilson and Pinopolis Dams, the connectivity between the coastal plain and piedmont was lost. In the 1980s, a fish passage facility at the St. Stephen powerhouse, designed to pass American shad and blueback herring, was completed that attempted to restore connectivity throughout the system. (Fish passage and fishway mean any structure on or around artificial barriers to facilitate diadromous fishes' natural migration). The passage facility has not been successful for Atlantic sturgeon (Post *et al.,* 2014). However, in 2007 an Atlantic sturgeon entered the fish passage facility at the fishway to the lift, presumably in an attempt to migrate upstream to spawn, and was subsequently physically removed and then released downstream into the Santee River (A. Crosby, SCDNR, pers. comm.).

Historically, the Cooper River was a small coastal plain river that fed into Charleston Harbor. The completion of the Santee Cooper hydropower project in the 1940s dramatically changed river discharge in the Cooper River. From the 1940s into the 1980s, nearly all river discharge of the Santee River was diverted through the Santee Cooper project, run through the hydroelectric units in Pinopolis Dam, and discharged down the Tailrace Canal and into the Cooper River. In the 1980s, the Rediversion Project redirected part of the system's discharge back to the Santee River; however, a significant discharge of freshwater still flows into the Cooper River. The Cooper River provides the dominant freshwater input for the Charleston Harbor and provides 77 RKM of riverine habitat (Post *et al.,* 2014).

The capture of 151 subadults, including age-1 fish in 1997 indicates a population exists in the Santee River (Collins and Smith, 1997). Four juvenile Atlantic sturgeon, including YOY, were captured in the winter of 2003 in the Santee (N = 1) and Cooper (N = 3) Rivers (McCord, 2004). These data support the existence of a spawning population, but South Carolina Department of Natural Resources biologists working in the Santee-Cooper system believe the smaller fish are pushed into the system from the Pee Dee and/or Waccamaw River during flooding conditions (McCord, 2004). This hypothesis is based on the lack of access to suitable spawning habitat due to the locations of the Wilson Dam and St. Stephen Powerhouse on the Santee River and the Pinopolis Dam on the Cooper River. Nonetheless, the Santee-Cooper River system appears to be important foraging and refuge habitat and could serve as important spawning habitat once access to historical spawning grounds is restored through a fishway prescription under the Federal Power Act (NMFS 2007).

In a recent telemetry study by Post *et al.* (2014), four Atlantic sturgeon were tagged in the Santee River from 2011 to 2014. Of the four Atlantic sturgeon tagged in the Santee River, one was detected in the river, one was detected at the mouth of the river, and the other two have not been detected in the Santee River system since being tagged. There was no detectable spawning run or pattern of movement for the tagged fish that remained in the Santee River (Post *et al.,* 2014). There were no Atlantic sturgeon captured in the Cooper River during the Post *et al.,* 2014 study. There were seven Atlantic sturgeon detected in the Cooper River that had been tagged in other systems.

The Atlantic sturgeon that were detected in the Cooper River were more commonly detected in the saltwater tidal zone, with the exception of one that made a presumed spawning run to Pinopolis Dam in the fall of 2013 (Post *et al.,* 2014).

Edisto River

The Edisto is the largest river in the Ashepoo, Combahee, Edisto (ACE) Basin; begins in the transition zone between piedmont and coastal plain; and is unimpeded for its entire length. It is the longest free flowing blackwater river in South Carolina. During excessive rainy seasons it will inundate lowlands and swamps, and the flow basin increases to a mile wide or more. The Edisto River was identified as a spawning river for Atlantic sturgeon based on the capture of an adult in spawning condition and capture location and tracking of adults.

Spawning adults (39 in 1998) and YOY (1,331 from 1994–2001) have been captured in the ACE basin (Collins and Smith, 1997; ASSRT, 2007). One gravid female was captured in the Edisto River during sampling efforts in 1997 (ASSRT, 2007). Seventy-six Atlantic sturgeon were tagged in the Edisto River during a 2011 to 2014 telemetry study (Post *et al.,* 2014). Fifty-eight of the 76 Atlantic sturgeon tagged were detected in the Edisto River during the study. Distinct movement patterns of Atlantic sturgeon were evident. Fish entered the river between April and June and were detected in the saltwater tidal zone until water temperature decreased below 25° C. They then moved into the freshwater tidal area, and some fish made presumed spawning migrations in the fall around September–October. Spawning migrations were thought to be occurring based on fish movements upstream to the presumed spawning zone between RKM 78 and 210. Fish stayed in these presumed spawning zones for an average of 22 days. The tagged Atlantic sturgeon left the river system by November. A number of tagged individuals were detected making such movements during multiple years of the study. Only those fish that were tagged in the Edisto River were detected upstream near presumed spawning grounds, while fish detected in the Edisto River, but tagged elsewhere, were not detected near the presumed spawning areas. In the winter and spring, Atlantic sturgeon were generally absent from the system except for a few fish that remained in the saltwater tidal zone (Post *et al.,* 2014).

Combahee—Salkehatchie River

The Combahee—Salkehatchie River was identified as a spawning river for Atlantic sturgeon based on capture location and tracking locations of adults and the spawning condition of an adult. Spawning adults (39 in 1998) and YOY (1,331 from 1994–2001) have been captured in the ACE basin (Collins and Smith, 1997; ASSRT, 2007). One running ripe male was captured in the Combahee River during a sampling program in 1997 (ASSRT, 2007). Seven Atlantic sturgeon were captured and five were tagged during a 2010 and 2011 telemetry study (Post *et al.,* 2014). Atlantic sturgeon that were tagged in the Combahee River were absent from the system for the majority of the study period. An Atlantic sturgeon that was tagged in June of 2011 left the system in the fall of 2011, returned in July 2012 and left the system again in the fall of 2012. This fish was detected the farthest upstream of any tagged Atlantic sturgeon in the Combahee River (RKM 56). Another individual was identified as a running ripe male at capture in the Combahee River in March 2011, was relocated exhibiting spawning behavior in the North East Cape Fear River, NC in March, 2012, and in 2014 was detected from February–April in the Pee Dee System.

Savannah River

The Savannah River was identified as a spawning river for Atlantic sturgeon based on capture location and tracking locations of adults and the collection of larvae. Forty three Atlantic sturgeon larvae were collected in upstream locations (RKM 113–283) near presumed spawning locations (Collins and Smith, 1997). Seven Atlantic sturgeon were also tagged from 2011 to 2014 and distinct movement patterns were evident (Post *et al.,* 2014). In 2011, one individual was detected travelling upstream in mid-April and remained at a presumed spawning area (RKM 200 to 301) through mid-September. Two Atlantic sturgeon migrated into the system and upstream to presumed spawning grounds in 2012. The first entered the system in mid-August and returned downriver in mid-September; the other entered the system in mid-September and returned downriver in mid-October. Four Atlantic sturgeon entered the Savannah River and migrated upstream during the late summer and fall months in 2013. Two Atlantic sturgeon previously tagged in the Savannah River made upstream spawning movements; this was the second year (2011) one of these fish was detected making similar upstream movements. These two fish were also detected immediately upstream of the New Savannah Bluff Lock and Dam (RKM 301). It is unknown if they passed through the lock or swam over the dam during high flows. There is a strong possibility that one fish may have been detected by the receiver directly upstream while still remaining downstream of the dam and while flow control gates were in a full open position. Atlantic sturgeon in the Savannah River were documented displaying similar behavior three years in a row—migrating upstream during the fall and then being absent from the system during spring and summer.

Ogeechee River

The Ogeechee River was identified as a spawning river for Atlantic sturgeon based on tracking of adults and YOY. Seventeen Atlantic sturgeon considered to be YOY (less than 30 cm TL) were collected in 2003 by the Army's Environmental and Natural Resources Division (AENRD) at Fort Stewart, Georgia. An additional 137 fish were captured by the AENRD in 2004. Nine of these fish measured less than 41 cm TL and were considered YOY. During a telemetry study from 2011 to 2014, there were no capture or tagging efforts conducted in the Ogeechee River; however, 40 Atlantic sturgeon were detected in the Ogeechee River (Ingram and Peterson in Post *et al.,* 2014).

Altamaha River

The Altamaha River and its major tributaries the Oconee and Ocmulgee Rivers were identified as spawning rivers for Atlantic sturgeon based on capture location and tracking of adults and the capture of adults in spawning condition. The Altamaha River supports one of the healthiest Atlantic sturgeon subpopulations in the Southeast, with over 2,000 subadults captured in trammel nets, 800 of which were nominally age-1 as indicated by size (ASSRT, 2007). A survey targeting Atlantic sturgeon was initiated in 2003 by the University of Georgia. By October 2005, 1,022 Atlantic sturgeon had been captured using trammel and large gill nets. Two hundred and sixty-seven of these fish were collected during the spring spawning run in 2004 (N = 74 adults) and 2005 (N = 139 adults). From these captures, 308 (2004) and 378 (2005) adults were estimated to have participated in the spring spawning run, representing 1.5% of Georgia's historical spawning stock (females) as estimated from U.S. Fish Commission landing records (Schueller and Peterson 2006, Secor 2002).

In a telemetry study by Peterson *et al.* (2006), most tagged adult Atlantic sturgeon were found between RKM 215 and 420 in October and November when water temperatures were appropriate for spawning. There are swift currents and rocky substrates throughout this stretch of river (Peterson *et al.,* 2006). Two hundred thirteen adults in spawning condition were captured in the Altamaha system in 2004–2005 (Peterson *et al.,* 2006).

Forty-five adult Atlantic sturgeon were captured and tagged from 2011 to 2013 (Ingram and Peterson in Post *et al.,* 2014). Telemetry data from the tagged individuals indicated that the fish were present in the system from April through December. Twenty-six fish made significant (≤ 160 RKM) migrations upstream with eight fish making the migration in at least two of the years and four making the migration in all three years of the study. No site fidelity was apparent based on these data; however, an upriver site near the confluence of the Ocmulgee (RKM 340–350) was visited by multiple fish in multiple years. Fish migrated upstream into both the Ocmulgee and Oconee Rivers, but the majority entered the Ocmulgee River. The maximum extent of these upriver migrations was RKM 408 in the Ocmulgee River and RKM 356 in the Oconee River (Ingram and Peterson in Post *et al.,* 2014).

Two general migration patterns were observed for fish in this system. Early upriver migrations that began in April—May typically occurred in two steps, with fish remaining at mid-river locations during the summer months before continuing upstream in the fall. The late-year migrations, however, were typically initiated in August or September and were generally non-stop. Regardless of which migration pattern was used during upstream migration, all fish exhibited a one-step pattern of migrating downstream in December and early January (Ingram and Peterson in Post *et al.,* 2014).

Satilla River

The Satilla River was identified as a spawning river for Atlantic sturgeon based on the capture of adults in spawning condition. Ong *et al.* (1996) captured four reproductively mature Atlantic sturgeon on spawning grounds during the spawning season in the Satilla River.

St. Marys River

The St. Marys River was identified as a spawning river for Atlantic sturgeon based on the capture of YOY Atlantic sturgeon. Atlantic sturgeon were once thought to be extirpated in the St. Marys River. However, nine Atlantic sturgeon were captured in sampling efforts between May 19 and June 9, 2014. Captured fish ranged in size from 293 mm (YOY) to 932 mm (subadult). This is a possible indication of a slow and protracted recovery in the St. Marys (D. Peterson, UGA, pers. comm. to J. Rueter, NMFS PRD, July 8, 2015).

Unoccupied Critical Habitat Areas

ESA section 3(5)(A)(ii) defines critical habitat to include specific areas outside the geographical area occupied if the areas are determined by the Secretary to be essential for the conservation of the species. Our regulations at 50 CFR 424.12(g) also state: ''The Secretary will not designate critical habitat within foreign countries or in other areas outside of the jurisdiction of the United States.'' At the present time, the geographical area occupied by the Carolina and South Atlantic DPS of Atlantic sturgeon which is within the jurisdiction of the United States is limited to waters off the U.S. east coast from Maine through Florida, seaward to the boundary of the U.S. Exclusive Economic Zone, and upstream in freshwater systems to the fall line or the first impediment to fish passage. We have identified three areas outside the geographical area occupied by these species that are essential for their conservation, and therefore are proposing to designate these unoccupied areas as critical habitat for the Carolina and South Atlantic DPS of Atlantic sturgeon. For the Carolina DPS, we have identified the Cape Fear River from Huske Lock and Dam (Lock and Dam #3) downstream to Lock and Dam #2. We also identified the rivers of the Santee-Cooper basin from the Parr Shoals Dam on the Broad River and the Wateree Dam on the Wateree River downstream to the Wilson Dam and St. Stephen Powerhouse on the Santee River and Pinopolis Dam on the Cooper River. For the South Atlantic DPS we have identified the Savannah River from the Augusta Diversion Dam downstream to the New Savannah Bluff Lock and Dam.

As stated previously, the key habitat-based conservation objectives for these DPSs are facilitating adult reproduction and facilitating recruitment into the adult population by protecting spawning areas, juvenile development habitat, and the migratory corridors that allow adults to reach the spawning areas and newly spawned sturgeon to make a safe downstream movement. To successfully fulfill these conservation objectives, the areas above the dams on these three systems need to be protected until it becomes accessible to the species. Available data suggest that these unoccupied areas did historically, or could, serve as spawning habitat for Atlantic sturgeon should they become accessible in the future.

Telemetry data from the Cape Fear River discussed above (Loeffler and Collier in Post *et al.,* 2014) indicate that Atlantic sturgeon make spawning movements up the Cape Fear River before being stopped at Lock and Dam #1; in one case the fish went downstream and then moved up the Northeast Cape Fear River. However, there have been reports of Atlantic sturgeon above Lock and Dam #1 (J. Hightower, NCSU, pers. comm. To J. Rueter, NMFS, July 21, 2015). It is likely the fish moving up to Lock and Dam #2 are attempting to reach historic upstream spawning areas. Using the fall line as a guide, only 33 percent of the historical habitat is available to Atlantic sturgeon below Lock and Dam #1 (96 km of 292 km). In some years, the salt water interface reaches Lock and Dam #1; so, spawning adults in the Cape Fear River either do not spawn in such years or spawn in the major tributaries of the Cape Fear River (*i.e.,* Black River or Northeast Cape Fear rivers) that are not obstructed by dams. There may be some exposed outcrops that would provide suitable substrate necessary for spawning between Lock and Dam #2 and Huske Lock and Dam (J. Facendola, NCDMF pers. comm. to J. Rueter, NMFS, July 20, 2015). The primary goal of the Cape Fear River Partnership is restoring access to historic migratory fish habitat. Their 2013 action plan identifies passage at Lock and Dam #2 as a priority and includes Atlantic sturgeon as a target species (Cape Fear River Partnership, 2013). In September 2015, the North Carolina General Assembly approved $250,000 to be used towards the design and engineering of a rock arch weir to help with fish passage at Lock and Dam #2 and matching funds are currently being sought. These efforts indicate to us it is likely a rock arch weir will provide passage at Lock and Dam #2 so that sturgeon can utilize the habitat upstream of Lock and Dam #2 up to the Huske Lock and Dam in the future. We propose to include the area from Huske Lock and Dam (Lock and Dam #3) downstream to Lock and Dam #2 as unoccupied critical habitat on the Cape Fear River because Atlantic sturgeon behavior indicates they are attempting to move upstream to spawning habitat located beyond this barrier, and we consider this historical spawning habitat essential to the conservation of the DPS.

The lowermost dams on the Santee and Cooper Rivers limit, and may

eliminate altogether, viable spawning grounds for Atlantic sturgeon. Using the fall line as the upper region of spawning habitat, it is estimated that only 38 percent of the historical habitat is available to Atlantic sturgeon in the Santee-Cooper River system today. There are a number of anecdotal reports of Atlantic sturgeon making spawning runs to the dams and either returning downstream or attempting to spawn at the dams. These dams may not be far enough upstream for eggs and larvae to develop before entering higher salinity waters where they perish. The Santee Cooper Diversion Dam and Canal Project created two reservoirs: the Wilson Dam on the Santee River created Lake Marion, and the Pinopolis Dam on the Cooper River created Lake Moultrie. Currently, relicensing by the Federal Energy Regulatory Commission (FERC) for the South Carolina Public Service Authority (SCPSA) Hydroelectric Project, located in South Carolina is ongoing. Fish passage past these two dams was prescribed as part of the relicensing. Once this passage is constructed, the first dam Atlantic sturgeon will encounter is the abandoned Granby Lock and Dam on the Congaree River. This dam could represent a hindrance, but likely not a complete obstacle, to upstream movements of Atlantic sturgeon because remnant parts of the dam may deter bottom oriented species. Above the Granby Lock and Dam, Atlantic sturgeon will encounter the Columbia Dam on the Broad River. In 2002 we prescribed a fishway to be constructed at the Columbia Dam for American shad, blueback herring, and American eel. Concurrently we reserved authority to prescribe a fishway for sturgeon, because although such a fishway was warranted, a safe and effective passage mechanism was not yet established. The fishway constructed to pass the target species (American shad, blueback herring, and American eel) incorporated ''sturgeon friendly'' features as sturgeon are potential future target species. Field work conducted during consultation by NMFS Habitat Conservation Division established that excellent spawning and juvenile rearing habitat exists in the 24 miles of large river shoals between the Columbia Dam and the next upstream dam, the Parr Shoals Dam (DOC, 2002). While sturgeon have not been documented as currently passing through the Columbia Dam fishway, our reservation of authority in the 2002 FERC relicensing provides us the expectation the Columbia Dam will be passable in the future so that sturgeon can utilize the upstream 24-miles of shoal habitat for spawning and rearing. Additionally, we have information on a population of shortnose sturgeon that has been stranded above Pinopolis and Wilson Dams for decades, and there is a good deal of data on their spawning activity in the Congaree, Broad, and Wateree Rivers. Shortnose sturgeon spawning habitat requirements are similar to Atlantic sturgeon, thus we believe these unoccupied areas contain suitable spawning habitat for Atlantic sturgeon. We conclude that these unoccupied spawning habitats are essential to the conservation of the DPS, and therefore, we are proposing to designate unoccupied critical habitat from the Wateree Dam on the Wateree River and from the Parr Shoals Dam on the Broad River downstream to the Wilson Dam and St. Stephen Powerhouse on the Santee River and the Pinopolis Dam on the Cooper River.

The Savannah River has some fish passage at New Savannah Bluff Lock and Dam, but successful passage of Atlantic sturgeon is not believed to occur. The historical primary spawning habitat for Atlantic sturgeon (and only shoal habitat on the Savannah River), the Augusta Shoals, is not accessible to Atlantic sturgeon because it lies above the New Savannah Bluff Lock and Dam. Sturgeon are currently frequently seen at the base of the New Savannah Bluff Lock and Dam during spawning season, indicating either crowding below the dam or individual motivation to spawn farther upriver, or both. We conclude this unoccupied area is essential to the conservation of the DPS and therefore, we propose to designate the Savannah River from the Augusta Diversion Dam downstream to the New Savannah Bluff Lock and Dam as critical habitat.

Application of ESA Section 4(a)(3)(B)(i) (Military Lands)

Section 4(a)(3)(B) of the ESA prohibits designating as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense (DOD), or designated for its use, that are subject to an Integrated Natural Resources Management Plan (INRMP) prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation. The legislative history to this provision explains:

> The conferees would expect the [Secretary] to assess an INRMP's potential contribution to species conservation, giving due regard to those habitat protection, maintenance, and improvement projects and other related activities specified in the plan that address the particular conservation and protection needs of the species for which critical habitat would otherwise be proposed. Consistent with current practice, the Secretary would establish criteria that would be used to determine if an INRMP benefits the listed species for which critical habitat would be proposed (Conference Committee report, 149 Cong. Rec. H. 10563 (November 6, 2003)).

In February 2014 and October 2015, we requested information from the DOD to assist in our analysis. Specifically, we asked for a list of facilities that occur within the potential critical habitat areas for the Carolina and South Atlantic DPSs of Atlantic sturgeon and available INRMPs for those facilities. We received information on two INRMPs for DOD facilities on or near the banks of rivers included in the proposed designation—the Naval Submarine Base Kings Bay (GA), on the St. Marys River and Joint Base Charleston (SC), on the Cooper River. At neither base does the Navy own or control, or have designated for its use, lands or geographic areas being proposed as critical habitat. Thus, there are no areas where the INRMP prohibition is applicable. Notably, the Department of Navy response indicated a desire to review and revise applicable INRMPs to provide appropriate and feasible conservation benefits to the species if possible.

Application of ESA Section 4(b)(2)

Section 4(b)(2) of the ESA requires that we consider the economic impact, impact on national security, and any other relevant impact, of designating any particular area as critical habitat. Additionally, the Secretary has the discretion to consider excluding any area from critical habitat if she determines, based upon the best scientific and commercial data available, the benefits of exclusion (that is, avoiding some or all of the impacts that would result from designation) outweigh the benefits of designation. The Secretary may not exclude an area from designation if exclusion will result in the extinction of the species. Because the authority to exclude is discretionary, exclusion is not required for any particular area under any circumstances.

The ESA provides the USFWS and NMFS (the Services) with broad discretion in how to consider impacts. *See,* H.R. Rep. No. 95–1625, at 17, reprinted in 1978 U.S.C.C.A.N. 9453, 9467 (1978) (''Economics and any other relevant impact shall be considered by the Secretary in setting the limits of critical habitat for such a species. The Secretary is not required to give economics or any other ''relevant impact'' predominant consideration in

his specification of critical habitat . . . The consideration and weight given to any particular impact is completely within the Secretary's discretion.''). Courts have noted the ESA does not contain requirements for any particular methods or approaches. *See, e.g., Bldg. Indus. Ass'n of the Bay Area et al.* v. *U.S. Dep't. of Commerce et al.,* No. 13–15132, 9th Cir., July 7, 2015 (upholding district court's ruling that the ESA does not require the agency to follow a specific methodology when designating critical habitat under section 4(b)(2). For this proposed rule, we followed the same approach to describing and evaluating impacts as we have for recent critical habitat rulemakings in the NMFS Southeast Region.

