SR 41 Conecuh River Bridge Replacement
Federal Highway Administration
Alabama Department of Transportation
Escambia County, Alabama

Biological Opinion
May 12, 2015

Prepared by:
U.S. Fish and Wildlife Service
1208 Main Street
Daphne, Alabama 36526

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

MAY 12 2015

Mr. Mark D. Bartlett
Division Administrator
Federal Highway Administration
9500 Wynlakes Place
Montgomery, AL 36117

Re: FWS Log No. 2009-I-0400
Date Started: January 14, 2015
Agency: Federal Highway Administration
Applicant: Alabama Department of Transportation
Project Title: SR 41 Bridge Replacement over the Conecuh River
ALDOT Project No.: BR-0041(501)
Location: Conecuh River
County: Escambia County, AL

Dear Mr. Bartlett:

This letter transmits the Fish and Wildlife Service's (Service) biological opinion (BO) for actions to be taken during the replacement of the State Road (SR) 41 Conecuh River Bridge, in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.) Your letter requesting formal consultation was received on December 29, 2014. Our BO is based on information provided in the biological assessment (BA), your responses to our requests for additional information, Service investigations in the project area, discussions with experts in the field, and other sources of information. A complete administrative record of this consultation is on file at the Service's Alabama Field Office, located in Daphne, Alabama.

This BO refers only to the potential effects of the Alabama Department of Transportation's (ALDOT's) proposed replacement of the SR-41 bridge over the Conecuh River on the threatened Gulf sturgeon (*Acipenser oxyrinchus desotoi*) and its critical habitat, and the threatened narrow pigtoe (*Fusconaia escambia*) and its critical habitat.

Table 1 identifies other federally listed species potentially occurring within the Action Area. The ALDOT has determined that bridge construction activities may affect, but are not likely to adversely affect (NLAA) the Choctaw bean (*Villosa choctawensis*), southern kidneyshell (*Ptychobranchus jonesi*), Alabama pearlshell (*Margaritifera marrianae*), Round ebonyshell (*Fusconaia rotulata*), Southern sandshell (*Hamiota australis*) and the Fuzzy pigtoe (*Pleurobema strodeanum*). The Service concurs with this determination. In addition, the ALDOT has determined that no suitable habitat is present and the work will have no effect (NE) on the eastern indigo snake (*Drymarchon corais couperi*), red-cockaded woodpecker (*Picoides borealis*), wood stork (*Mycteria americana*), and listed plants. No further coordination is needed for these species and they will not be discussed further in this BO.

Table 1. Other federally protected species evaluated for effects.

Species	**CH in Action Area**	**Present in Action Area**	**Effects Determination**
Eastern indigo snake	No	No	NE
Red-cockaded woodpecker	No	No	NE
Choctaw bean	Yes	No	NLAA
Southern kidneyshell	Yes	No	NLAA
Wood stork	No	No	NLAA
Round ebonyshell	Yes	No	NLAA
Southern sandshell	Yes	No	NLAA
Fuzzy pigtoe	Yes	No	NLAA

Consultation History

March 30, 2009	ALDOT requested technical assistance and a list of species that may be affected by the replacement of a portion of the relief bridges near the Conecuh River along SR-41.
April 2, 2009	Alabama Field Office provided clearance because no impacts were to occur in the river.
March 5, 2012	ALDOT requested clearance for the entire bridge replacement over the Conecuh River along SR-41.
March 21, 2012	The Service recommended a biological assessment be prepared for the project impacts to the gulf sturgeon based on changes in the scope of the project.
December 2012	ALDOT was notified by telephone that eight candidate mussels had become listed with critical habitat within the Conecuh River.
February 2014	A conference call was held between ALDOT and the Service to discuss