The following discussion of impacts summarizes the analysis contained in our Draft Impact Analysis of Critical Habitat Designation for the Carolina and South Atlantic Distinct Population Segments of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) (Draft Impacts Analysis), which identifies the economic, national security, and other relevant impacts that we projected would result from including each of the fourteen occupied and three unoccupied specific areas in the proposed critical habitat designation. We considered these impacts when deciding whether to exercise our discretion to propose excluding particular areas from the designation. Both positive and negative impacts were identified and considered (these terms are used interchangeably with benefits and costs, respectively). Impacts were evaluated in quantitative terms where feasible, but qualitative appraisals were used where that is more appropriate to particular impacts. The Draft Impacts Analysis Report is available on NMFS's Southeast Regional Office Web site at *http://sero.nmfs.noaa.gov/protected_resources/sturgeon/index.html.*

The primary impacts of a critical habitat designation result from the ESA Section 7(a)(2) requirement that Federal agencies ensure their actions are not likely to result in the destruction or adverse modification of critical habitat, and that they consult with NMFS in fulfilling this requirement. Determining these impacts is complicated by the fact that Section 7(a)(2) also requires that Federal agencies ensure their actions are not likely to jeopardize the species' continued existence. One incremental impact of designation is the extent to which Federal agencies modify their proposed actions to ensure they are not likely to destroy or adversely modify the critical habitat beyond any modifications they would make because of listing and the jeopardy requirement. When the same modification would be required due to impacts to both the species and critical habitat, the impact of the designation is coextensive with the ESA listing of the species (*i.e.,* attributable to both the listing of the species and the designation critical habitat). Relevant, existing regulatory protections are referred to as the ''baseline'' and are also discussed in the Draft Impacts Analysis. In this case, notable baseline protections include the ESA listings of not only Atlantic sturgeon, but the co-occurring shortnose sturgeon.

The Draft Impacts Analysis Report describes the projected future federal activities that would trigger Section 7 consultation requirements because they may affect the essential features, and consequently may result in economic costs or negative impacts. The report also identifies the potential national security and other relevant impacts that may arise due to the proposed critical habitat designation, such as positive impacts that may arise from conservation of the species and its habitat, state and local protections that may be triggered as a result of designation, and education of the public to the importance of an area for species conservation.

Economic Impacts

Economic impacts of the critical habitat designation result through implementation of Section 7 of the ESA in consultations with Federal agencies to ensure their proposed actions are not likely to destroy or adversely modify critical habitat. These economic impacts may include both administrative and project modification costs; economic impacts that may be associated with the conservation benefits of the designation are described later.

We examined the ESA Section 7 consultation record over the last 10 years, as compiled in our Public Consultation Tracking System (PCTS) database, to identify the types of Federal activities that may adversely affect proposed Atlantic sturgeon critical habitat. We requested that federal action agencies provide us with information on future consultations if we omitted any future actions likely to affect the proposed critical habitat. No new categories of activities were identified through this process. Of the types of past consultations that ''may affect'' some or all of the essential features in any unit of proposed critical habitat, we determined that no activities would solely affect the essential features. That is, all categories of the activities identified have potential routes of adverse effects to both Atlantic or shortnose sturgeon and the critical habitat.

Fourteen categories of activities implemented by ten different federal entities were identified as likely to recur in the future and have the potential to affect the essential features (total number of projected consultations over 10 years indicated in parentheses):

1. U.S. Army Corps of Engineers (USACE)—Navigation maintenance dredging, harbor expansion (14)
2. USACE—Water Resources Development Act (WRDA) flood control, ecosystem restoration studies (6)
3. USACE—WRDA dam operations, repair, fishway construction (3)
4. USACE—Section 404/Rivers and Harbors Act (RHA) section 10 permitting—dredge, fill, construction (20)
5. Federal Highway Administration (FHWA)—Bridge repair, replacement (67)
6. U.S. Coast Guard (USCG)—Bridge repair, replacement permitting (3)
7. FERC—Hydropower licensing (5)
8. FERC—Liquefied Natural Gas (LNG) facilities, pipelines authorization (5)
9. Nuclear Regulatory Commission (NRC)—Nuclear power plant construction/operation licensing (8)
10. NMFS—ESA research and incidental take permitting (section 10) (46)
11. U.S. Fish and Wildlife Service (USFWS)—Fishery management grants (11)
12. Environmental Protection Agency (EPA)—Nationwide pesticide authorizations (9)
13. Federal Emergency Management Agency (FEMA)—Disaster assistance/preparation grants (5)
14. Department of Energy (DOE)—Nuclear fuel management (3)

We estimate that 205 activities will require consultation over the next 10 years and will require analysis of impacts to Atlantic sturgeon critical habitat. As discussed in more detail in our Draft Impacts Analysis, all the activities identified as having the potential to adversely affect one or more of the proposed essential features, also have the potential to take Atlantic sturgeon. For most, if not all, of the projected future activities, if the effects to critical habitat will be adverse and require formal consultation, those effects would also constitute adverse effects to the species, either directly when they are in the project area, or indirectly due to the effects on their habitat. This is due to the conservation functions that the features are being designated to provide. For example,

water quality is being identified as an essential feature to facilitate successful spawning, annual and inter-annual adult, larval, and juvenile survival, and larva, juvenile and subadult growth, development, and recruitment. Effects to the water quality feature that impede that conservation objective could injure or kill individual Atlantic sturgeon, for example by preventing adult reproduction, or rendering reproduction ineffective or resulting in reduced growth or mortality of larvae, juveniles or subadults. In these circumstances, the same project modifications would be required to address effects to both the species and effects to the critical habitat. Thus, projects that adversely affect the proposed essential features are likely to always also adversely affect the species and the project impacts would not be incremental.

For some of the projected activities, it may be feasible to conduct the action when sturgeon are out of the action area. If effects to critical habitat are temporary such that the essential features return to their pre-project condition by the time the sturgeon return and need to use the features, there might not be any adverse effects to either the species or the critical habitat. In these circumstances, consultations would be fully incremental consultations only on critical habitat, and the consultations would be informal (*i.e.,* impacts to critical habitat would not be permanent and would not be significant). This would likely only apply to actions that affect just spawning habitat in the upper parts of the rivers, as sturgeon of various ages are present year-round in the lower reaches of the rivers and the estuaries. The costs of fully incremental, informal consultations are higher than the marginal costs of adding critical habitat analyses to coextensive, formal consultations. Thus, to be conservative and avoid underestimating incremental impacts of this designation, and based on the activities involved, we assumed that two categories of activities could result in incremental, informal consultations. Those activities, both implemented by the USACE, are section Clean Water Act section 404/Rivers and Harbors Act permitting and WRDA dam operations/repair.

Administrative costs include the cost of time spent in meetings, preparing letters, and in some cases, developing a biological assessment and biological opinion, identifying and designing reasonable and prudent measures (RPMs), and so forth. For this impacts report, we estimated per-project administrative costs based on critical habitat economic analyses by Industrial Economics, Inc. (IEc). (2014a, 2014b). These impacts reports estimate administrative costs for different categories of consultations as follows: (1) New consultations resulting entirely from critical habitat designation; (2) new consultations considering only adverse modification (unoccupied habitat); (3) re-initiation of consultation to address adverse modification; and, (4) additional consultation effort to address adverse modification in a new consultation. Most of the projected future consultations we project to result from this proposed rulemaking will be coextensive formal consultations on new actions that would be evaluating impacts to sturgeon as well as impacts to critical habitat, and the administrative costs for these 182 consultations would be in category 4 above. The remaining 23 actions are projected to involve incremental informal consultation due to impacts to critical habitat alone. Based on IEc (2014a, b), we project that each formal consultation will result in the following additional costs to address critical habitat impacts: $1,400 in NMFS costs; $1,600 in action agency costs; $880 in third party (*e.g.,* permittee) costs, if applicable; and $1,200 in costs to the action agency or third party to prepare a Biological Assessment (BA). Costs for the incremental informal consultations would be as follows: $1,900 in NMFS' costs; $2,300 in action agency costs; $1,500 in third party (*e.g.,* permittee) costs, if applicable; and $1,500 in costs to the action agency or third party to prepare a BA. Costs of the 9 EPA nationwide consultations were treated differently. These consultations will involve all listed species and designated critical habitat under NMFS's jurisdiction, and thus costs attributable solely to this proposed rule are expected to be very small. To be conservative, we added 9 consultations to each unit, and 9 to each DPS's total number of consultations. We spread the costs of these consultations ($5,080 each) evenly across all units included in this proposed rule and the companion proposed rule to designate critical habitat for the Gulf of Maine, New York Bight, and Chesapeake Bay DPSs. This resulted in a total cost of $1,474.84 per unit.

In our impacts analysis, we concluded that none of the projected future activities are likely to require project modifications to avoid adverse effects to critical habitat features that would be different from modifications required to avoid adverse effects to sturgeon. In other words, we projected no incremental costs in proposed critical habitat units other than the administrative costs of consultations. While there may be serious adverse impacts to critical habitat from projected future projects that require project modifications to avoid destroying or adversely modifying critical habitat, impacts of these magnitudes to the essential features as defined, would also result in adverse effects to Atlantic sturgeon, either directly when they are in the project area, or indirectly as harm, resulting from impacts to their habitat that result in injury or death to sturgeons. The same project modifications would be required to avoid destroying or adversely modifying critical habitat and avoiding jeopardy or minimizing take of Atlantic sturgeon caused by impacts to its habitat.

Based on our draft impacts analysis, we project that the costs that will result from the proposed designation will total $1,092,793 over the next 10 years. The total incremental cost resulting from the designation for the Carolina DPS is $503,954, and the total incremental cost resulting from the designation for the South Atlantic DPS is $588,839, over 10 years. The per-unit costs vary widely. The annual per-unit costs range from $147 (Unoccupied Cape Fear River unit, Carolina DPS) to $23,051 (Occupied Savannah River unit, South Atlantic DPS).

National Security Impacts

Previous critical habitat designations have recognized that impacts to national security result if a designation would trigger future ESA Section 7 consultations because a proposed military activity ''may affect'' the physical or biological feature(s) essential to the listed species' conservation. Anticipated interference with mission-essential training or testing or unit readiness, through the additional commitment of resources to an adverse modification analysis and expected requirements to modify the action to prevent adverse modification of critical habitat, has been identified as a negative impact of critical habitat designations. (See, *e.g.,* Proposed Designation of Critical Habitat for Southern Resident Killer Whales; 69 FR 75608, Dec. 17, 2004, at 75633.)

On February 14, 2014, and again in October 7, 2015, NMFS sent letters to DOD and the Department of Homeland Security requesting information on national security impacts of the proposed critical habitat designation, and we received responses from the Navy, Air Force, Army, and USCG. We discuss the information contained within the responses thoroughly in the

Draft Impacts Analysis and summarize the information below.

The Navy's first submission provided information on its facilities and operations. However, the Navy was not able to make a full assessment whether there would be any national security impacts. The Navy indicated that as we define our essential features and areas more precisely, they would be able to provide a more detailed response to our requests and would update their INRMPs as necessary for the protection of Atlantic sturgeon and its critical habitat. The Navy's second submission noted that Naval Submarine Base Kings Bay was adjacent to the South Atlantic DPS critical habitat unit in the St. Marys River. The Navy stated it did not own or control any land or waters within the St. Marys channel, but that the TRIDENT-class submarines used 4.9 km of the waterway transiting to and from the Atlantic Ocean. The Navy stated that any operational or dredging restrictions that would impede maintenance of the channel from the Intracoastal Waterway and St. Marys channel intersection, downstream, could pose a national security risk. The USACE is typically the lead action agency with us for dredging actions, and the Navy would be the permit applicant. We determined that dredging has the potential to affect critical habitat, but we also concluded that consultations for effects of dredging on critical habitat will be fully-coextensive with consultations to address impacts to sturgeon. The effects of dredging on essential features would also result in injury or death to individual sturgeon, and thus constitute take. Removal or covering of spawning substrate could prevent effective spawning or result in death of eggs or larvae that are spawned. Changing the salinity regime by deepening harbors and parts of rivers could result in permanent decreases if available foraging and developmental habitat for juveniles. These types of adverse effects are not likely to be temporary and limited to periods of sturgeon absence. Thus, adverse effects of dredging activities are likely to be coextensive formal consultations to address impacts to both the species and the essential features, and thus no new requirements or project modifications are anticipated as a result of the proposed critical habitat designation. Therefore, we find there will be no impact on national security as a consequence of the proposed designation for these actions.

The Navy and Air Force expressed concern that designating the Cooper River, including the area of the river on the west side adjacent to the Joint Base Charleston Naval Weapons Station, could have significant impacts on the Navy's ability to adequately support mission-essential military operations, thereby impacting national security. The Navy and Air Force were concerned designation of critical habitat could affect training facilities and the maintenance of these facilities. Additional concerns were expressed regarding shipping and receiving operations from two waterfront facilities. Because no specifics were given on how designation of critical habitat could affect these activities, and because we determined there are no routes of effects to essential features from these activities based on the information provided, we concluded that designation of critical habitat will have no impact on these activities and thus will not result in impacts to national security

The Army noted that Military Ocean Terminal-Sunny Point, North Carolina, was located on the Cape Fear River and Fort Stewart, Georgia, was located on the Ogeechee River. However, the Army was not able to make a full assessment whether there would be any national security impacts and concluded that technical assessments between the installations and regional levels of NMFS would identify any specific impacts.

The USCG provided information on its facilities and operations. However, the USCG was not able to make a full assessment whether there would be any national security impacts. The USCG indicated that as we define our essential features and areas more precisely, they would be able to provide a more detailed response to our requests. The USCG consulted with us three times on authorizations for bridge repairs or replacements. If conducted in the future, these activities may affect proposed critical habitat features, but the effects would be fully coextensive with effects to listed sturgeon. Based on this information regarding potential future USCG action in proposed Atlantic sturgeon critical habitat, we do not expect any national security impacts as a consequence of the proposed critical habitat designation.

Based on a review of our consultation database, and the information provided by the Navy, Air Force, Army, and USCG on their activities conducted within the specific areas proposed for designation as Atlantic sturgeon critical habitat, we determined that only one military action identified as a potential area of national security impact has routes of potential adverse effects to proposed critical habitat—river channel dredging. As discussed, this activity will require consultation due to potential impacts to listed Atlantic and shortnose sturgeon, and any project modifications needed to address impacts to these species would also address impacts to critical habitat. Thus, no incremental project modification impacts are expected due to this designation. On this basis, we conclude there will be no national security impacts associated with the proposed critical habitat for the Carolina and South Atlantic DPSs of Atlantic sturgeon.

Other Relevant Impacts

Other relevant impacts of critical habitat designations can include conservation benefits to the species and to society, and impacts to governmental and private entities. Our Draft Impacts Analysis discusses conservation benefits of designating the 14 occupied and 3 unoccupied areas, and the benefits of conserving the Carolina and South Atlantic sturgeon DPSs to society, in both ecological and economic metrics.

As discussed in the Draft Impacts Analysis and summarized here, Atlantic sturgeon currently provide a range of benefits to society. Given the positive benefits of protecting the physical features essential to the conservation of these DPSs, this protection will in turn contribute to an increase in the benefits of this species to society in the future as the species recovers. While we cannot quantify nor monetize these benefits, we believe they are not negligible and would be an incremental benefit of this designation. However, although the features are essential to the conservation of Atlantic sturgeon DPSs, critical habitat designation alone will not bring about the recovery of the species. The benefits of conserving Atlantic sturgeon are, and will continue to be, the result of several laws and regulations.

We identified in the Draft Impacts Analysis both consumptive (*e.g.,* commercial and recreational fishing) and non-consumptive (*e.g.,* wildlife viewing) activities that occur in the areas proposed as critical habitat. Commercial and recreational fishing are components of the economy related to the ecosystem services provided by the resources within the proposed Atlantic sturgeon critical habitat areas. The essential features provide for abundant fish species diversity.

Education and awareness benefits stem from the critical habitat designation when non-federal government entities or members of the general public responsible for, or interested in, Atlantic sturgeon conservation change their behavior or activities when they become aware of the designation and the importance of

the critical habitat areas and features. Designation of critical habitat raises the public's awareness that there are special considerations that may need to be taken within the area. Similarly, state and local governments may be prompted to carry out programs to complement the critical habitat designation and benefit the Carolina and South Atlantic DPSs of Atlantic sturgeon. Those programs would likely result in additional impacts of the designation. However, it is impossible to quantify the beneficial effects of the awareness gained or the secondary impacts from state and local programs resulting from the critical habitat designation.

Discretionary Exclusions Under Section 4(b)(2)

On the basis of our impacts analysis, we are not proposing to exercise our discretion to propose excluding any particular areas from the proposed critical habitat designation.

Our conservative identification of potential incremental economic impacts indicates that any such impacts would be very small—$50,395 annually for the Carolina DPS critical habitat and $58,884 annually for the South Atlantic DPS critical habitat. These costs will result from very few (about 20) Federal ESA section 7 consultations annually. These consultations will be spread over 4 states and over 3,300 river miles (4,900 river kilometers). Incremental economic impacts will consist solely of the administrative costs of consultation; no project modifications are projected to be required to address impacts solely to the proposed critical habitat. Further, the analysis indicates that there is no particular area within the units designated as critical habitat where economic impacts would be particularly high or concentrated. No impacts to national security are expected. Other relevant impacts include conservation benefits of the designation, both to the species and to society. Because the features that form the basis of the critical habitat designation are essential to the conservation of the Carolina and South Atlantic DPSs of Atlantic sturgeon, the protection of critical habitat from destruction or adverse modification may at minimum prevent loss of the benefits currently provided by the species and may contribute to an increase in the benefits of these species to society in the future. While we cannot quantify nor monetize the benefits, we believe they are not negligible and would be an incremental benefit of this designation. Therefore, we have concluded that there is no basis to exclude any particular area from the proposed critical habitat units.

Proposed Critical Habitat Designation

Critical habitat must be defined by specific limits using reference points and lines as found on standard topographic maps of the area, and cannot use ephemeral reference points (50 CFR 424.12(c)). When several habitats, each satisfying the requirements for designation as critical habitat, are located in proximity to one another, an inclusive area may be designated as critical habitat (50 CFR 424.12(d)).

The habitat containing the physical features that are essential to the conservation of the Carolina and South Atlantic DPSs and that may require special management considerations or protection is aquatic habitat of main stem rivers flowing into a coastal estuary. Atlantic sturgeon typically cannot pass dams or natural features such as waterfalls and rapids found at the fall line of rivers. Therefore, we are defining each critical habitat unit by an upriver GPS position or landmark on the main stem river (*e.g.,* the most downriver dam) and all waters of the main stem downriver of that location to river kilometer zero (RKM 0). Main stem river is the primary segment of a river and any portions thereof that depart from and rejoin the primary segment. Thus, channels and cuts that depart from and rejoin the main channel are included (*e.g.,* Middle and Front Rivers are part of the Savannah River).

In order to include areas of dynamic water depth containing suitable spawning habitat, we are relying on the ordinary high water mark (OHWM) to delineate the lateral boundaries of the specific critical habitat areas. Federal regulations at 33 CFR 328.3(e) define OHWM as ''that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.''

Occupied Critical Habitat Unit Descriptions

Carolina Unit 1, Roanoke Unit. Roanoke River in Bertie, Halifax, Martin, Northampton, and Washington Counties in North Carolina. Carolina Unit 1 includes the Roanoke River main stem from the Roanoke Rapids Dam downstream to RKM 0.

Carolina Unit 2, Tar-Pamlico Unit. Tar-Pamlico River in Beaufort, Edgecombe, Hyde, Nash, Pamlico, and Pitt Counties in North Carolina. Carolina Unit 2 includes the Tar-Pamlico River main stem from the Rocky Mount Millpond Dam downstream to RKM 0.

Carolina Unit 3, Neuse Unit. Neuse River in Carteret, Craven, Duplin, Johnston, Lenoir, Pamlico, Pitt, Wake, and Wayne Counties in North Carolina. Carolina Unit 3 includes the Neuse River main stem from the Milburnie Dam downstream to RKM 0. The Neuse River, one of two major tributaries to Pamlico Sound, is dammed. It is likely that Atlantic sturgeon historically utilized habitat in the Neuse River up to the falls at RKM 378 where a dam (Falls Dam) is now located, although this site is above the fall line (ASSRT, 2007). Spawning migration may be impeded to historic habitat above the Milburnie Dam (RKM 349).

Carolina Unit 4, Cape Fear Unit. Cape Fear River in Bladen, Brunswick, Columbus, Cumberland, New Hanover, and Pender Counties in North Carolina and the Northeast Cape Fear River in Duplin, New Hanover, Pender, and Wayne Counties in North Carolina. Carolina Unit 4 includes the Cape Fear River main stem from Lock and Dam #2 downstream to RKM 0 and the Northeast Cape Fear River from the upstream side of Rones Chapel Road Bridge downstream to the confluence with the Cape Fear River.

Carolina Unit 5, Pee Dee Unit. Pee Dee River in Anson and Richmond Counties in North Carolina and Chesterfield, Darlington, Dillon, Florence, Georgetown, Horry, Marion, Marlboro, and Williamsburg Counties in South Carolina; Waccamaw River in Georgetown County in South Carolina; and Bull Creek in Georgetown County in South Carolina. Carolina Unit 5 includes the Pee Dee River main stem from Blewett Falls Dam downstream to RKM 0, the Waccamaw River from Bull Creek downstream to RKM 0, and Bull Creek from the Pee Dee River to the confluence with the Waccamaw River.

Carolina Unit 6. Black River Unit. Black River in Clarendon, Georgetown, Lee, Sumter, and Williamsburg Counties in South Carolina. Carolina Unit 6 includes the Black River main stem from Interstate Highway 20 downstream to RKM 0.

Carolina Unit 7, Santee-Cooper Unit. Santee River in Berkeley, Georgetown, and Williamsburg Counties in South Carolina; North Santee River in Georgetown County in South Carolina; South Santee River in Charleston County in South Carolina; and the

Cooper River in Berkeley and Charleston Counties in South Carolina. Carolina Unit 7 includes the Santee River main stem from the Wilson and St. Stephen Dams downstream to the fork of the North Santee River and South Santee River distributaries, the Rediversion Canal from the St. Stephen Powerhouse downstream to the confluence with the Santee River, the North Santee River from the fork of the Santee River and South Santee River downstream to RKM 0, the South Santee River from the fork of the Santee River and North Santee River downstream to RKM 0, the Tailrace Canal from Pinopolis Dam downstream to the West Branch Cooper River, the West Branch Cooper River from the Tailrace Canal downstream to the confluence with the East Branch Cooper River, and the Cooper River from confluence of the West Branch Cooper River and East Branch Cooper River tributaries downstream to RKM 0.

South Atlantic Unit 1, Edisto Unit. The North Fork Edisto in Lexington, and Orangeburg Counties in South Carolina; the South Fork Edisto in Aiken, Bamberg, Barnwell, Edgefield, and Orangeburg Counties in South Carolina; the Edisto River in Bamberg, Charleston, Colleton, Dorchester, and Orangeburg Counties in South Carolina; the North Edisto in Charleston and Colleton Counties in South Carolina; and the South Edisto in Charleston and Colleton Counties in South Carolina. South Atlantic Unit 1 includes the North Fork Edisto River from Cones Pond downstream to the confluence with the South Fork Edisto River, the South Fork Edisto River from Highway 121 downstream to the confluence with the North Fork Edisto River, the Edisto River main stem from the confluence of the North Fork Edisto River and South Fork Edisto River tributaries downstream to the fork at the North Edisto River and South Edisto River distributaries, the North Edisto River from the Edisto River downstream to RKM 0, and the South Edisto River from the Edisto River downstream to RKM 0.

South Atlantic Unit 2, Combahee-Salkehatchie Unit. Combahee-Salkehatchie River in Allendale, Bamberg, Barnwell, Beaufort, Colleton, and Hampton Counties in South Carolina. South Atlantic Unit 2 includes the main stem Combahee—Salkehatchie River from the confluence of Buck Creek and Rosemary Creek with the Salkehatchie River downstream to the Combahee River, the Combahee River from the Salkehatchie River downstream to RKM 0.

South Atlantic Unit 3, Savannah Unit. Savannah River in Aiken, Allendale, Barnwell, Edgefield, Hampton, Jasper and McCormick Counties in South Carolina and Burke, Chatham, Columbia, Effingham, Richmond, and Screven Counties in Georgia. South Atlantic Unit 3 includes the main stem Savannah River from the New Savannah Bluff Lock and Dam downstream to RKM 0.

South Atlantic Unit 4, Ogeechee Unit. Ogeechee River in Bryan, Bulloch, Burke, Chatham, Effingham, Emanuel, Glascock, Jefferson, Jenkins, Screven, and Washington Counties in Georgia. South Atlantic Unit 4 includes the main stem Ogeechee River from the confluence of the North Fork and South Fork Ogeechee Rivers downstream to RKM 0.

South Atlantic Unit 5, Altamaha Unit. Altamaha River in Appling, Jeff Davis, Long, McIntosh, Montgomery, Tattnall, Toombs, and Wheeler Counties in Georgia; the Oconee River in Baldwin, Hancock, Johnson, Laurens, Montgomery, Washington, Wheeler, and Wilkinson Counties in Georgia; and the Ocmulgee River in Ben Hill, Bibb, Bleckley, Dodge, Houston, Jasper, Jeff Davis, Jones, Plaski, Telfair, Twiggs, Wheeler, and Wilcox Counties in Georgia. South Atlantic Unit 5 includes the main stem Ocmulgee River from Juliette Dam downstream to the confluence with the Oconee River, the Oconee River from Sinclair Dam downstream to the confluence with the Ocmulgee, and the Altamaha River from the confluence of the Ocmulgee and Oconee downstream to RKM 0.

South Atlantic Unit 6, Satilla Unit. Satilla River in Atkinson, Brantley, Camden, Charlton, Coffee, Glynn, Irwin, Pierce, Ware, and Wayne Counties in Georgia. South Atlantic Unit 6 includes the main stem Satilla River from the confluence of Satilla Creek and Wiggins Creek downstream to RKM 0.

South Atlantic Unit 7, St. Marys Unit. St. Marys River in Camden and Charlton Counties in Georgia and Baker and Nassau Counties in Florida. South Atlantic Unit 7 includes the main stem St. Marys River from the confluence of Middle Prong St. Marys and the St. Marys Rivers downstream to RKM 0.

Unoccupied Critical Habitat Unit Descriptions

Carolina Unoccupied Unit 1. Cape Fear River in Bladen County in North Carolina. Carolina Unoccupied Unit 1 includes the main stem Cape Fear River from Huske Lock and Dam (Lock and Dam #3) downstream to Lock and Dam #2.

Carolina Unoccupied Unit 2. Wateree River in Kershaw, Richland, and Sumter Counties in South Carolina; Broad River in Lexington and Richland Counties in South Carolina; Congaree River in Calhoun and Richland Counties in South Carolina; Santee River in Calhoun and Sumter Counties in South Carolina; Lake Marion in Berkeley, Calhoun, Clarendon, Orangeburg, and Sumter Counties in South Carolina; Diversion Canal in Orangeburg County in South Carolina; and, Lake Moultrie in Berkeley and Orangeburg Counties in South Carolina. Carolina Unoccupied Unit 2 includes the Wateree River from the Wateree Dam downstream to the confluence with the Congaree River, the Broad River from the Parr Shoals Dam downstream to the confluence with the Saluda River, the Congaree River from the confluence of the Saluda and Broad Rivers downstream to the Santee River, the Santee River from the confluence of the Congaree and Wateree Rivers downstream to Lake Marion, Lake Marion from the Santee River downstream to the Diversion Canal, the Diversion Canal from Lake Marion downstream to Lake Moultrie, Lake Moultrie from the Diversion Canal downstream to the Pinopolis Dam and the Rediversion Canal, the Rediversion Canal from Lake Moultrie downstream to the St. Stephen Powerhouse.

South Atlantic Unoccupied Unit 1. Savannah River in Aiken and Edgefield Counties in South Carolina and Columbia and Richmond Counties in Georgia. South Atlantic Unoccupied Unit 1 includes the Savannah River from the Augusta Diversion Dam downstream to the New Savannah Bluff Lock and Dam.

Table 1. Critical Habitat Units and Extents of the Units.

Critical Habitat Unit Name	DPS Nomenclature	Water Body	State	Upper extent	River kilometers	River miles
Roanoke	Carolina Unit 1 (C1)	Roanoke River	North Carolina	Roanoke Rapids Dam	213	132
Tar - Pamlico	Carolina Unit 2 (C2)	Tar - Pamlico River	North Carolina	Rocky Mount Mill Pond Dam	199	124
Neuse	Carolina Unit 3 (C3)	Neuse River	North Carolina	Milburnie Dam	345	214
Cape Fear	Carolina Unit 4 (C4)	Cape Fear River	North Carolina	Lock and Dam #2	151	94
		Northeast Cape Fear River	North Carolina	Upstream side of Rones Chapel Road Bridge	218	136
Cape Fear Unoccupied	Carolina Unoccupied Unit 1 (CU1)	Cape Fear River	North Carolina	Huske Lock and Dam (a.k.a. Lock and Dam #3)	37	23
Pee Dee	Carolina Unit 5 (C5)	Pee Dee River	North Carolina/South Carolina	Blewett Falls Dam	310	192
		Waccamaw River	South Carolina	Bull Creek (a.k.a. Big Bull Creek)	35	22
		Bull Creek (a.k.a. Big Bull Creek)	South Carolina	Pee Dee River	17	11
Black	Carolina Unit 6 (C6)	Black River	South Carolina	Interstate Highway 20	253	157
Santee - Cooper	Carolina Unit 7 (C7)	Santee River	South Carolina	Wilson Dam	114	71
		Rediversion Canal	South Carolina	St. Stephens Dam	8	5
		North Santee River	South Carolina	Confluence of Santee River	29	18
		South Santee River	South Carolina	Confluence of Santee River	27	17
		Tailrace Canal - West Branch Cooper River	South Carolina	Pinopolis Dam	29	18
		Cooper River	South Carolina	Confluence of the West Branch Cooper and East Branch Cooper Rivers	48	30
Santee - Cooper Unoccupied	Carolina Unoccupied Unit 2 (CU2)	Wateree River	South Carolina	Wateree Dam	124	77
		Broad River	South Carolina	Parr Shoals	43	27
		Congaree River	South Carolina	Confluence of Saluda and Broad Rivers	84	52
		Santee River (up river of Lake Marion)	South Carolina	Confluence of Congaree and Wateree Rivers	13	8
		Lake Marion	South Carolina	Santee River (upstream of Lake Marion)	50	31
		Diversion Canal	South Carolina	Lake Marion	8	5
		Lake Moultrie	South Carolina	Diversion Canal	16	10
		Rediversion Canal	South Carolina	Lake Moultrie	8	5
Edisto	South Atlantic Unit 1 (SA1)	North Fork Edisto River	South Carolina	Cones Pond just north of I-20 (approximately 33.8035 N, 80.4702 W)	155	96
		South Fork Edisto River	South Carolina	State Hwy 121	175	109
		Edisto River	South Carolina	Confluence of the North Fork Edisto and South Fork Edisto Rivers	163	101
		North Edisto River	South Carolina	Edisto River	29	18
		South Edisto River	South Carolina	Edisto River	31	19
Combahee - Salkehatchie	South Atlantic Unit 2 (SA2)	Combahee - Salkehatchie River	South Carolina	Confluence of Buck and Rosemary Creeks with (Approximately 33.2906 N, 81.4326 W)	185	115
Savannah	South Atlantic Unit 3 (SA3)	Savannah River	South Carolina/Georgia	New Savannah Bluff Lock and Dam	338	210
Savannah Unoccupied	South Atlantic Unoccupied Unit 1 (S/	Savannah River	South Carolina/Georgia	Augusta Diversion Dam	33	20
Ogeechee	South Atlantic Unit 4 (SA4)	Ogeechee River	Georgia	Confluence of North Fork and South Fork Ogeechee Rivers (Approximately 33.5200 N, 82.9095 W)	448	278
Altamaha	South Atlantic Unit 5 (SA5)	Oconee River	Georgia	Sinclair Dam	227	141
		Ocmulgee River	Georgia	Juliette Dam	363	226
		Altamaha River	Georgia	Confluence of Oconee and Ocmulgee Rivers	216	134
Satilla	South Atlantic Unit 6 (SA6)	Satilla River	Georgia	Confluence of Satilla and Wiggins Creeks (Approximately 31.5041 N, 83.0818 W)	378	235
St. Marys	South Atlantic Unit 7 (SA7)	St. Marys River	Georgia/Florida	Confluence of Middle Prong St. Marys and St. Marys Rivers (Approximately 30.4233 N, 82.2094 W)	203	126

Effects of Critical Habitat Designations

Section 7(a)(2) of the ESA requires Federal agencies, including NMFS, to insure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify designated critical habitat. Federal agencies are also required to confer with NMFS regarding any actions likely to jeopardize a species proposed for listing under the ESA, or likely to destroy or adversely modify proposed critical habitat, pursuant to Section 7(a)(4). A conference involves informal discussions in which NMFS may recommend conservation measures to minimize or avoid adverse effects. The discussions and conservation recommendations are to be documented in a conference report provided to the Federal agency. If requested by the Federal agency, a formal conference report may be issued, including a biological opinion prepared according to 50 CFR 402.14. A formal conference report may be adopted as the biological opinion when the species is listed or critical habitat designated, if no significant new information or changes to the action alter the content of the opinion. When a species is listed or critical habitat is designated, Federal agencies must consult with NMFS on any agency actions to be conducted in an area where the species is present and that may affect the species or its critical habitat. During the consultation, NMFS would evaluate the agency action to determine whether the action may adversely affect listed species or critical habitat and issue its findings in a biological opinion. If NMFS concludes in the biological opinion that the agency action would likely result in the destruction or adverse modification of critical habitat, NMFS would also recommend any reasonable and prudent alternatives to the action. Reasonable and prudent alternatives are defined in 50 CFR 402.02 as alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that would avoid the destruction or adverse modification of critical habitat. Regulations at 50 CFR 402.16 require federal agencies that have retained discretionary involvement or control over an action, or where such discretionary involvement or control is authorized by law, to reinitiate consultation on previously reviewed actions in instances where: (1) Critical habitat is subsequently designated; or (2) new information or changes to the action may result in effects to critical habitat not previously considered in the biological opinion. Consequently, some Federal agencies may request reinitiation of consultation or conference with NMFS on actions for which formal consultation has been completed, if those actions may affect designated critical habitat or adversely modify or destroy proposed critical habitat. Activities subject to the ESA Section 7 consultation process include activities on Federal lands and activities on private or state lands requiring a permit from a Federal agency or some other Federal action, including funding. In the marine and aquatic environments, activities subject to the ESA Section 7 consultation process include activities in Federal waters and in state waters that: (1) Have the potential to affect listed species or critical habitat; and (2) are carried out by a Federal agency, need a permit or license from a Federal agency, or receive funding from a Federal agency. ESA Section 7 consultation would not be required for Federal actions that do not affect listed species or critical habitat and for actions that are not Federally funded, authorized, or carried out.

Activities That May be Affected

Section 4(b)(8) of the ESA requires that we describe briefly and evaluate in any proposed or final regulation to designate critical habitat, those activities that may adversely modify such habitat or that may be affected by such designation. As described in our Draft Impacts Analysis, a wide variety of activities may affect critical habitat and, when carried out, funded, or authorized by a Federal agency, will require an ESA Section 7 consultation because they may affect one or more of the essential features of critical habitat. Such activities include in-water construction for a variety of federal actions, dredging for navigation, harbor expansion or sand and gravel mining, flood control projects, bridge repair and replacement, hydropower licensing, natural gas facility and pipeline construction, ESA research and incidental take permits or fishery research grants, and Clean Water Act TMDL program management. Private entities may also be affected by these proposed critical habitat designations if they are a proponent of a project that requires a Federal permit, Federal funding is received, or the entity is involved in or receives benefits from a Federal project. Future activities will need to be evaluated with respect to their potential to destroy or adversely modify critical habitat. For example, activities may adversely modify the substrate essential feature by removing or altering the substrate. The open passage feature may be adversely modified by the placement of structures such as dams and tidal turbines, research nets, or altering the water depth so that fish cannot swim. The salinity feature may be adversely modified by activities that impact fresh water input such as operation of water control structures and water withdrawals, and impacts to water depth such as dredging. The water quality feature may be adversely modified by land development as well as commercial and recreational activities on rivers that contribute to nutrient loading which could result in decreased dissolved oxygen levels and increased water temperature, and increased sediment deposition that reduces Atlantic sturgeon egg adherence on hard spawning substrate and reduces the interstitial spaces used by larvae for refuge from predators. Dredging to remove sediment build-up or to facilitate vessel traffic may remove or alter hard substrate that is necessary for egg adherence and as refuge for larvae, and may change the water depth resulting in shifts in the salt wedge within the estuary or change other characteristics of the water quality (*e.g.,* temperature, dissolved oxygen) necessary for the developing eggs, larvae, and juveniles. These activities would require ESA Section 7 consultation when they are implemented, funded, or carried out by a federal agency.

Questions regarding whether specific activities will constitute destruction or adverse modification of critical habitat should be directed to us (see **ADDRESSES** and **FOR FURTHER INFORMATION CONTACT**).

Public Comments Solicited

We request that interested persons submit comments, information, and suggestions concerning this proposed rule during the comment period (see **DATES**). We are soliciting comments or suggestions from the public, other concerned governments and agencies, the scientific community, industry, or any other interested party concerning this proposed rule, including any foreseeable economic, national security, or other relevant impact resulting from the proposed designations. You may submit your comments and materials concerning this proposal by any one of several methods (see **ADDRESSES**). Copies of the proposed rule and supporting documentation can be found on the NMFS Southeast Region Web site

at *http://sero.nmfs.noaa.gov/*. We will consider all comments pertaining to this designation received during the comment period in preparing the final rule. Accordingly, the final designation may differ from this proposal.

Information Quality Act and Peer Review

The data and analyses supporting this proposed action have undergone a pre-dissemination review and have been determined to be in compliance with applicable information quality guidelines implementing the Information Quality Act (Section 515 of Public Law 106–554). On July 1, 1994, a joint USFWS/NMFS policy for peer review was issued stating that the Services would solicit independent peer review to ensure the best biological and commercial data is used in the development of rulemaking actions and draft recovery plans under the ESA (59 FR 34270). In addition, on December 16, 2004, the Office of Management and Budget (OMB) issued its Final Information Quality Bulletin for Peer Review (Bulletin). The Bulletin was published in the **Federal Register** on January 14, 2005 (70 FR 2664), and went into effect on June 16, 2005. The primary purpose of the Bulletin is to improve the quality and credibility of scientific information disseminated by the Federal government by requiring peer review of 'influential scientific information'' and ''highly influential scientific information'' prior to public dissemination. ''Influential scientific information'' is defined as ''information the agency reasonably can determine will have or does have a clear and substantial impact on important public policies or private sector decisions.'' The Bulletin provides agencies broad discretion in determining the appropriate process and level of peer review. Stricter standards were established for the peer review of ''highly influential scientific assessments,'' defined as information whose ''dissemination could have a potential impact of more than $500 million in any one year on either the public or private sector or that the dissemination is novel, controversial, or precedent-setting, or has significant interagency interest.''

The information in the Draft Impacts Analysis Report supporting this proposed critical habitat rule is considered influential scientific information and subject to peer review. To satisfy our requirements under the OMB Bulletin, we obtained independent peer review of the information used to draft this document, and incorporated the peer review comments into this draft prior to dissemination of this proposed rulemaking. For this action, compliance with the OMB Peer Review Bulletin satisfies any peer review requirements under the 1994 joint peer review policy. Comments received from peer reviewers are available on our Web site at *http://sero.nmfs.noaa.gov/protected_resources/sturgeon/index.html.*

Classification

Takings (Executive Order 12630)

Under E.O. 12630, Federal agencies must consider the effects of their actions on constitutionally protected private property rights and avoid unnecessary takings of property. A taking of property includes actions that result in physical invasion or occupancy of private property, and regulations imposed on private property that substantially affect its value or use. In accordance with E.O. 12630, this proposed rule would not have significant takings implications. A takings implication assessment is not required.

Regulatory Planning and Review (Executive Order 12866)

This proposed rule has been determined to be significant for purposes of E.O. 12866 because it may create a serious inconsistency or otherwise interfere with an action taken or planned by another agency. A draft economic impacts report has been prepared to support an impacts analysis under section 4(b)(2) of the ESA.

Federalism (Executive Order 13132)

Pursuant to the Executive Order on Federalism, E.O. 13132, we determined that this proposed rule does not have significant Federalism effects and that a Federalism assessment is not required. However, in keeping with Department of Commerce policies and consistent with ESA regulations at 50 CFR 424.16(c)(1)(ii), we will request information for this proposed rule from state resource agencies in North Carolina, South Carolina, Georgia, and Florida. The proposed designations may have some benefit to state and local resource agencies in that the proposed rule more clearly defines the physical and biological features essential to the conservation of the species and the areas on which those features are found.

Energy Supply, Distribution, and Use (Executive Order 13211)

Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking an action expected to lead to the promulgation of a final rule or regulation that is a significant regulatory action under E.O. 12866 and is likely to have a significant adverse effect on the supply, distribution, or use of energy. OMB Guidance on Implementing E.O. 13211 (July 13, 2001) states that significant adverse effects could include any of the following outcomes compared to a world without the regulatory action under consideration: (1) Reductions in crude oil supply in excess of 10,000 barrels per day; (2) reductions in fuel production in excess of 4,000 barrels per day; (3) reductions in coal production in excess of 5 million tons per year; (4) reductions in natural gas production in excess of 25 million cubic feet per year; (5) reductions in electricity production in excess of 1 billion kilowatt-hours per year or in excess of 500 megawatts of installed capacity; (6) increases in energy use required by the regulatory action that exceed any of the thresholds above; (7) increases in the cost of energy production in excess of one percent; (8) increases in the cost of energy distribution in excess of one percent; or (9) other similarly adverse outcomes. A regulatory action could also have significant adverse effects if it: (1) Adversely affects in a material way the productivity, competition, or prices in the energy sector; (2) adversely affects in a material way productivity, competition or prices within a region; (3) creates a serious inconsistency or otherwise interferes with an action taken or planned by another agency regarding energy; or (4) raises novel legal or policy issues adversely affecting the supply, distribution or use of energy arising out of legal mandates, the President's priorities, or the principles set forth in E.O. 12866 and 13211.

This rule, if finalized, will not have a significant adverse effect on the supply, distribution, or use of energy. Therefore, we have not prepared a Statement of Energy Effects.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

We prepared an initial regulatory flexibility analysis (IRFA) pursuant to section 603 of the Regulatory Flexibility Act (RFA) (5 U.S.C. 601, *et seq.*). The IRFA analyzes the impacts to those areas where critical habitat is proposed and is included as Appendix A of the Draft Impacts Analysis Report and is available upon request (see **ADDRESSES** section). The IRFA is summarized below, as required by section 603 of the RFA. The IRFA describes the economic impact this proposed rule, if adopted, would have on small entities.

As discussed previously and in our IRFA, the designation of critical habitat is required under the ESA, and in this particular case, is also required

pursuant to a court-ordered settlement agreement. The purpose of the critical habitat designation, as required by the ESA, is to designate, to the maximum extent prudent and determinable, the specific areas that contain the physical or biological features essential to the conservation of the species and that may require special management considerations or protections. The proposed critical habitat rule does not directly apply to any particular entity, small or large. The rule would operate in conjunction with ESA Section 7(a)(2), which requires that federal agencies insure, in consultation with NMFS, that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. Consultations may result in economic impacts to federal agencies and proponents of proposed actions (*e.g.,* permittees, applicants, grantees). Those economic impacts may be in the form of administrative costs of participating in a Section 7 consultation and, if the consultation results in required measures to protect critical habitat, project modification costs.

We evaluated whether predicted future federal actions would affect Atlantic sturgeon, the essential features of the proposed critical habitat, or both, or whether there were other identifiable baseline impacts that might be coextensive with impacts to habitat features, such as impacts to shortnose sturgeon. If a proposed action affects only listed sturgeon or affects both listed sturgeon and essential features, the administrative and project modification costs are not necessarily attributable solely to critical habitat designation. In these circumstances, the added administrative costs associated with addressing critical habitat in a consultation were considered incremental impacts of the proposed designation. There could also be incremental project modification costs for consultations with coextensive impacts, if an action is considered likely to require unique project modifications to specifically address impacts to the features. If a proposed action would only affect the essential features, the administrative and project modification costs would be attributable to the critical habitat designation and thus treated as incremental impacts of the designation.