	timing for mussel surveys in the Conecuh River. The Service recommended surveying in the late summer or early fall of 2014.
October 7-8, 2014	Mussel surveys were conducted by AST Environmental during the first week of October. One of the five listed mussel species that occur in the Conecuh River was found within the survey area near SR-41.
November 2014	The Service recommended formal consultation for the Gulf sturgeon and the narrow pigtoe mussel and provided potential conservation measures to minimize adverse effects to both the Gulf sturgeon and freshwater mussels.
December 29, 2014	The Service received a letter from the Federal Highway Administration (FHWA) requesting initiation of formal consultation for the narrow pigtoe and provided a biological assessment (BA).
January 23, 2015	The Service acknowledged by letter the initiation of formal consultation for this project, with an expected completion date on no later than April 30, 2015.
April 14, 2015	The Service provided a draft biological opinion to FHWA and ALDOT for review.
April 24, 2015	Meeting between the Service and ALDOT Southwest Division to discuss draft Biological Opinion and potential revisions to construction plans.
May 12, 2015	Final Biological Opinion provided to FHWA and ALDOT

BIOLOGICAL OPINION

1.0 DESCRIPTION OF PROPOSED ACTION

The Alabama Department of Transportation (ALDOT) proposes to replace the SR-41 Conecuh River Bridge in Escambia County, Alabama. The proposed project site is a total length of 4200 feet (0.8 mile) by 260 foot wide linear highway corridor of SR-41 between the communities of Brewton and Riverview in Escambia County. A map of the proposed project area is given in Figure 1.

The current bridge typical section consists of two, 12-foot lanes, 8-foot shoulders, and concrete barrier walls for a total roadway width of 40 feet. The current roadway typical section consists of two, 12-foot lanes, and 5-foot paved shoulders. The proposed bridge dimensions will be similar to the existing with an addition of 4 feet in width to meet updated design standards. The span length will replace the 1040 feet Conecuh River Bridge and 272 foot for the relief bridge with one bridge for a total length of 1850 feet. Bents will be located to avoid the deepest natural channel area and there will be fewer bents in the stream. Features such as the increased length and fewer spans will improve protection of the river's natural channel. Work will be conducted using cranes from a temporary access road and temporary work bridge constructed to the north of the proposed bridge within the existing right-of-way (ROW). If the temporary access road will cross wetlands, matting will be used to protect the wetlands from unnecessary damage.