For most, if not all, of the federal activities predicted to occur in the next 10 years, if the effects to critical habitat will be adverse and require formal consultation, those effects would also constitute adverse effects to Atlantic sturgeon or shortnose sturgeon, either directly when they are in the project area, or indirectly due to the effects on their habitat. Thus, as discussed previously, projects that adversely affect the proposed essential features are likely to always also adversely affect the species and the project impacts would not be incremental. Therefore, the only costs of this class of actions that are attributable to this rule are the administrative costs of adding critical habitat analyses to a consultation that would occur anyway, due to impacts to sturgeon species.

For some of the predicted future federal activities, it may be feasible to conduct the action when sturgeon are out of the action area. If effects to critical habitat are temporary such that the essential features return to their pre-project condition by the time the sturgeon return and need to use the features, there might not be any adverse effects to either the species or the critical habitat. In these circumstances, consultations would be fully incremental consultations only on critical habitat, and the consultations would be informal. This would likely only apply to actions that affect just spawning habitat in the upper parts of the rivers, as sturgeon of various ages are present year-round in the lower reaches of the rivers and the estuaries. Because the costs of fully incremental informal consultations are higher than the marginal costs of adding critical habitat analyses to coextensive formal consultations, we conservatively assumed future actions will be incremental informal consultations, where applicable. Thus, the costs of these future activities that are attributable to the rule would consist of the full costs of informal consultation, to NMFS, to the action agency, and to any third party proponent of the action (*e.g.,* applicant, permittee).

Ten different federal entities implemented or approved 14 different categories of activities in the areas covered by the proposed critical habitat units that required consultations in the past. All categories of activities implemented by these federal entities were identified as having the potential to affect the essential features. The total number of projected consultations over 10 years is indicated in parentheses below.

1. USACE—Navigation maintenance dredging, harbor expansion (14)
2. USACE—WRDA flood control, ecosystem restoration studies (6)
3. USACE—WRDA dam operations, repair, fishway construction (3)
4. USACE—Section 404/RHA section 10 permitting—dredge, fill, construction (20)
5. FHWA—Bridge repair, replacement (67)
6. USCG—Bridge repair, replacement permitting (3)
7. FERC—Hydropower licensing (5)
8. FERC—LNG facilities, pipelines authorization (5)
9. NRC—Nuclear power plant construction/operation licensing (8)
10. NMFS—ESA research or incidental take permitting (section 10) (46)
11. USFWS—Fishery management grants (11)
12. EPA—Nationwide pesticide authorizations (9)
13. FEMA—Disaster assistance/preparation grants (5)
14. DOE—Nuclear fuel management (3)

We predict that a total of 205 federal actions will require consultation due to impacts to critical habitat over the next 10 years; of these, we project that 179 actions could involve third parties that might be small entities. One hundred fifty-six projected future federal actions that could involve third parties will consist of coextensive formal consultations considering impacts to both sturgeon and critical habitat. The administrative costs of consultation to third parties per consultation from these actions will either be $880 or $2,080, depending upon whether they bear the costs of completing a biological assessment. The 23 projected future actions that would be fully incremental and that could involve third parties would result in either $1,500 or $3,000 in costs to such third parties per consultation, depending upon whether they bear the costs of completing a biological assessment. Given the EPA consultations will be national in scope and involve all of NMFS's listed species and designated critical habitats, costs to third parties involved in the these consultations that are attributable to this rulemaking are conservatively estimated to be $25,072 for all units over 10 years.

Businesses in North American Industry Classification System (NAICS) Subsector 325320, Pesticide and Other Agricultural Chemical Manufacturing, could be involved in the 5 nationwide EPA pesticide authorization consultations. A small business in this Subsector is defined by the SBA as having 1,000 employees (*https://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf).*

Businesses in North American Industry Classification System (NAICS) Sector 22 (Utilities) could be involved in 18 actions projected to occur in federal action categories 7–9. For hydropower power generation and natural gas distribution enterprises, a small business is defined by the SBA as

one having a total of 500 employees. For nuclear power generation, a small business is defined by the SBA as one having a total of 750 employees. Businesses in NAICS Sector 54 could be involved as contractors assisting with the ESA consultation in any of the 179 projected future federal actions that could involve third parties. Relevant subsectors could include 541370, Surveying and Mapping, 541620, Environmental Consulting Services, or 541690, Other Scientific and Technical Consulting Services. A small business in any of these subsectors is defined by the SBA as one having average annual receipts of $15 million.

Businesses in NAICS Sector 23, Construction, could be involved in a number of categories of projected future actions, where they could incur administrative costs of construction. Businesses in subsector 237120, Oil and Gas Pipeline and Related Structures Construction, could be involved in the 3 FERC LNG pipeline consultations. A small business in this subsector has average annual receipts of $36.5 million. Businesses in subsector 237310, Highway, Street, and Bridge Construction, could be involved in the 70 FHWA and USCG bridge repair, replacement consultations. A small business in this subsector has average annual receipts of $36.5 million.

Businesses in subsector 238, Other Specialty Trade Contractors, could be involved as construction contractors in the 20 future USACE section 404/RHA permitting actions and the 5 FEMA disaster assistance actions. Small businesses in this subsector have average annual receipts of $15 million.

Cities could be involved in many of the 70 FHWA and USCG bridge repair, replacement projects, and some proportion of the 20 USACE section 404/RHA permitting actions. The SBA defines a small governmental jurisdiction as cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000.

Our consultation database does not track the identity of past third parties involved in consultations, or whether the third parties were small entities; therefore we have no basis to determine the percentage of the 179 third parties that may potentially be involved in future consultations due to impacts to proposed critical habitat that may be small businesses, small nonprofits, or small government jurisdictions.

There is no indication in the data evaluated in the Draft Impacts Analysis Report, which serves as the basis for this IRFA, that the designation would place small entities at a competitive disadvantage compared to large entities. Incremental economic impacts due to the designation proposed for the Carolina and South Atlantic DPSs will be minimal overall. These costs will result from participation in the Section 7 consultation process, and will be spread over 14 river systems totaling over 3,300 river miles in 4 states. Federal agencies will bear the majority of the costs (59% to 83%), which will be limited to administrative costs of consultation for all parties involved. There are no apparent concentrations of costs. Assuming a third party would be involved and incur costs for each of the 179 projects in all of the categories of federal activity that involved third parties in the past, the costs to third parties that could be involved in the projected future consultations, other than the EPA consultations, would be between $880 and $2,080 for each action for coextensive formal consultations, and between $1,500 and $3,000 for each fully incremental informal consultation. The total costs over the next 10 years to all third parties for these 2 classes of actions would be between $30,000 and $60,000 for the incremental informal consultations and between $136,400 and $322,400 for the coextensive consultations. The total costs over the next 10 years to third parties involved in the EPA consultations are conservatively estimated to be $25,072 across all units.

Even though we cannot determine relative numbers of small and large entities that may be affected by the designation of critical habitat, there is no indication that affected project applicants would be limited to, nor disproportionately comprised of, small entities. It is unclear whether small entities would be placed at a competitive disadvantage compared to large entities. However, as described in the Draft Impacts Analysis Report, consultations and project modifications will be required based on the type of permitted action and its associated impacts on the essential critical habitat features.

It is unlikely that the proposed rule will significantly reduce profits or revenue for small businesses, if they are involved in future consultations required by this rulemaking, given costs will be limited to administrative costs of participating in the consultation process and the maximum cost of a single consultation to a third party is projected to be $3,000.

We encourage all small businesses, small nonprofits and small governmental jurisdictions that may be affected by this rule to provide comment on the potential economic impacts of the proposed designation, to improve the above analysis.

There are no record-keeping or reporting requirements associated with the proposed rule. Similarly, there are no other compliance requirements in the rule. There are no professional skills necessary for preparation of any report or record, although consultants are frequently involved on behalf of project proponents, for example in preparing biological assessments of the impacts of a proposed action on listed species and critical habitat. Federal laws and regulations that directly and indirectly protect the Carolina and South Atlantic DPSs of Atlantic sturgeon are listed and discussed in the Draft Impacts Analysis Report. No federal laws or regulations duplicate or conflict with the proposed rule. Existing federal laws and regulations overlap with the proposed rule only to the extent that they provide protection to marine natural resources. However, no existing laws or regulations specifically address negative impacts to, or require the avoidance of the destruction or adverse modification of, the essential features of critical habitat for the Carolina and South Atlantic DPSs of Atlantic sturgeon.

We considered a no action (status quo) alternative to the proposed designation under which NMFS would not propose critical habitat for the Carolina and South Atlantic DPSs of Atlantic sturgeon. Under this alternative, conservation and recovery of the listed species would depend upon the protection provided under the ''jeopardy'' provisions of Section 7 of the ESA. Compared to the status quo, there would be no increase in the number of ESA consultations or project modifications in the future that would not otherwise be required due to the listing of the Carolina and South Atlantic DPSs of Atlantic sturgeon. However, we have determined that the physical features forming the basis for our proposed critical habitat designation are essential to the conservation of the Carolina and South Atlantic DPSs of Atlantic sturgeon. Thus, the lack of protection of the essential features from adverse modification and/or destruction could result in decline in abundance of the Carolina and South Atlantic DPSs of Atlantic sturgeon, and loss of associated economic and other values this species provides to society. Thus, the no action alternative is not necessarily a ''no cost'' alternative for small entities.

We also considered an alternative of including all large coastal rivers from the North Carolina/Virginia border southward to the St Johns River, Florida, in the designation. Several large coastal rivers within the geographic area

occupied by the Carolina and South Atlantic DPSs of Atlantic sturgeon do not appear to support spawning and juvenile recruitment or to contain suitable habitat features to support spawning. These rivers are the Chowan and New Rivers in North Carolina; the Waccamaw (above its confluence with Bull Creek which links it to the Pee Dee River), Sampit, Ashley, Ashepoo, and Broad-Coosawhatchie Rivers in South Carolina; and the St. Johns River, Florida. We have no information, current or historic, of Atlantic sturgeon utilizing the Chowan and New Rivers in North Carolina. Recent telemetry work by Post *et al.* (2014) indicates that Atlantic sturgeon do not utilize the Sampit, Ashley, Ashepoo, and Broad-Coosawhatchie Rivers in South Carolina. These rivers are short, coastal plains rivers that most likely do not contain suitable habitat for Atlantic sturgeon. Post *et al.* (2014) also found Atlantic sturgeon only utilized the portion of the Waccamaw River downstream of Bull Creek. Due to man-made structures and alterations, spawning areas in the St. Johns are not accessible and therefore do not support a reproducing population. For these reasons, we are not designating these coastal rivers, or portions of the rivers, as critical habitat.

Coastal Zone Management Act

We have determined that this action will have no reasonably foreseeable effects on the enforceable policies of approved Coastal Zone Management Programs of North Carolina, South Carolina, Georgia and Florida. Upon publication of this proposed rule, these determinations will be submitted for review by the responsible state agencies under section 307 of the Coastal Zone Management Act.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This proposed rule does not contain any new or revised collection of information. This rule, if adopted, would not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

This proposed rule will not produce a Federal mandate. The designation of critical habitat does not impose a legally-binding duty on non-Federal government entities or private parties. The only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under Section 7 of the ESA. Non-Federal entities which receive Federal funding, assistance, permits or otherwise require approval or authorization from a Federal agency for an action may be indirectly impacted by the designation of critical habitat, but the Federal agency has the legally binding duty to avoid destruction or adverse modification of critical habitat.

We do not anticipate that this rule, if finalized, will significantly or uniquely affect small governments. Therefore, a Small Government Action Plan is not required.

Consultation and Coordination With Indian Tribal Governments (Executive Order 13175)

The longstanding and distinctive relationship between the Federal and tribal governments is defined by treaties, statutes, executive orders, judicial decisions, and agreements, which differentiate tribal governments from the other entities that deal with, or are affected by, the Federal Government.

Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, outlines the responsibilities of the Federal Government in matters affecting tribal interests. If NMFS issues a regulation with tribal implications (defined as having a substantial direct effect on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes) we must consult with those governments or the Federal Government must provide funds necessary to pay direct compliance costs incurred by tribal governments. The proposed critical habitat designations for the Carolina and South Atlantic DPSs do not have tribal implications.

References Cited

A complete list of all references cited in this rulemaking can be found on our Web site at *http://sero.nmfs.noaa.gov/protected_resources/sturgeon/index.html* and is available upon request from the NMFS Southeast Region Fisheries Office in St. Petersburg, Florida (see **ADDRESSES**).

List of Subjects in 50 CFR part 226

Endangered and threatened species.

Dated: May 24, 2016.

Samuel D Rauch, III

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

For the reasons set out in the preamble, we propose to amend 50 CFR part 226 as follows:

PART 226—DESIGNATED CRITICAL HABITAT

■ 1. The authority citation for part 226 continues to read as follows:

Authority: 16 U.S.C. 1533.

■ 2. Add § 226.226 to read as follows:

§ 226.226 Critical habitat for the Carolina and South Atlantic distinct population Segments of Atlantic sturgeon.

Critical habitat is designated for the Carolina and South Atlantic DPSs of Atlantic sturgeon as described in paragraphs (a) through (b) of this section. The textual descriptions in paragraphs (c) through (d) of this section are the definitive source for determining the critical habitat boundaries.

(a) The physical features essential for the conservation of Atlantic sturgeon belonging to the Carolina and South Atlantic Distinct Population Segments are those habitat components that support successful reproduction and recruitment. These are:

(1) Suitable hard bottom substrate (*e.g.,* rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (*i.e.,* 0.0–0.5 parts per thousand range) for settlement of fertilized eggs and refuge, growth, and development of early life stages;

(2) Transitional salinity zones inclusive of waters with a gradual downstream gradient of 0.5–30 parts per thousand and soft substrate (*e.g.,* sand, mud) downstream of spawning sites for juvenile foraging and physiological development;

(3) Water of appropriate depth and absent physical barriers to passage (*e.g.,* locks, dams, reservoirs, gear, etc.) between the river mouth and spawning sites necessary to support:

(i) Unimpeded movement of adults to and from spawning sites;

(ii) Seasonal and physiologically dependent movement of juvenile Atlantic sturgeon to appropriate salinity zones within the river estuary; and

(iii) Staging, resting, or holding of subadults or spawning condition adults. Water depths in main river channels must also be deep enough (at least 1.2 m) to ensure continuous flow in the main channel at all times when any sturgeon life stage would be in the river;

(4) Water quality conditions, especially in the bottom meter of the water column, with temperature and oxygen values that support:

(i) Spawning;

(ii) Annual and inter-annual adult, subadult, larval, and juvenile survival; and

(iii) Larval, juvenile, and subadult growth, development, and recruitment.

Appropriate temperature and oxygen values will vary interdependently, and depending on salinity in a particular habitat. For example, 6 mg/L dissolved oxygen (D.O.) for juvenile rearing habitat is considered optimal, whereas D.O. less than 5.0 mg/L for longer than 30 days is considered suboptimal when water temperature is greater than 25°C. In temperatures greater than 26°C, D.O. greater than 4.3 mg/L is needed to protect survival and growth. Temperatures of 13° C to 26° C for spawning habitat are considered optimal

(b) Critical habitat is designated for the following DPSs in the following states and counties:

DPS	State—Counties
Carolina	NC—Anson, Bertie, Beaufort, Bladen, Brunswick, Carteret, Craven, Columbus, Duplin, Edgecombe, Halifax, Hyde, Johnston, Lenoir, Martin, Nash, New Hanover, Northampton, Pamlico, Pender, Pitt, Richmond, Wake, Washington, and Wayne SC—Berkeley, Calhoun, Charleston, Chesterfield, Clarendon, Darlington, Dillon, Fairfield, Florence, Kershaw, Georgetown, Horry, Lee, Lexington, Marion, Marlboro, Newberry, Orangeburg, Richland, Sumter, and Williamsburg
South Atlantic	SC—Aiken, Allendale, Bamberg, Barnwell, Beaufort, Charleston, Colleton, Dorchester, Edgefield, Hampton, Jasper, Lexington, and Orangeburg GA—Appling, Atkinson, Baldwin, Ben Hill, Bibb, Bleckley, Brantley, Bryan, Bulloch, Burke, Camden, Charlton, Chatham, Coffee, Columbia, Dodge, Effingham, Emanuel, Glascock, Glynn, Hancock, Houston, Irwin, Jasper, Jeff Davis, Jefferson, Jenkins, Johnson, Jones, Laurens, Long, McIntosh, Montgomery, Pierce, Plaski, Richmond, Screven, Tattnall, Telfair, Toombs, Twiggs, Ware, Washington, Wayne, Wheeler, and Wilkinson FL—Baker and Nassau

(c) *Critical Habitat Boundaries of the Carolina DPS.* The lateral extent for all critical habitat units for the Carolina DPS of Atlantic sturgeon is the ordinary high water mark on each bank of the river and shorelines. Critical habitat for the Carolina DPS of Atlantic sturgeon is:

(1) Carolina Unit 1 includes the Roanoke River main stem from the Roanoke Rapids Dam downstream to RKM 0;

(2) Carolina Unit 2 includes the Tar-Pamlico River main stem from the Rocky Mount Millpond Dam downstream to RKM 0;

(3) Carolina Unit 3 includes the Neuse River main stem from the Milburnie Dam downstream to RKM 0;

(4) Carolina Unit 4 includes the Cape Fear River main stem from Lock and Dam #2 downstream to RKM 0 and the Northeast Cape Fear River from the upstream side of Rones Chapel Road Bridge downstream to the confluence with the Cape Fear River;

(5) Carolina Unit 5 includes the Pee Dee River main stem from Blewett Falls Dam downstream to RKM 0, the Waccamaw River from Bull Creek downstream to RKM 0, and Bull Creek from the Pee Dee River to the confluence with the Waccamaw River;

(6) Carolina Unit 6 includes the Black River main stem from Interstate Highway 20 downstream to RKM 0;

(7) Carolina Unit 7 includes the Santee River main stem from the Wilson Dam downstream to the fork of the North Santee River and South Santee River distributaries, the Rediversion Canal from the St. Stephen Powerhouse downstream to the confluence with the Santee River, the North Santee River from the fork of the Santee River and South Santee River downstream to RKM 0, the South Santee River from the fork of the Santee River and North Santee River downstream to RKM 0, the Tailrace Canal from Pinopolis Dam downstream to the West Branch Cooper River, the West Branch Cooper River from the Tailrace Canal downstream to the confluence with the East Branch Cooper River, and the Cooper River from confluence of the West Branch Cooper River and East Branch Cooper River tributaries downstream to RKM 0;

(8) Carolina Unoccupied Unit 1 includes the Cape Fear River from Huske Lock and Dam (Lock and Dam #3) downstream to Lock and Dam #2; and

(9) Carolina Unoccupied Unit 2 includes the Wateree River from the Wateree Dam downstream to the confluence with the Congaree River, the Broad River from the Parr Shoals Dam downstream to the confluence with the Saluda River, the Congaree River from the confluence of the Saluda River and Broad River downstream to the Santee River, the Santee River from the confluence of the Congaree River and Wateree River downstream to Lake Marion, Lake Marion from the Santee River downstream to the Diversion Canal, the Diversion Canal from Lake Marion downstream to Lake Moultrie, Lake Moultrie from the Diversion Canal downstream to the Pinopolis Dam and the Rediversion Canal, the Rediversion Canal from Lake Moultrie downstream to the St. Stephen Powerhouse.

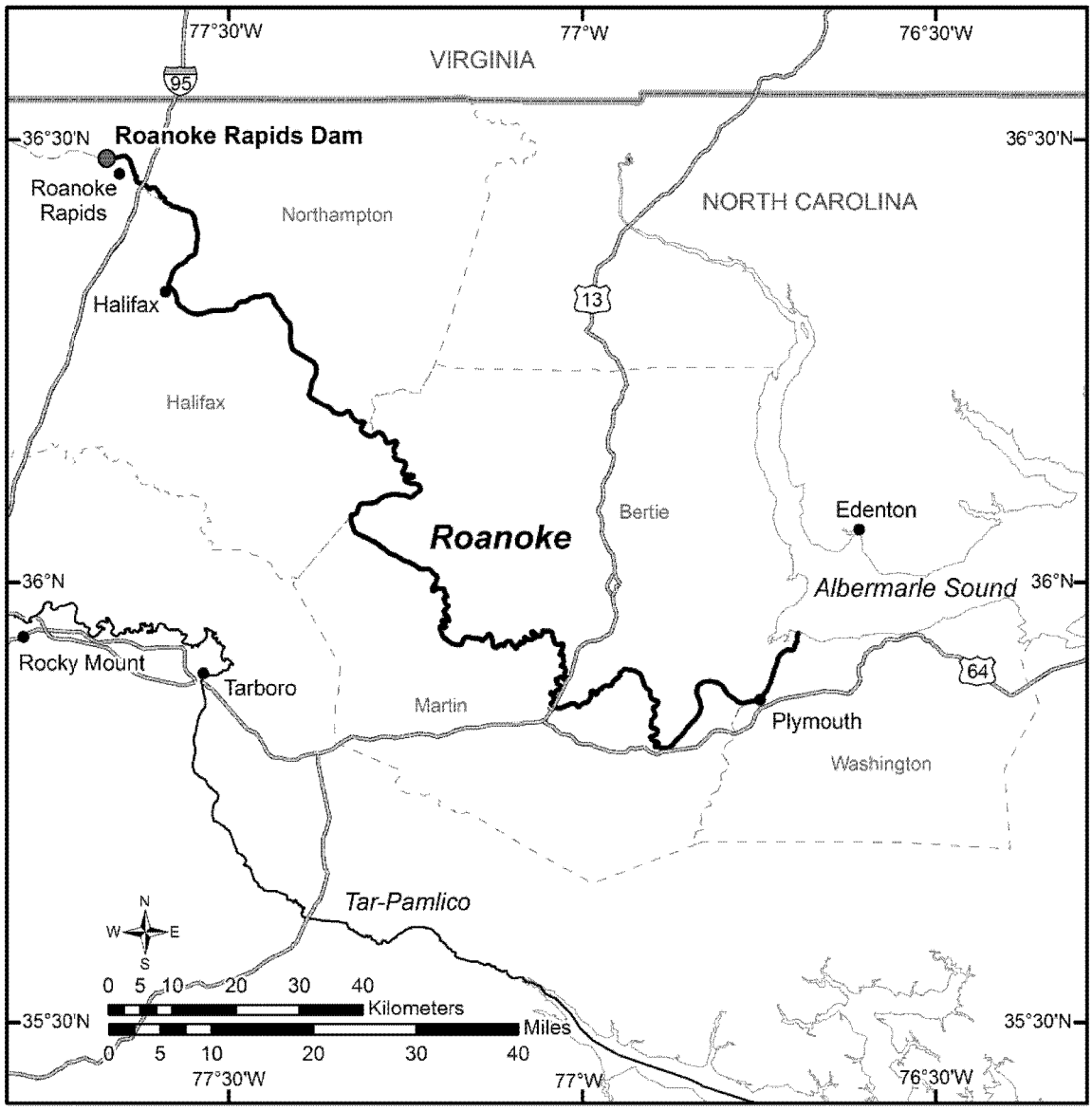
(d) *Areas Not Included in Critical Habitat.* Pursuant to ESA section 3(5)(A)(i), all areas containing existing (already constructed) federally authorized or permitted man-made structures such as aids-to-navigation (ATONs), artificial reefs, boat ramps, docks, pilings, maintained channels, or marinas.

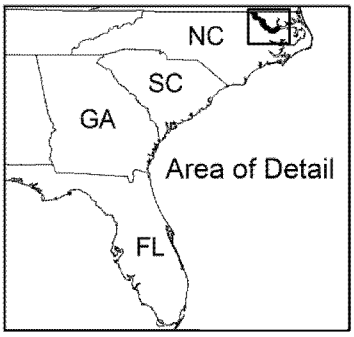
(e) Maps of The Carolina DPS follow:

BILLING CODE 35101–22–P

Carolina Unit 1
Roanoke Unit

Map 1





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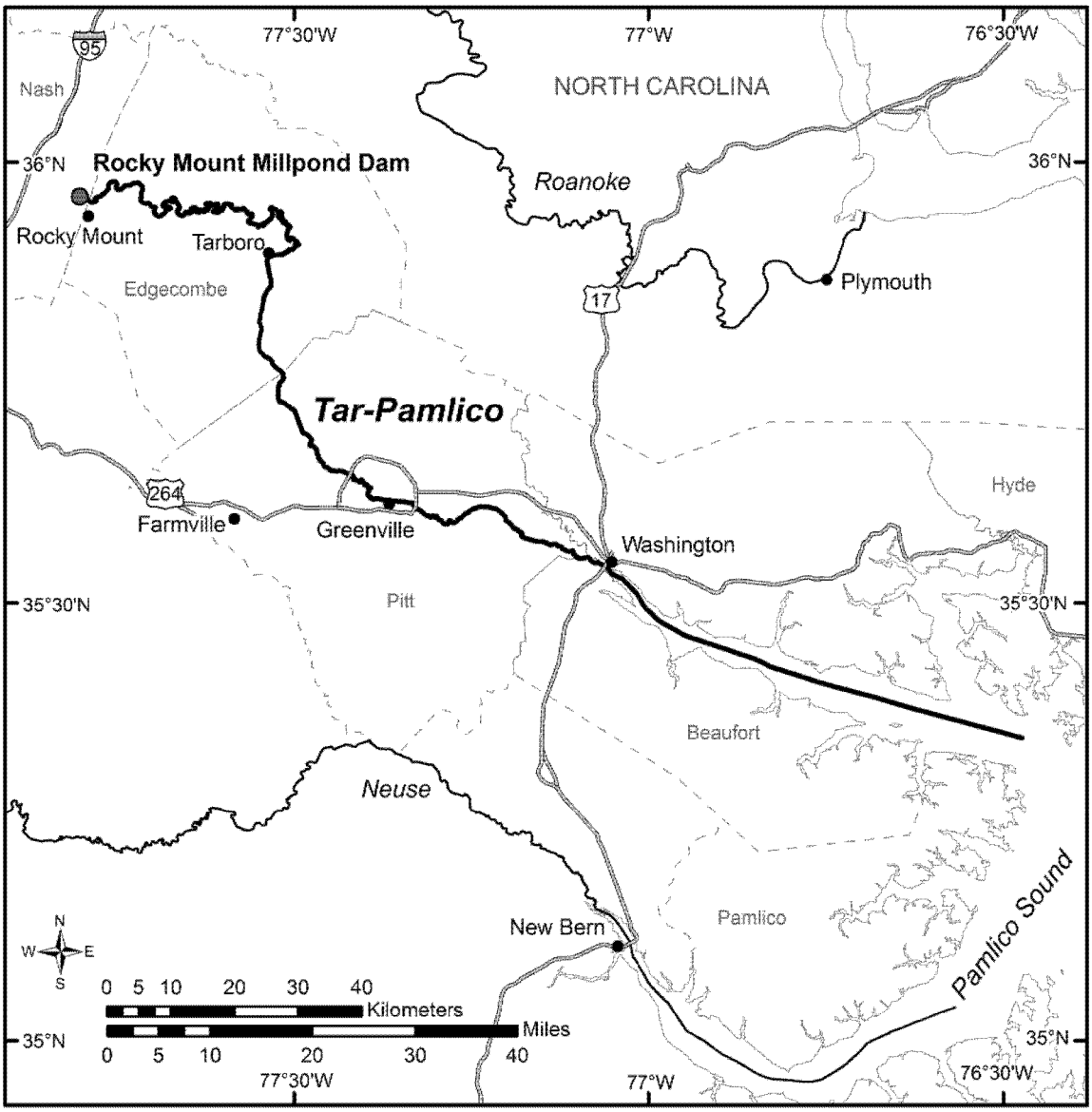
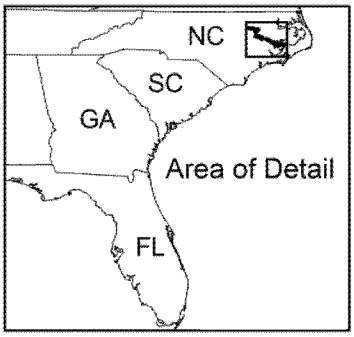
Critical Habitat

This map is provided for illustrative purposes only of Atlantic sturgeon critical habitat. For the precise legal definition of critical habitat, please refer to the narrative description.

Carolina Unit 2
Tar-Pamlico Unit

Map 2





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Critical Habitat

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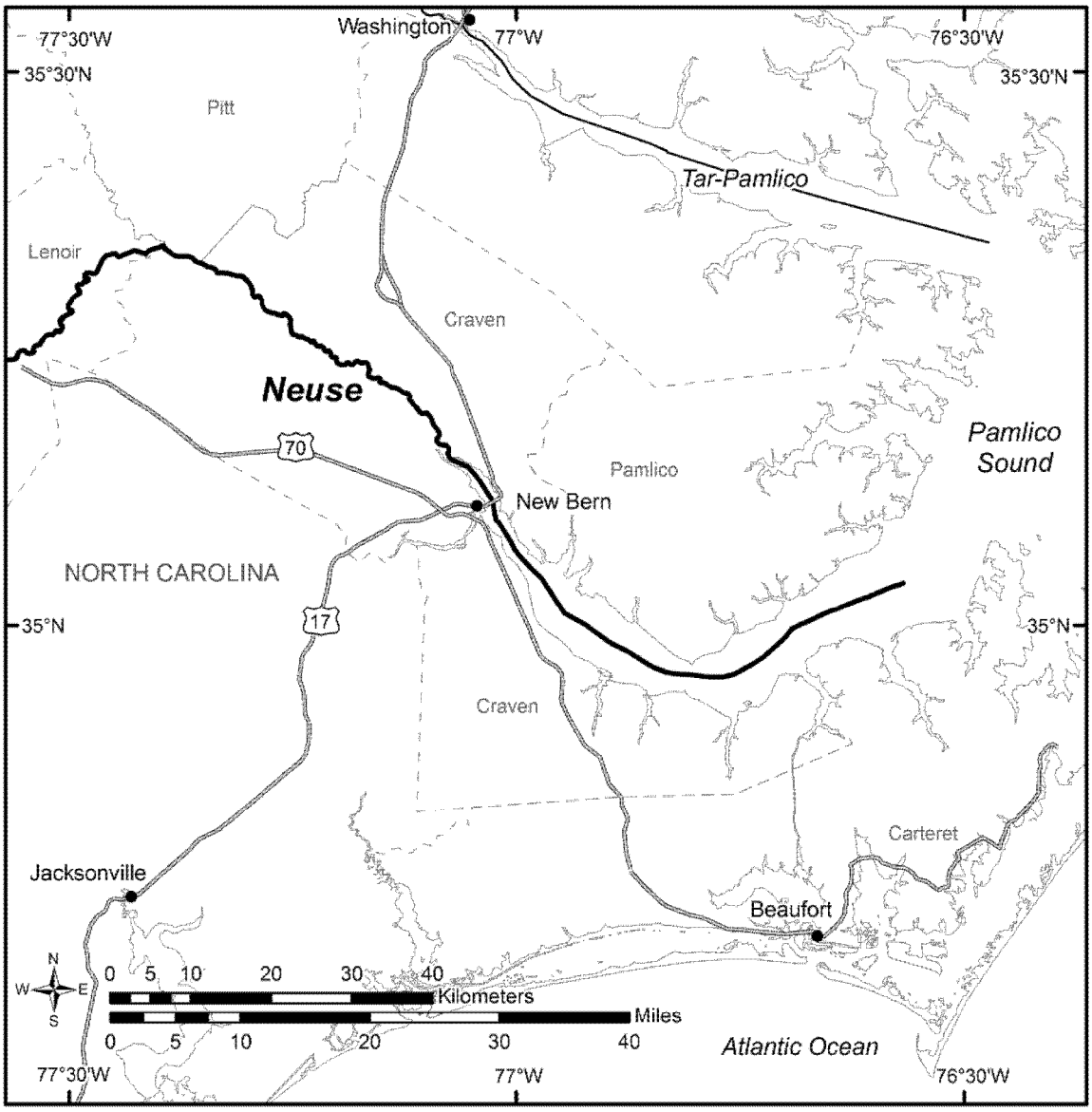
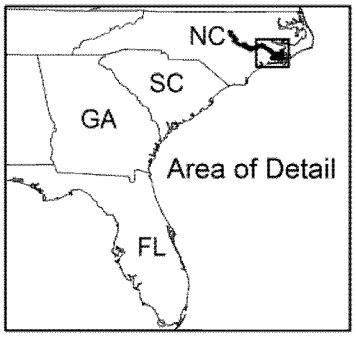
Carolina Unit 3
Neuse Unit

Map 3.1





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Critical Habitat

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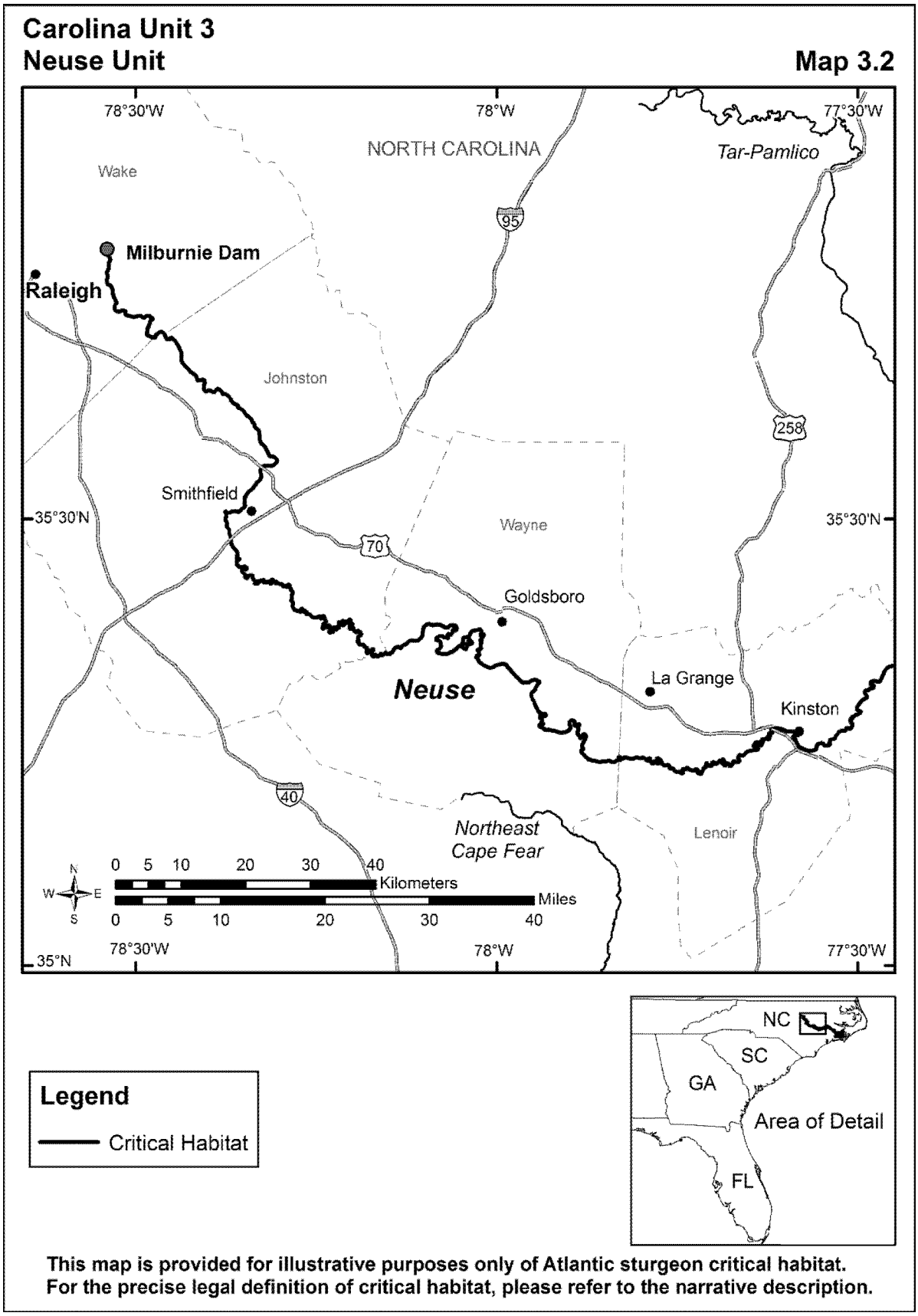
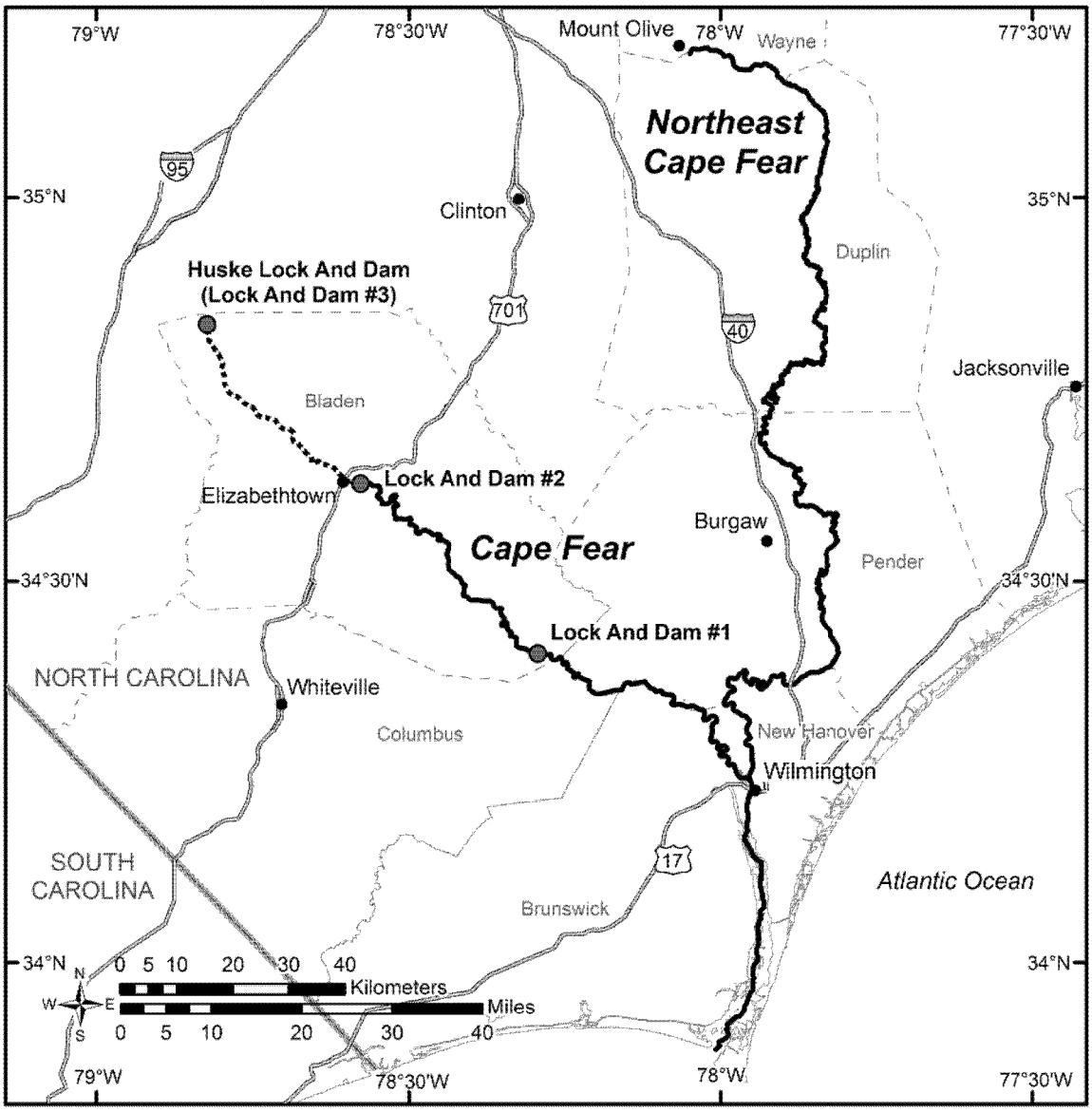
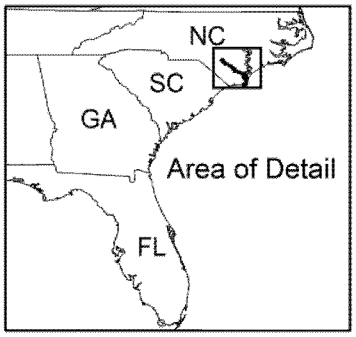

Carolina Unit 3
Neuse Unit
Map 3.2
78°30'W
78°W
77°30'W
NORTH CAROLINA
Tar-Pamlico
Wake
95
Milburnie Dam
Raleigh
Johnston
258
Smithfield
35°30'N
Wayne
70
Goldsboro
Neuse
La Grange
Kinston
40
Northeast
Cape Fear
Lenoir
0 5 10 20 30 40
Kilometers
Miles
N
W
E
S
35°N
NC
SC
GA
Area of Detail
FL
Legend
Critical Habitat
This map is provided for illustrative purposes only of Atlantic sturgeon critical habitat.
For the precise legal definition of critical habitat, please refer to the narrative description.

Carolina Unit 4 and Carolina Unoccupied Unit 1
Cape Fear Unit

Map 4





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Occupied Critical Habitat

Unoccupied Critical Habitat

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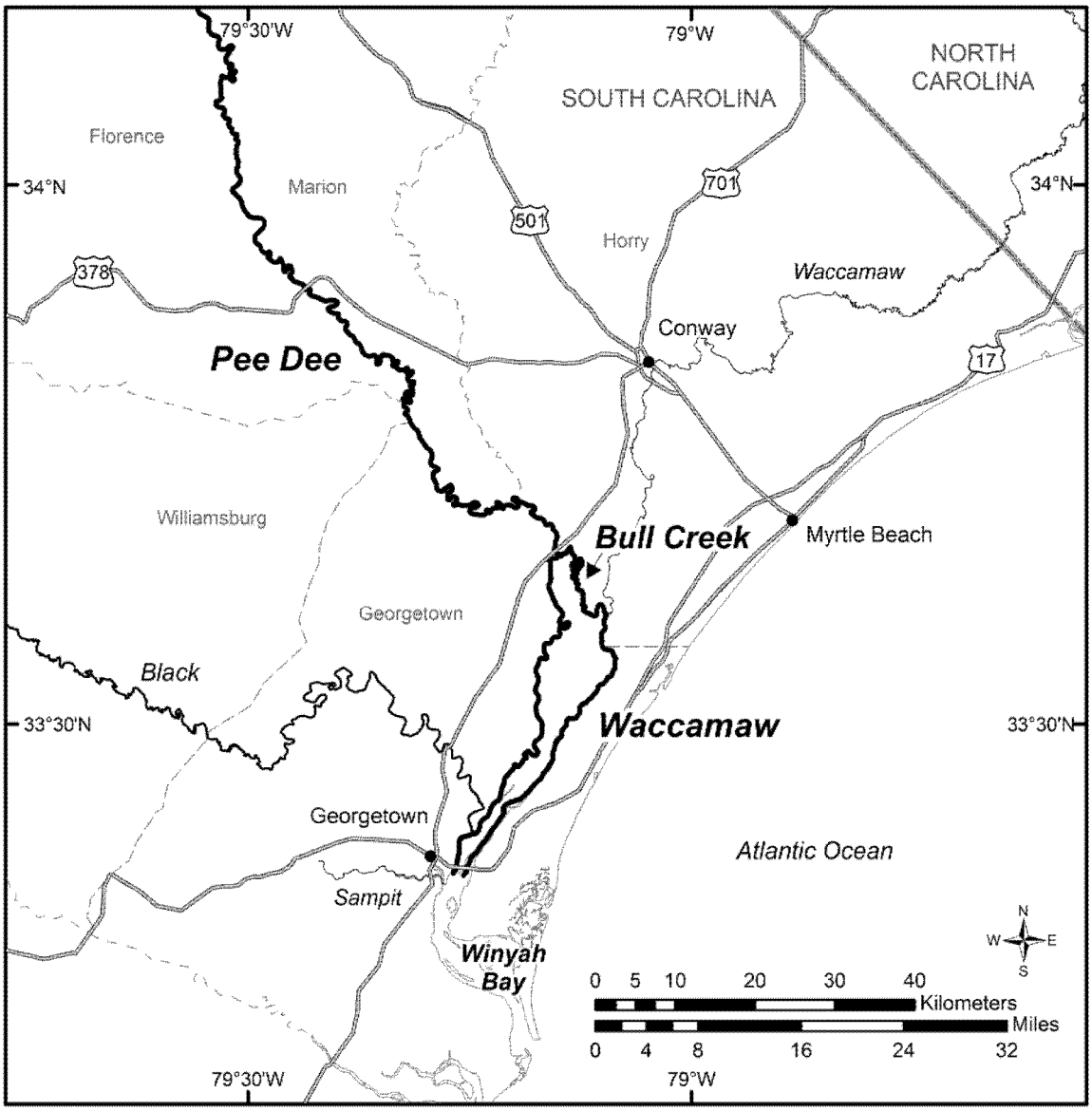
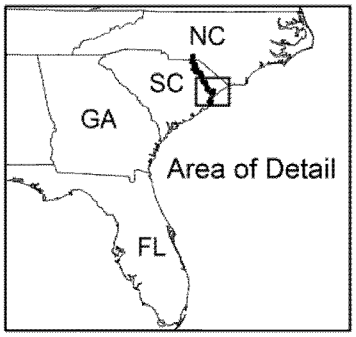
Carolina Unit 5
Pee Dee Unit

Map 5.1





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Critical Habitat

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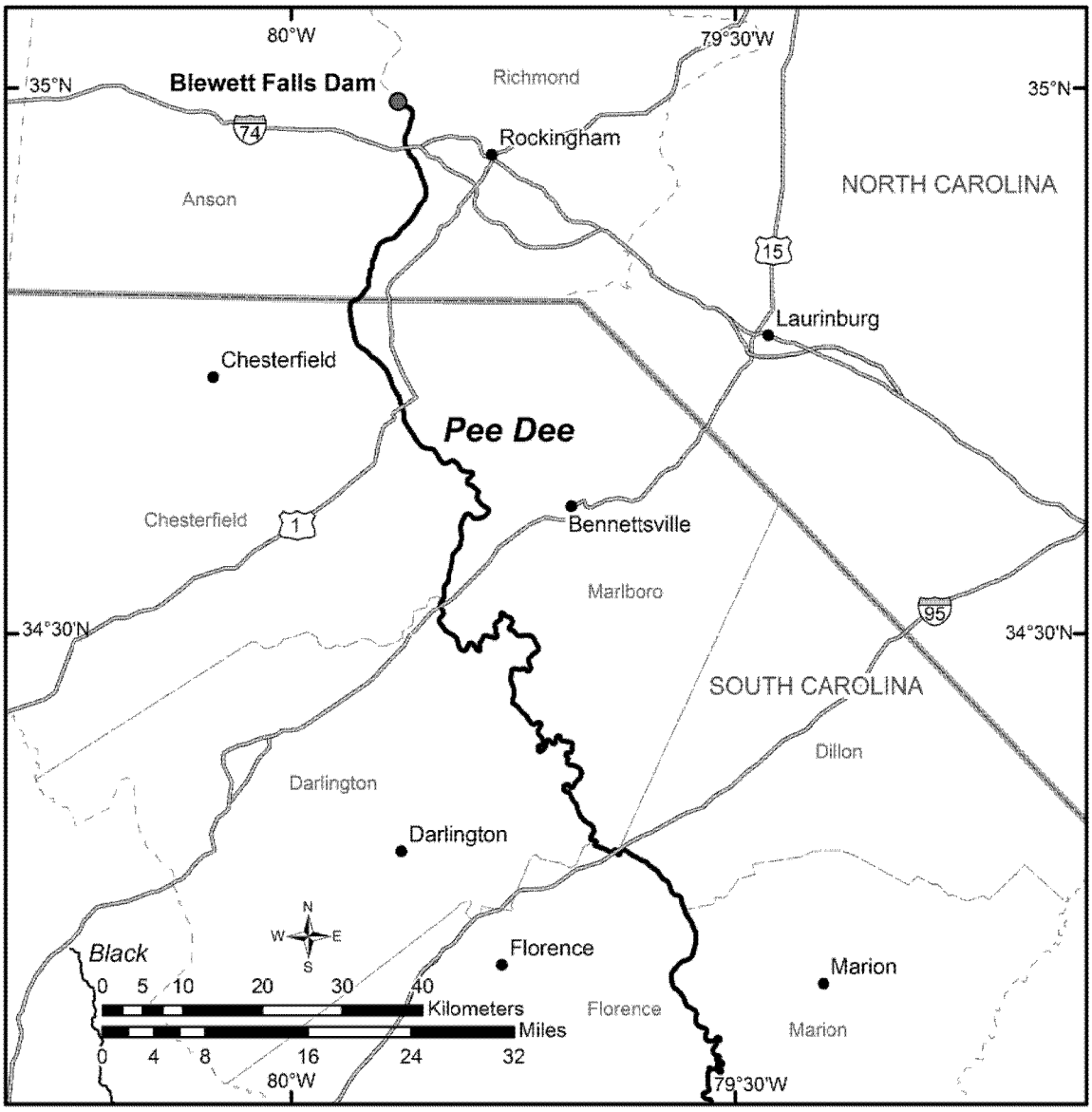
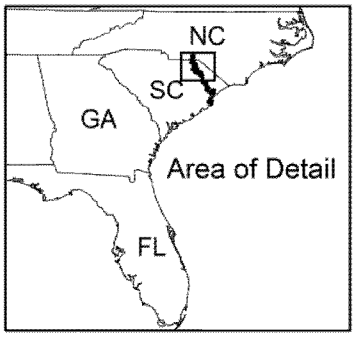
Carolina Unit 5
Pee Dee Unit

Map 5.2





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Critical Habitat

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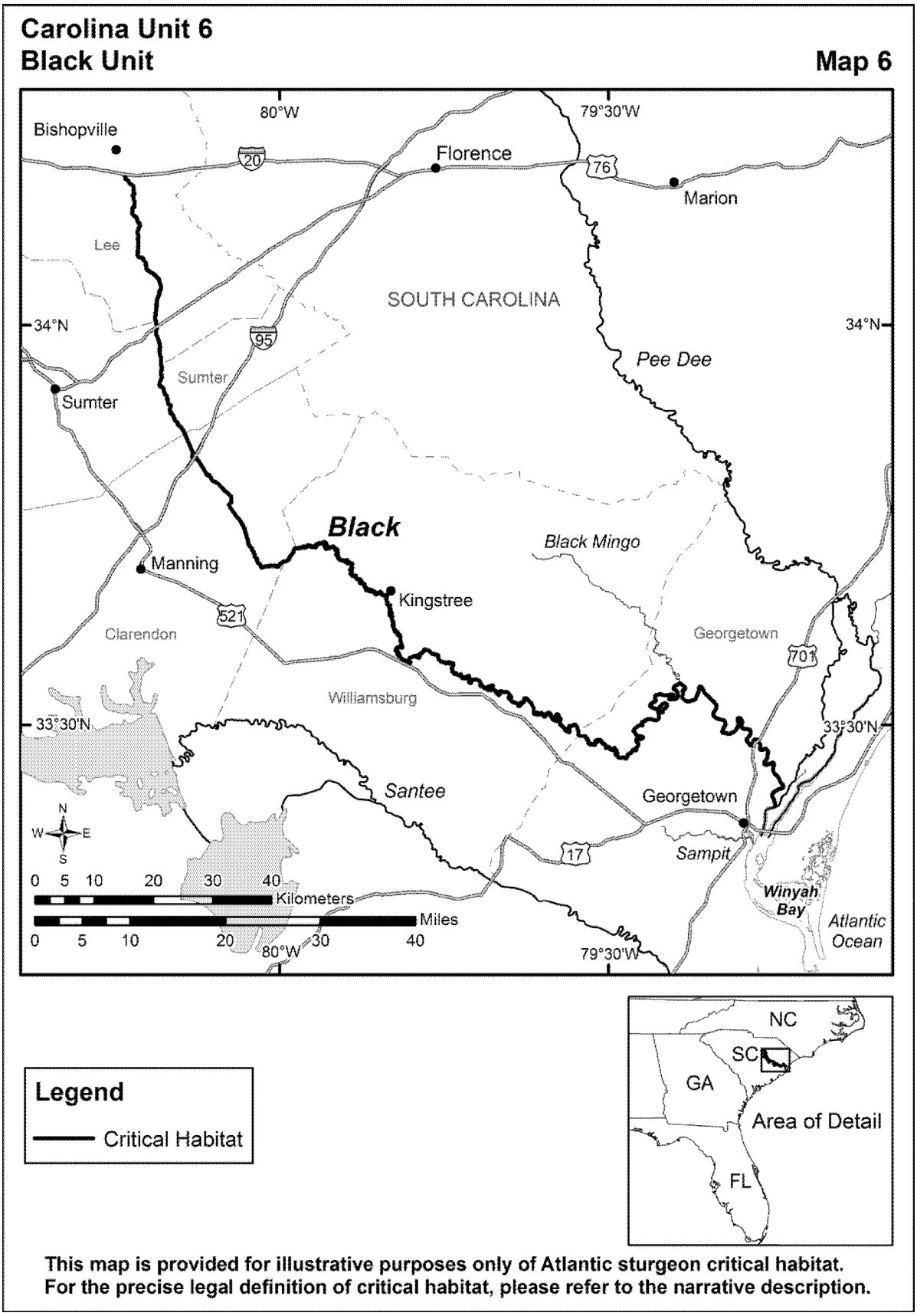
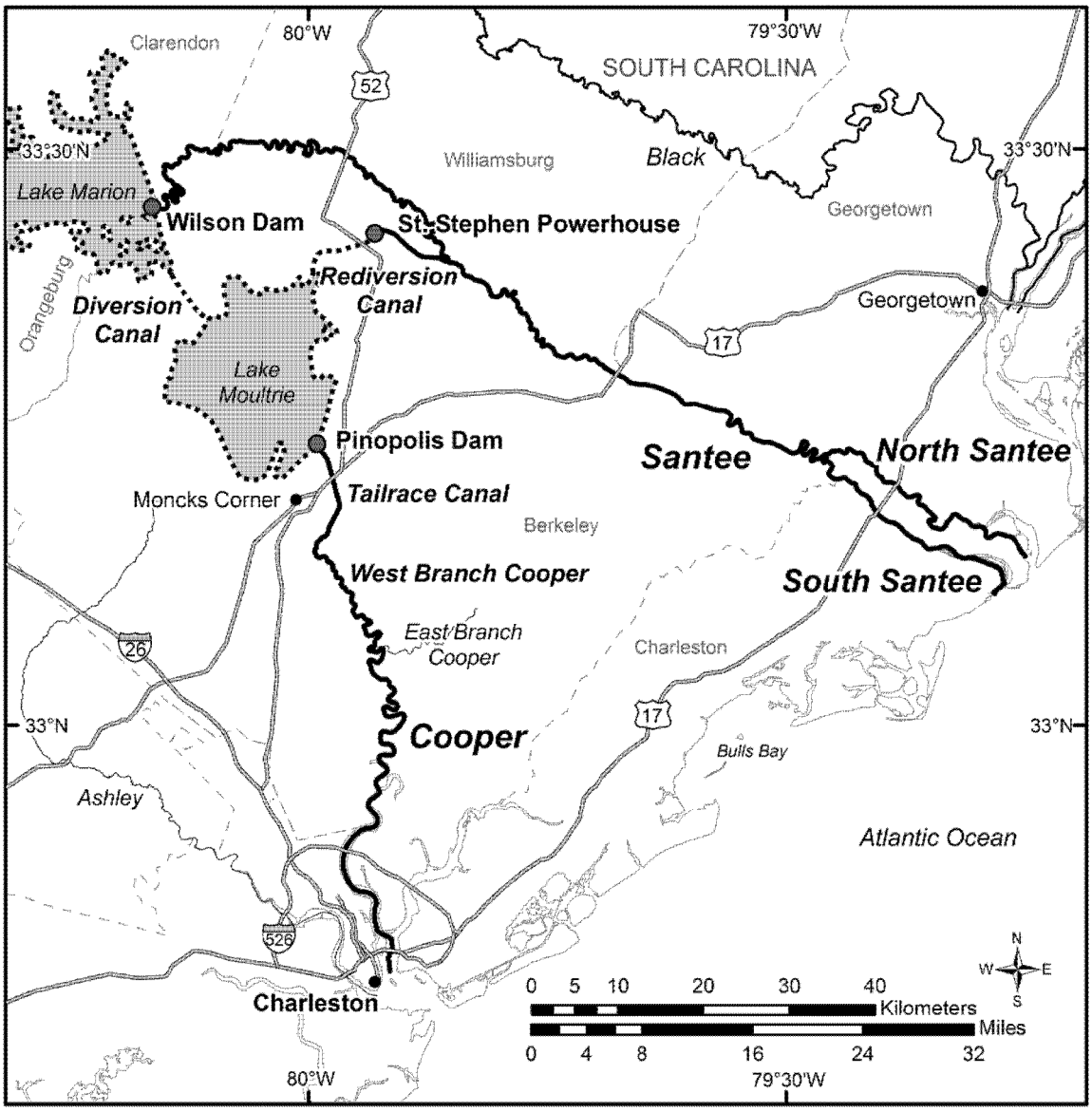


This map is provided for illustrative purposes only of Atlantic sturgeon critical habitat. For the precise legal definition of critical habitat, please refer to the narrative description.

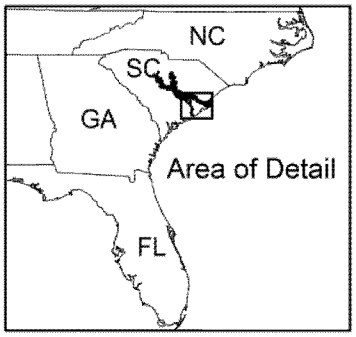
Carolina Unit 7 and Carolina Unoccupied Unit 2
Santee - Cooper Unit **Map 7.1**



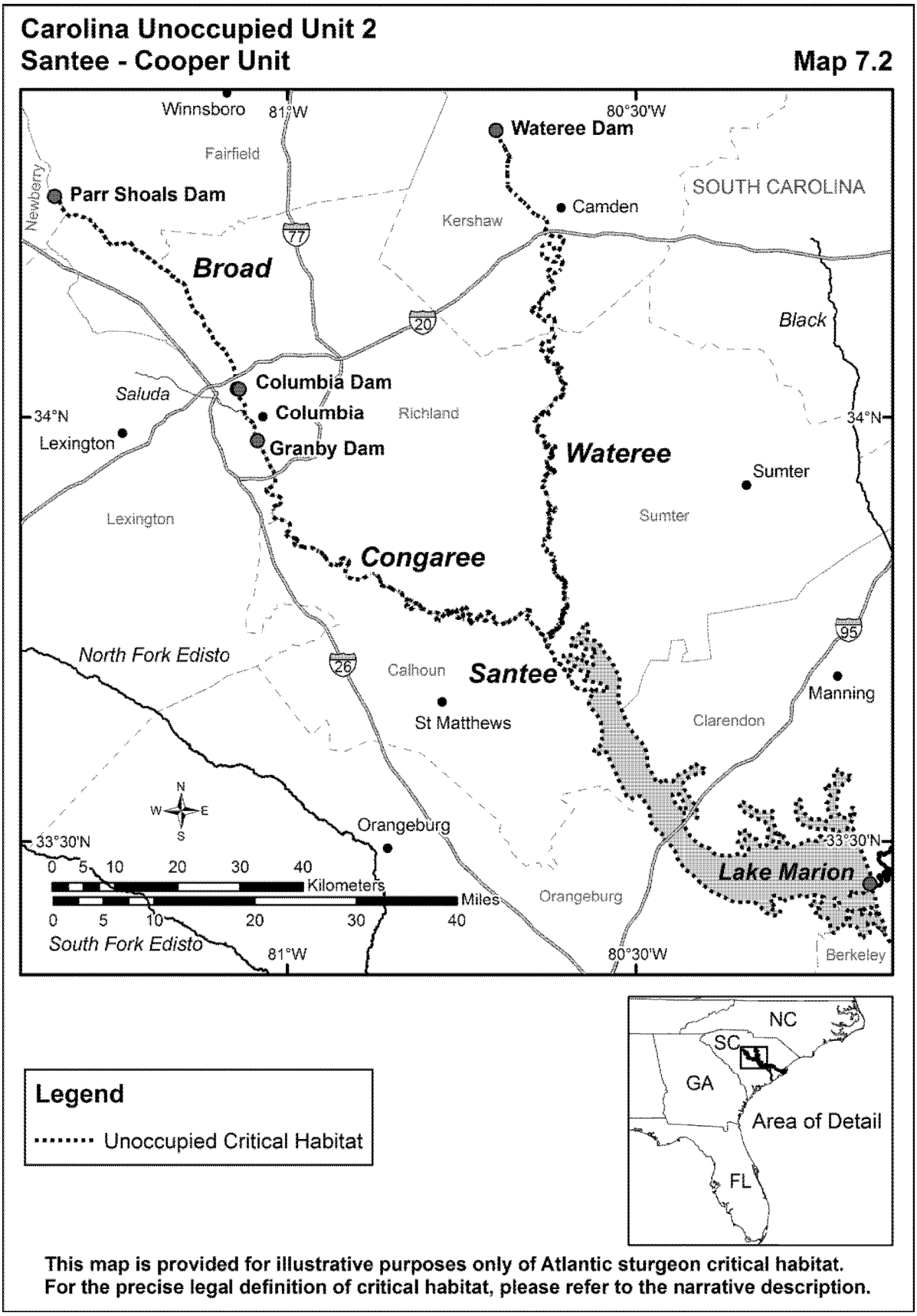
Legend

Occupied Critical Habitat

Unoccupied Critical Habitat



This map is provided for illustrative purposes only of Atlantic sturgeon critical habitat. For the precise legal definition of critical habitat, please refer to the narrative description.



(d) *Critical Habitat Boundaries of the South Atlantic DPS.* The lateral extent for all critical habitat units for the South Atlantic DPS of Atlantic sturgeon is the ordinary high water mark on each bank of the river and shorelines. Critical

habitat for the South Atlantic DPS of Atlantic sturgeon is:

(1) South Atlantic Unit 1 includes the North Fork Edisto River from Cones Pond downstream to the confluence with the South Fork Edisto River, the South Fork Edisto River from Highway 121 downstream to the confluence with the North Fork Edisto River, the Edisto River main stem from the confluence of the North Fork Edisto River and South Fork Edisto River tributaries downstream to the fork at the North Edisto River and South Edisto River distributaries, the North Edisto River from the Edisto River downstream to RKM 0, and the South Edisto River from the Edisto River downstream to RKM 0;

(2) South Atlantic Unit 2 includes the main stem Combahee—Salkehatchie River from the confluence of Buck and Rosemary Creeks with the Salkehatchie River downstream to the Combahee River, the Combahee River from the Salkehatchie River downstream to RKM 0;

(3) South Atlantic Unit 3 includes the main stem Savannah River from the New Savannah Bluff Lock and Dam downstream to RKM 0;

(4) South Atlantic Unit 4 includes the main stem Ogeechee River from the confluence of the North Fork Ogeechee River and South Fork Ogeechee River downstream to RKM 0;

(5) South Atlantic Unit 5 includes the main stem Oconee River from Sinclair Dam downstream to the confluence with the Ocmulgee River, the main stem Ocmulgee River from Juliette Dam downstream to the confluence with the Oconee River, and the main stem Altamaha River from the confluence of the Oconee River and Ocmulgee River downstream to RKM 0;

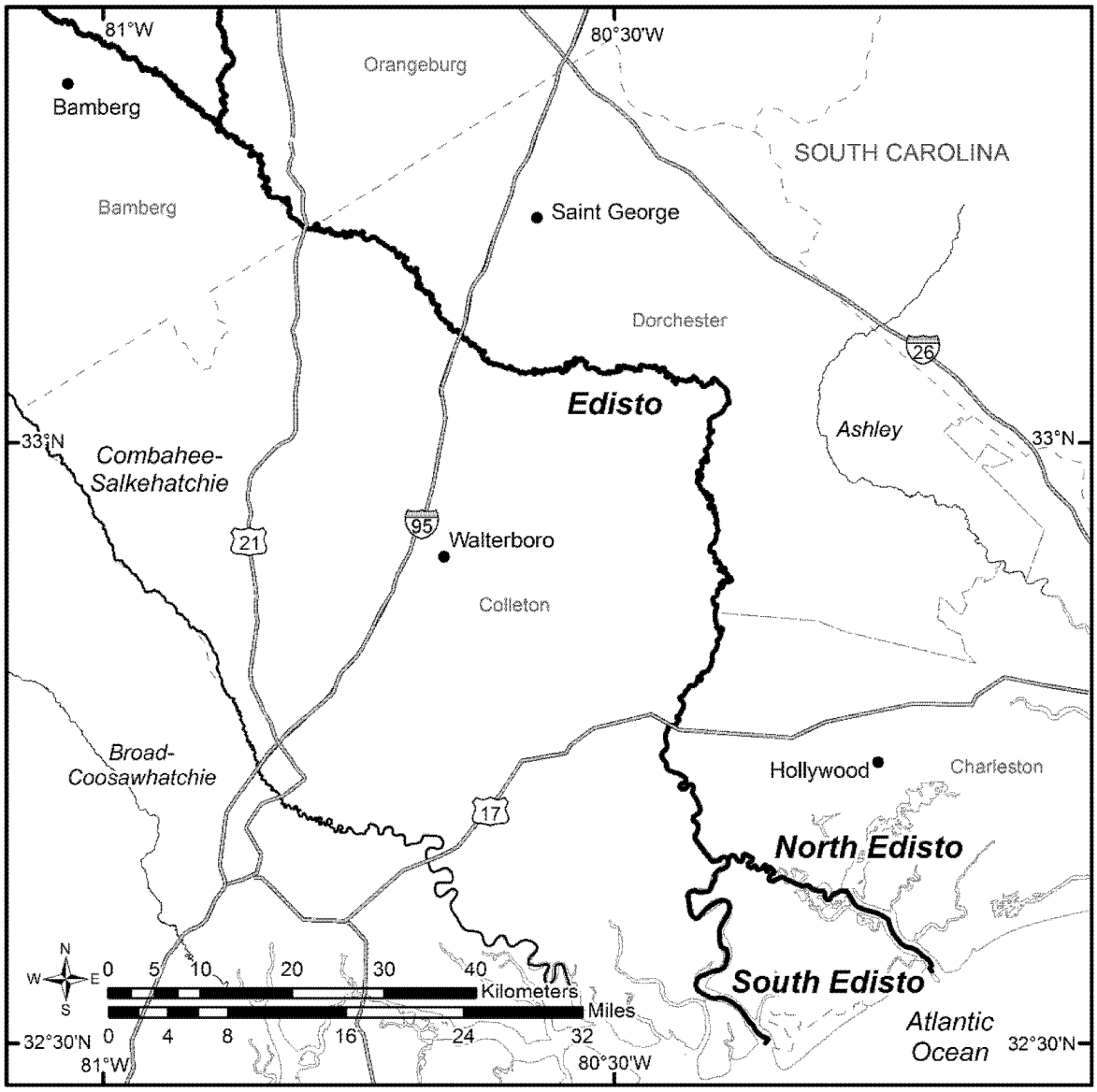
(6) South Atlantic Unit 6 includes the main stem Satilla River from the confluence of Satilla and Wiggins Creeks downstream to RKM 0;

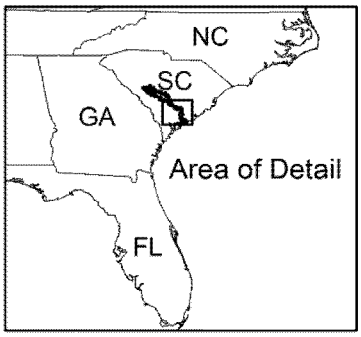
(7) South Atlantic Unit 7 includes the main stem St. Marys River from the confluence of Middle Prong St. Marys and the St. Marys Rivers downstream to RKM 0; and

(8) South Atlantic Unoccupied Unit 1 includes the main stem Savannah River from the Augusta Diversion Dam downstream to the New Savannah Bluff Lock and Dam.

(9) Maps of the South Atlantic DPS follow:

South Atlantic Unit 1
Edisto Unit **Map 8.1**





Legend

Critical Habitat

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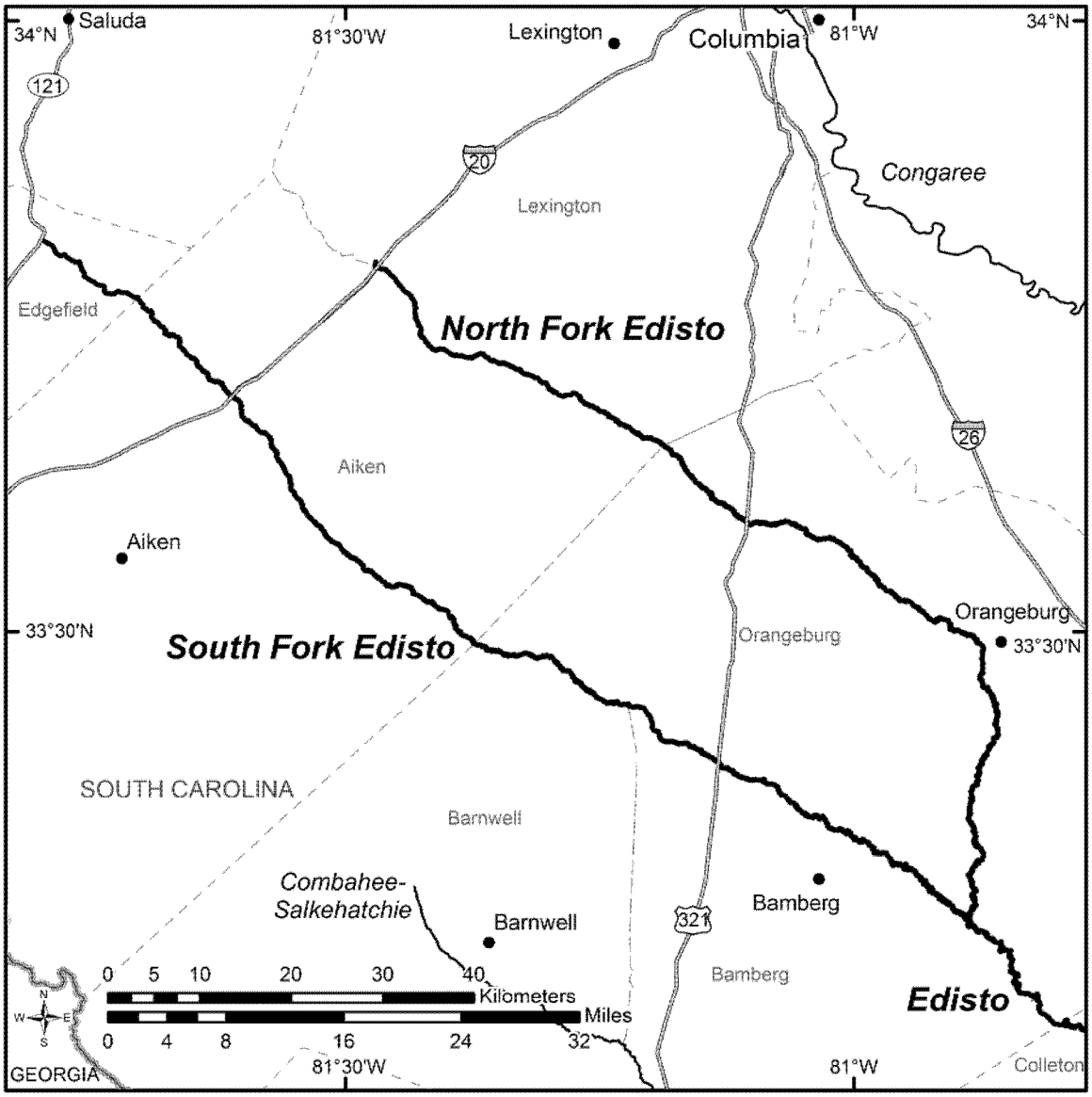
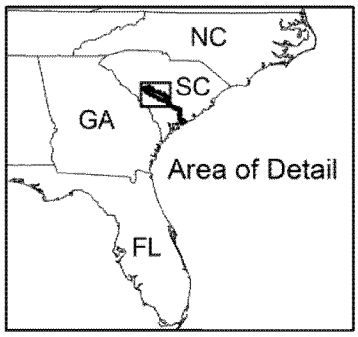
South Atlantic Unit 1
Edisto Unit

Map 8.2



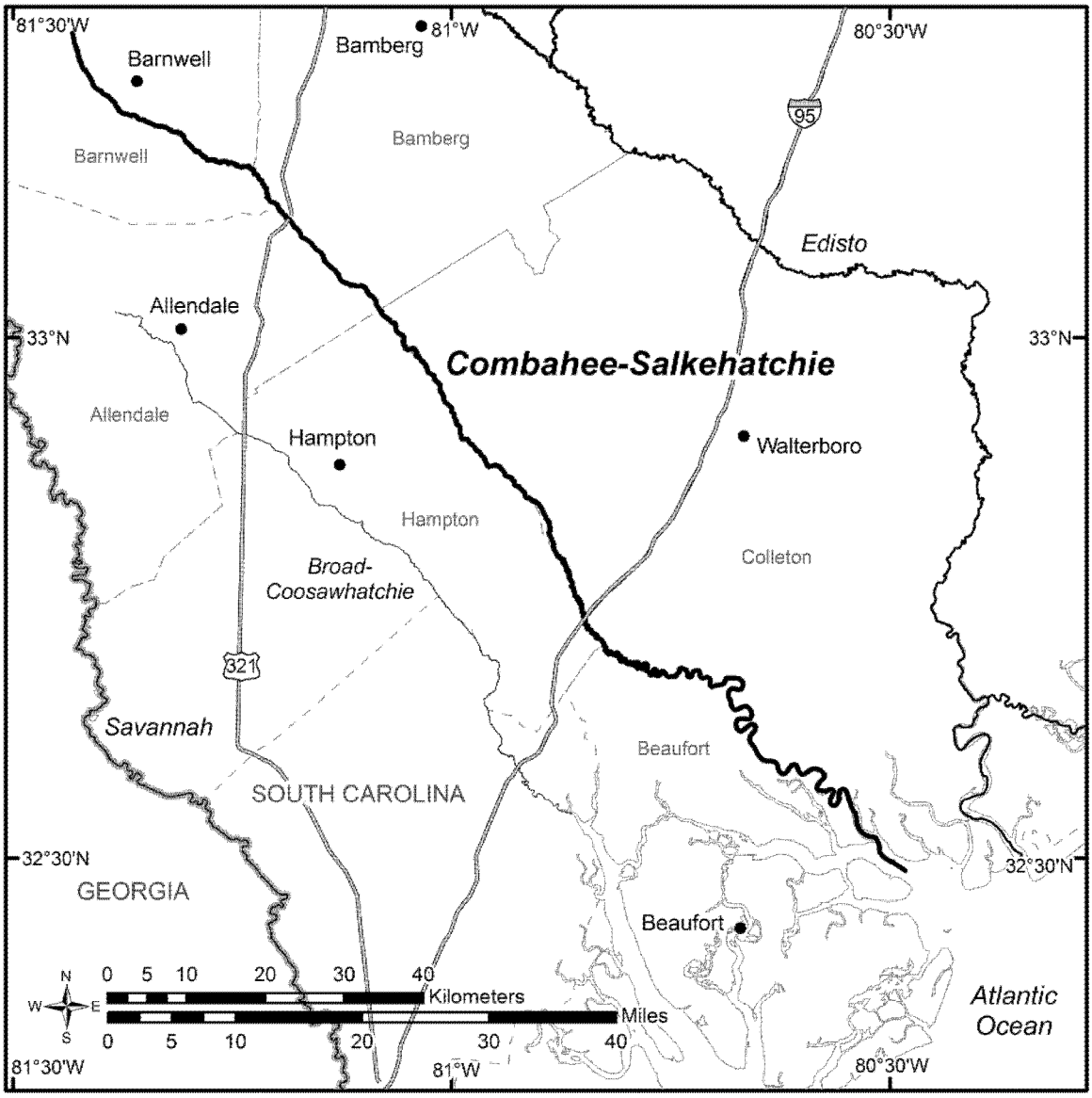


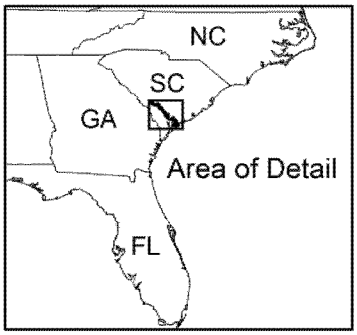
Legend

Critical Habitat

This map is provided for illustrative purposes only of Atlantic sturgeon critical habitat. For the precise legal definition of critical habitat, please refer to the narrative description.

South Atlantic Unit 2
Combahee - Salkehatchie Unit **Map 9**





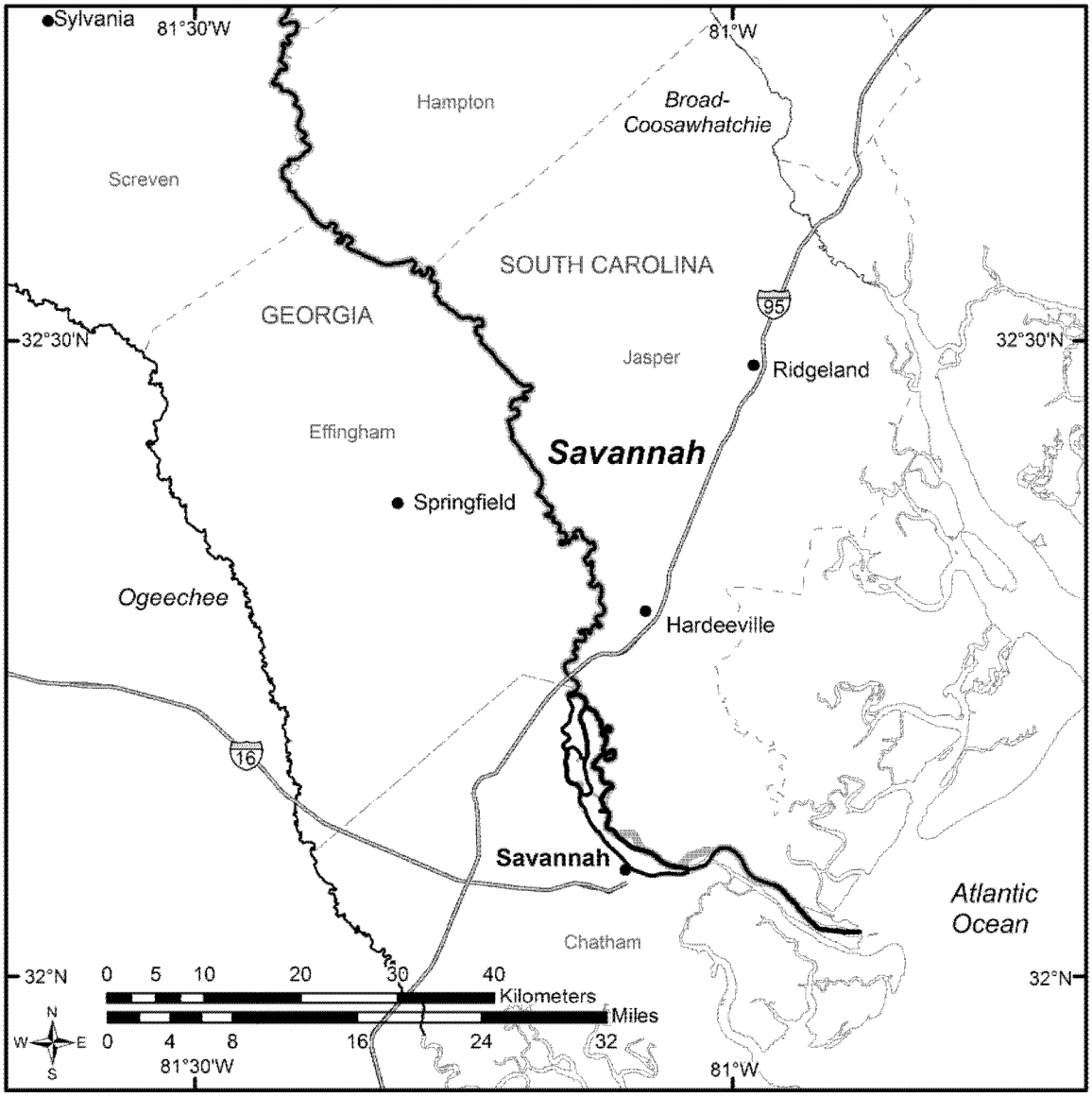
Legend

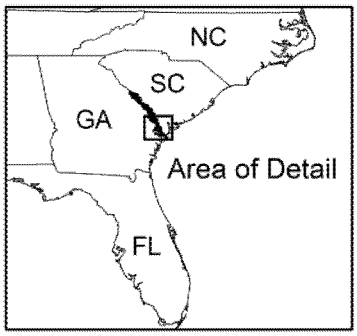
Critical Habitat

This map is provided for illustrative purposes only of Atlantic sturgeon critical habitat. For the precise legal definition of critical habitat, please refer to the narrative description.

South Atlantic Unit 3
Savannah Unit

Map 10.1





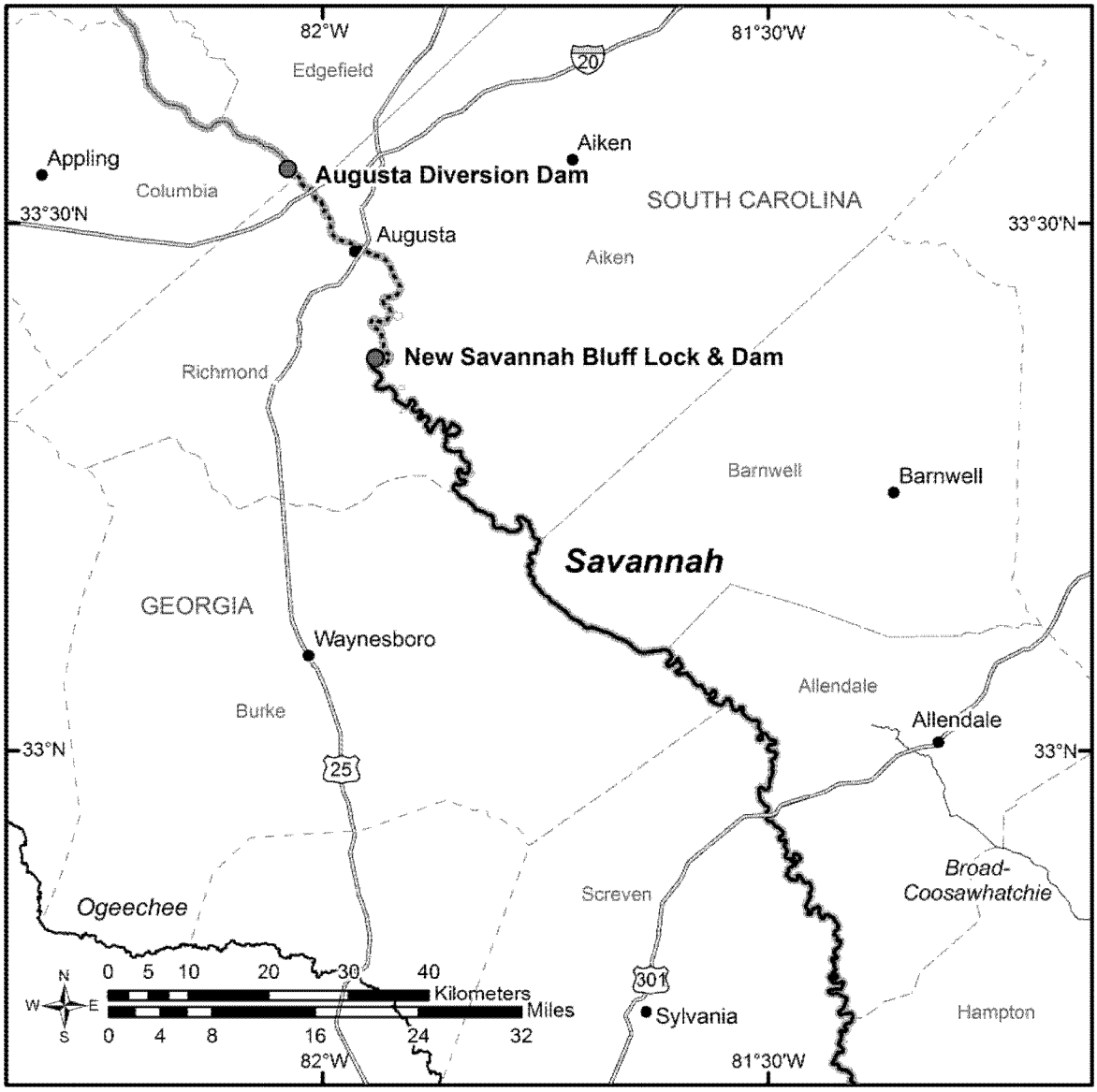
Legend

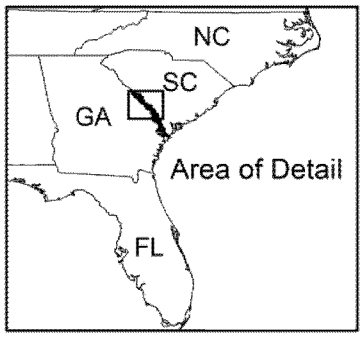
Critical Habitat

SC/GA State Line

This map is provided for illustrative purposes only of Atlantic sturgeon critical habitat. For the precise legal definition of critical habitat, please refer to the narrative description.

South Atlantic Unit 3 and South Atlantic Unoccupied Unit 1
Savannah Unit
Map 10.2





Legend

Occupied Critical Habitat

Unoccupied Critical Habitat

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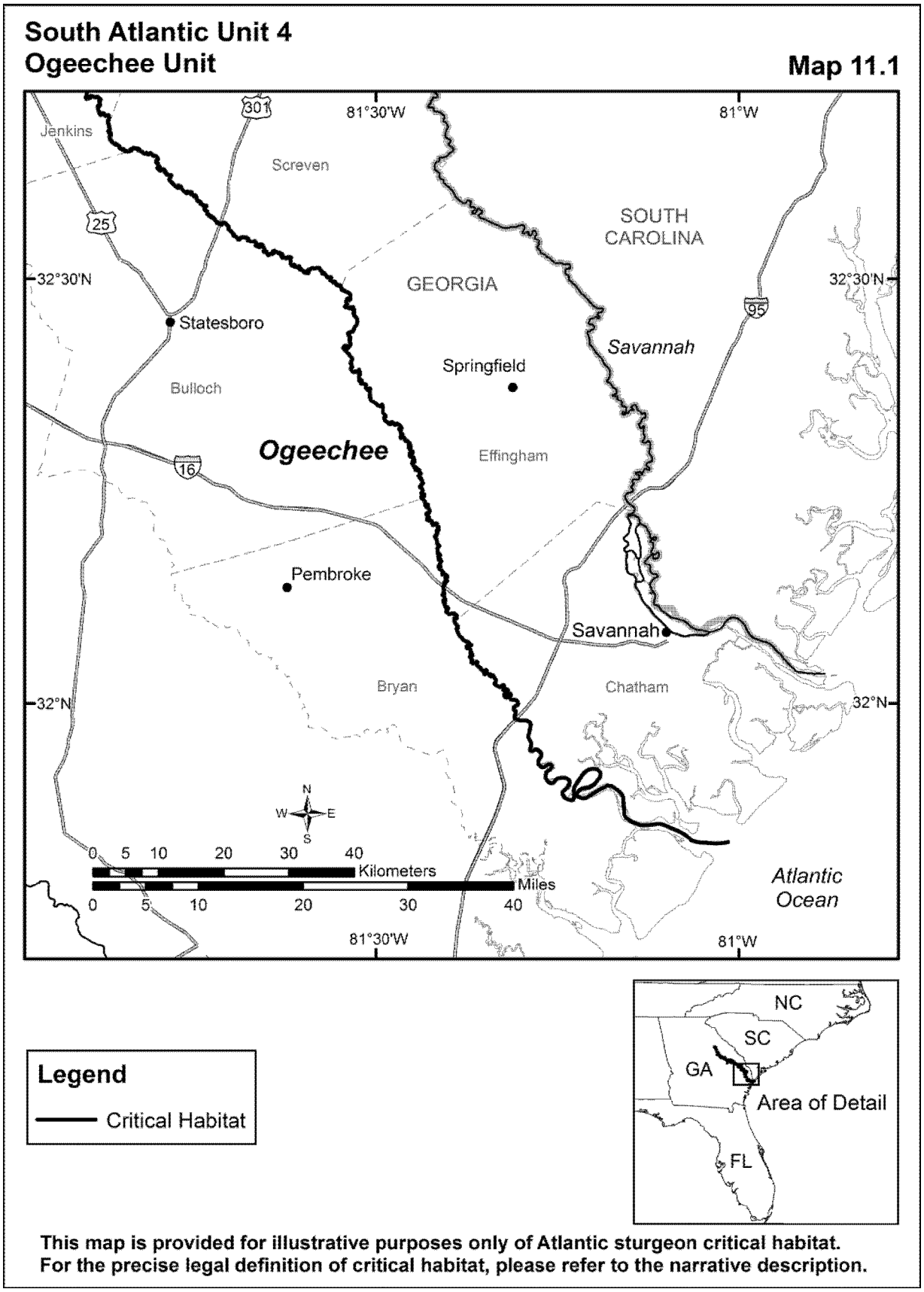
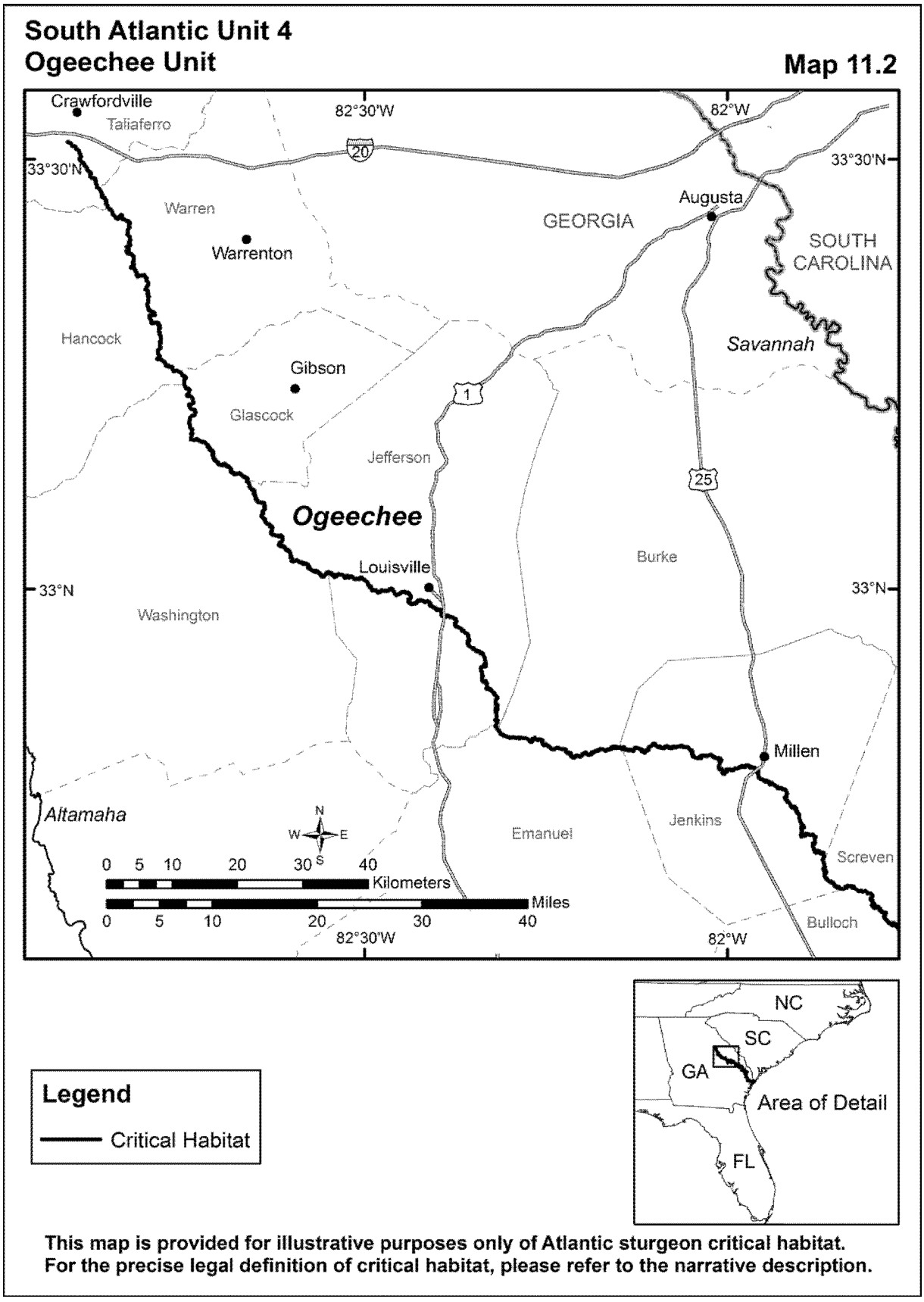
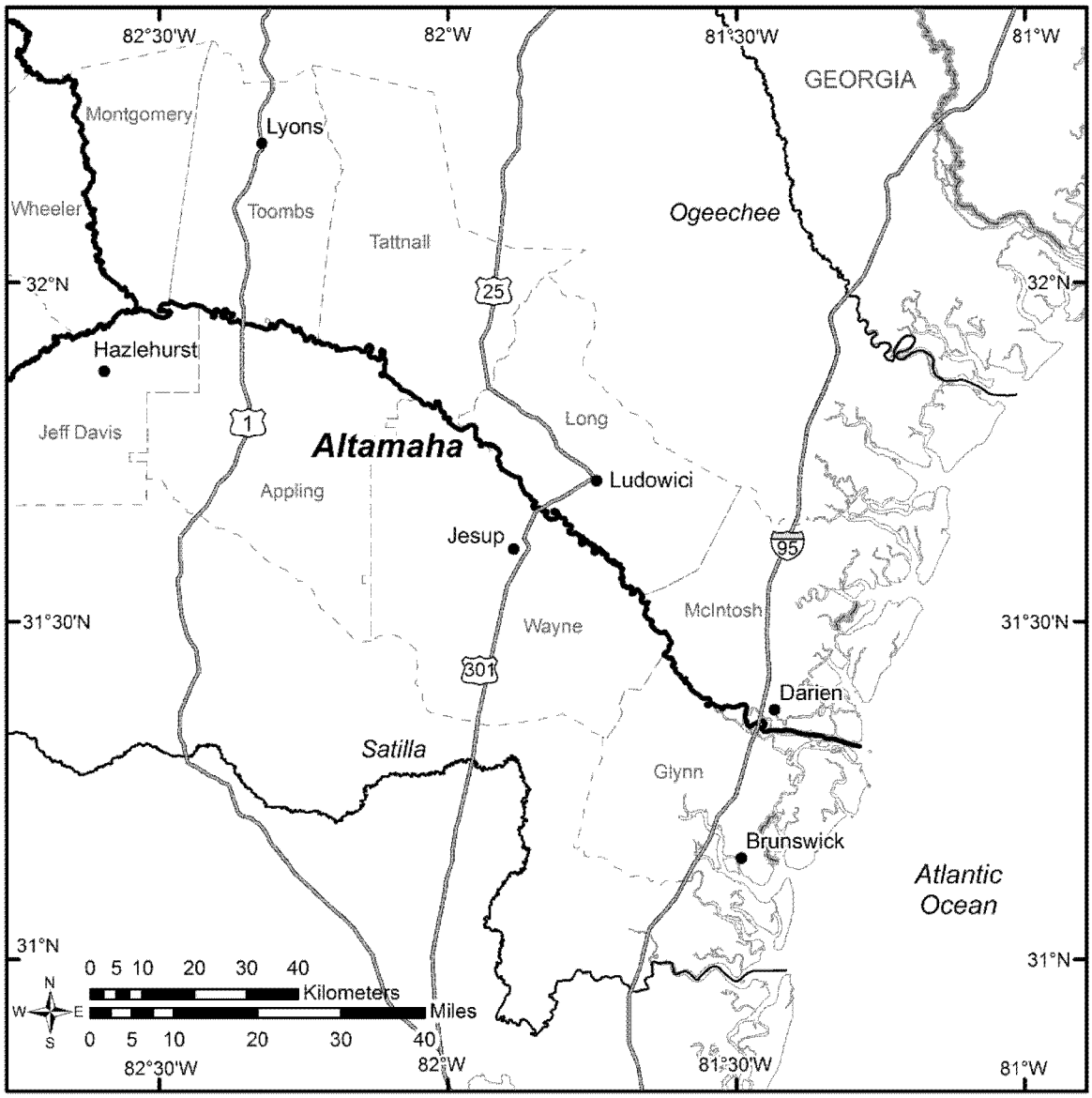

South Atlantic Unit 4
Ogeechee Unit
Map 11.1
Jenkins
Screven
301
81°30'W
81°W
25
SOUTH CAROLINA
32°30'N
GEORGIA
32°30'N
95
Statesboro
Savannah
Springfield
Bulloch
Ogeechee
Effingham
16
Pembroke
Savannah
Bryan
Chatham
32°N
32°N
N
W
E
S
0 5 10 20 30 40
Kilometers
Miles
0 5 10 20 30 40
Atlantic Ocean
81°30'W
81°W
NC
SC
GA
Area of Detail
FL
Legend
Critical Habitat
This map is provided for illustrative purposes only of Atlantic sturgeon critical habitat.
For the precise legal definition of critical habitat, please refer to the narrative description.

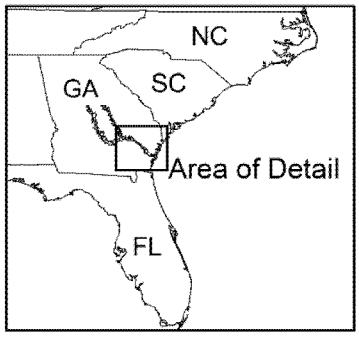


This map is provided for illustrative purposes only of Atlantic sturgeon critical habitat. For the precise legal definition of critical habitat, please refer to the narrative description.

South Atlantic Unit 5
Altamaha Unit

Map 12.1





Legend

Critical Habitat

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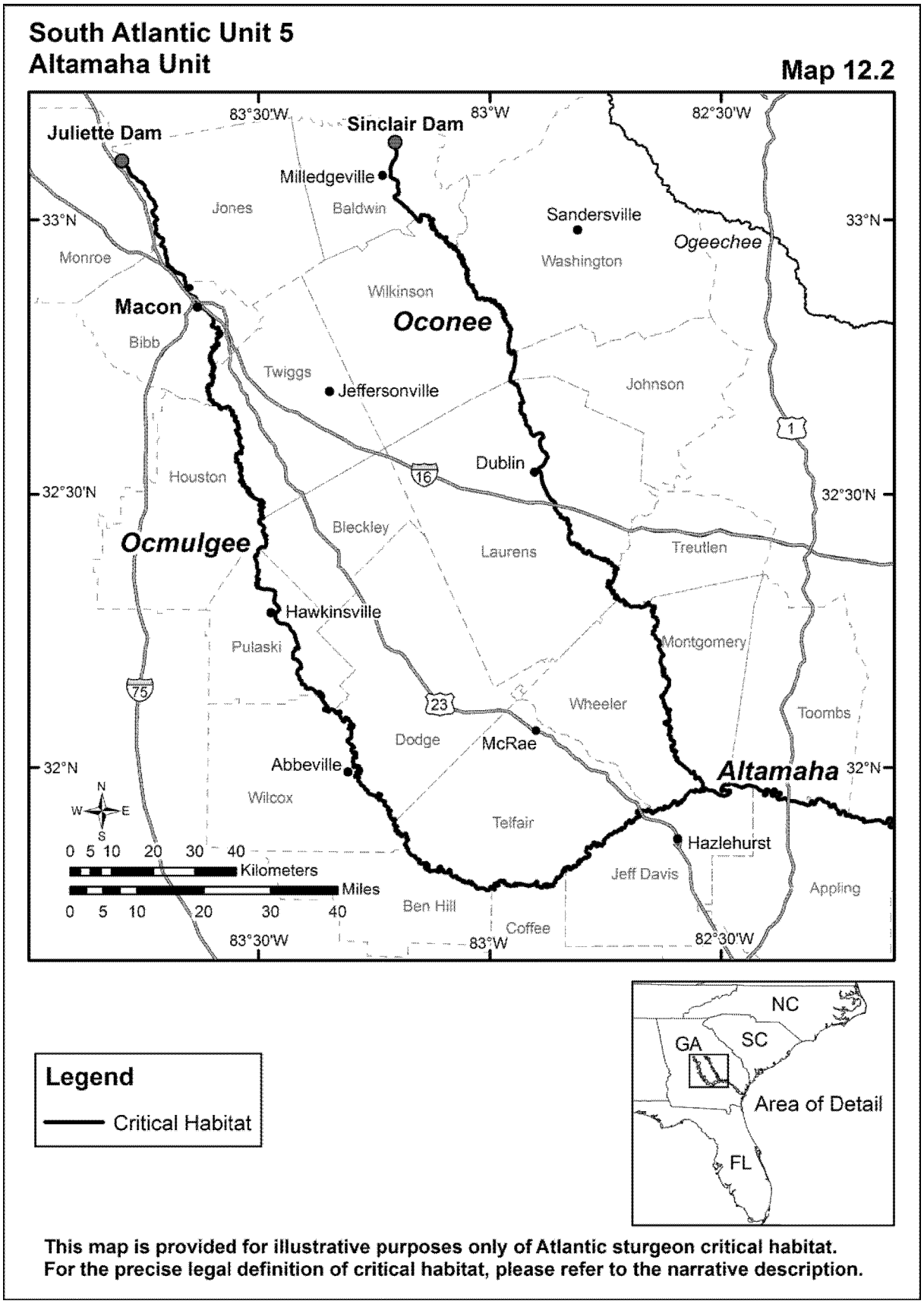
South Atlantic Unit 5
Altamaha Unit
Map 12.2
Juliette Dam
Sinclair Dam
Milledgeville
Sandersville
Macon
Jeffersonville
Dublin
Hawkinsville
Abbeville
McRae
Hazlehurst
Ocmulgee
Oconee
Altamaha
Ogeechee
Jones
Baldwin
Monroe
Washington
Wilkinson
Bibb
Twiggs
Johnson
Houston
Bleckley
Laurens
Treutlen
Pulaski
Montgomery
Wheeler
Toombs
Dodge
Wilcox
Telfair
Jeff Davis
Appling
Ben Hill
Coffee
83°30'W
83°W
82°30'W
33°N
32°30'N
32°N
0 5 10 20 30 40
Kilometers
Miles
Legend
Critical Habitat
NC
SC
GA
FL
Area of Detail
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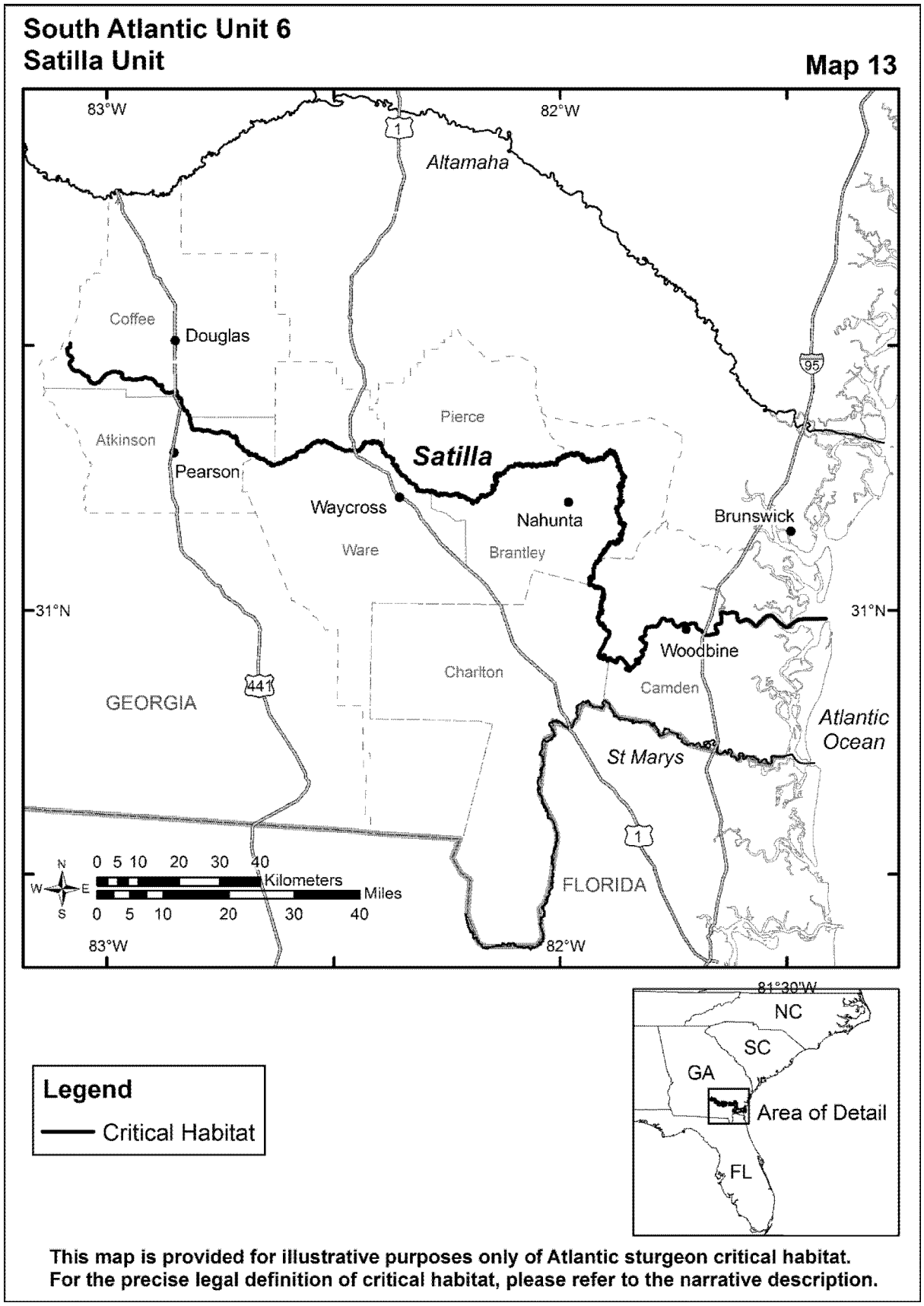

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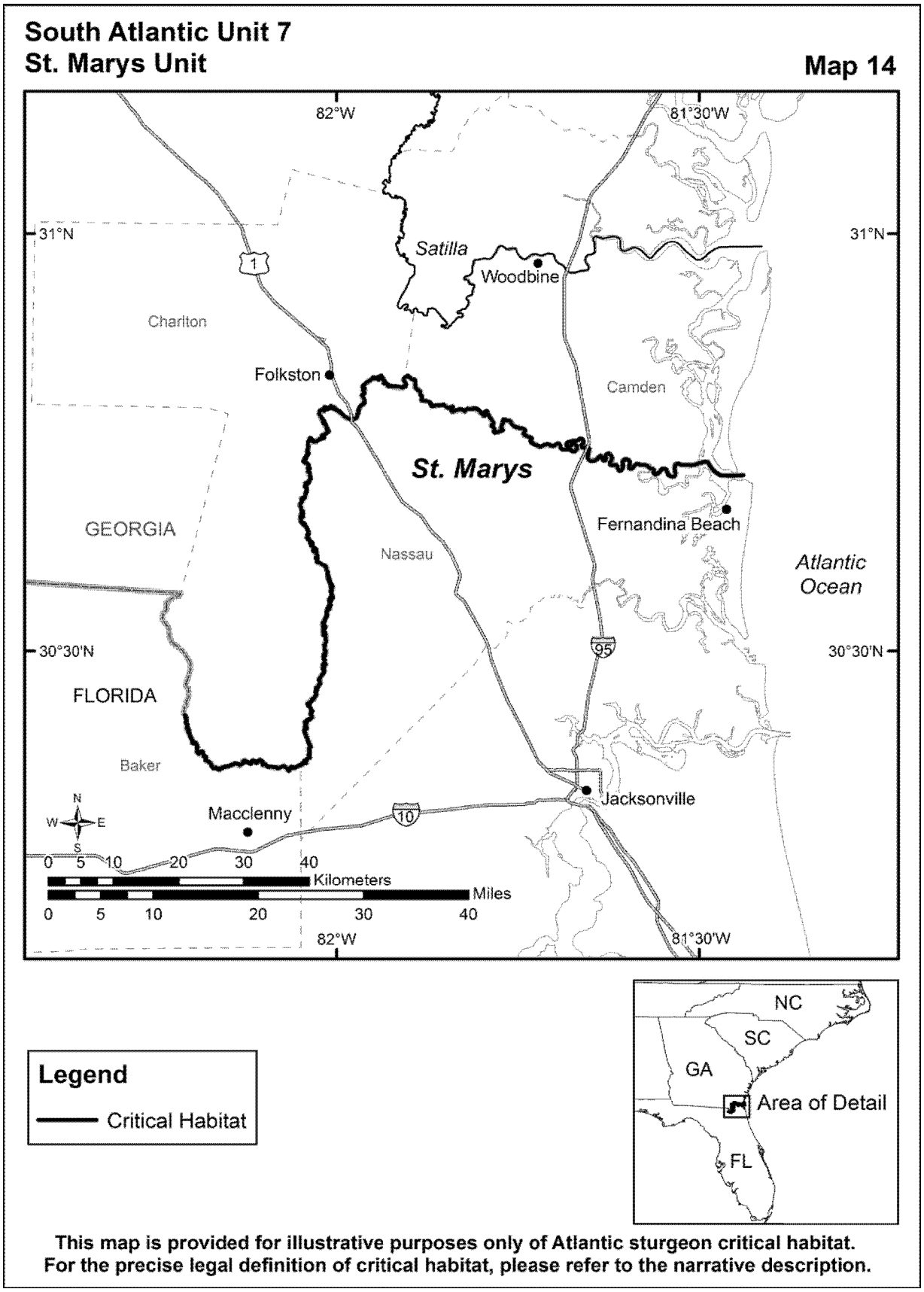

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BILLING CODE 3510–22–C