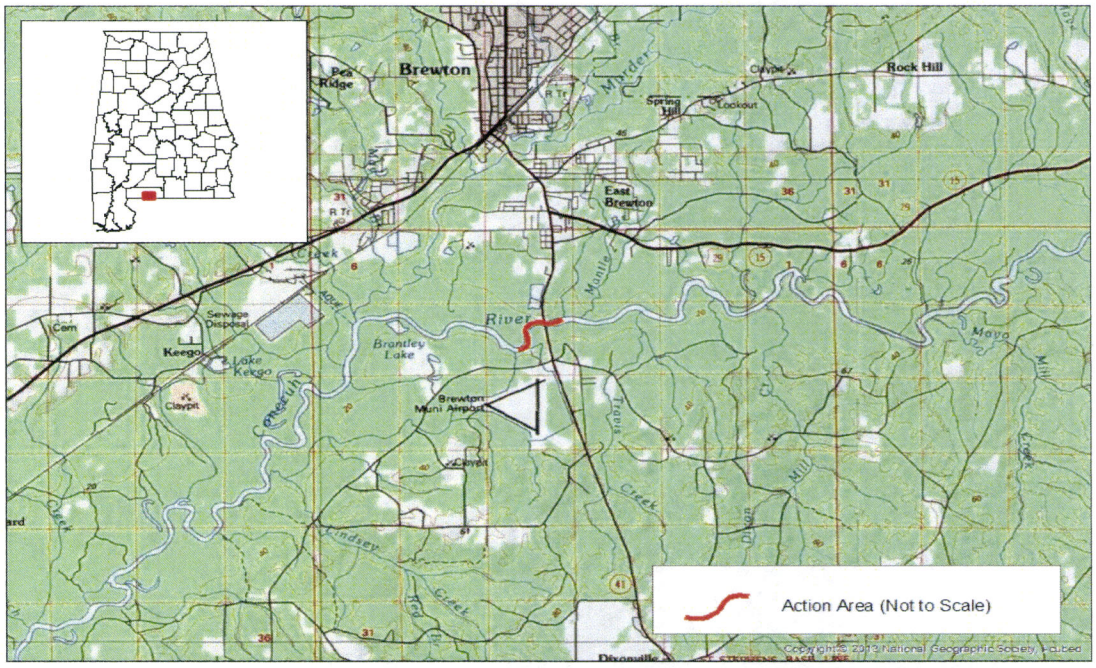

Figure 1 Project Location for SR-41 Conecuh River Bridge

For the purposes of this BO, we have defined in-river work as all work occurring within the banks and bed of the river main channel at bents 9 and 10. Drilled shaft pile construction will be used during construction of the proposed bridge to minimize sound propagation during in-river work activities. Two bents will be placed within the main channel of the river. There are two shafts each for bents 9 and 10. Potential sedimentation from pile drilling will be contained using a coffer dam to contain sedimentation consistent with a water quality control plan.

Upon completion of the project, timber beds will be removed from the temporary work roads. The existing superstructure will be completely removed (November to March) and not allowed to fall into the river. Existing piles will either be cut to the river bottom or at a safe height that is agreeable to the regulatory agencies. Explosives will not be used for bridge removal. The demolished bridge and fill materials will be disposed of properly at an approved off-site facility.

The limits of construction will be contained within silt fences, turbidity barriers, and other erosion control and water quality protection measures. Staging areas will occur in uplands or within identified temporary impact areas. Any offsite staging, storage, and parking areas will be identified as needed by the contractor and undergo a separate review by ALDOT for endangered species and other issues.

1.1 Purpose and Need

The project purpose is to replace the existing bridge with a bridge that meets current design standards. The existing bridge is structurally deficient.

1.2 Action Area

The action area is defined at 50 CFR 402 to mean, "all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." Therefore, the action area may be larger than the construction limits of the project. The impact radius for roads is variable, depending on the ecological factor under consideration and the habitat the road traverses. For example, sediment from a road or bridge can affect stream habitat and fish populations for downstream distances of 1,000 meters (3,280 feet) and greater (Forman et al. 2003).

The action area for this biological opinion is: (1) the 260-foot ROW for the 0.8-mile length of the project; (2) a buffer of 1,000 feet on either side of the ROW; (3) upstream of the bridge to 130 feet; and (4) downstream of the bridge approximately 3,280 feet. The 260-foot ROW will encompass the entire work area, which varies in width along the project corridor. A buffer of an additional 1,000 feet is included to address potential effects that may extend into the terrestrial and aquatic environment outside of the road ROW (*e.g.* sedimentation from erosion during high rainfall events). The action area includes 3,280 feet downstream from the bridge to address potential downstream turbidity and other environmental effects. The action area includes the upstream mussel search area which also provides potential mussel relocation sites. The use of Best Management Practices (BMPs) for water quality protection, environmentally sensitive construction techniques, and other conservation measures are expected to minimize the zone of influence for the project.

2.0 STATUS OF THE SPECIES

2.1 Gulf Sturgeon

2.1.1 Species Description

The Gulf sturgeon (*Acipenser oxyrinchus* (=*oxyrhynchus*) *desotoi*), also known as the Gulf of Mexico sturgeon, is an anadromous fish (breeding in freshwater after migrating up rivers from marine and estuarine environments), inhabiting coastal rivers from Louisiana to Florida during the warmer months and over wintering in estuaries, bays, and the Gulf of Mexico. It is a nearly cylindrical primitive fish embedded with bony plates or scutes. The head ends in a hard, extended snout; the mouth is inferior and protrusible and is preceded by four conspicuous barbels. The caudal fin (tail) is heterocercal (upper lobe is longer than the lower lobe). Adults range from 1.2 to 2.4 m (4 to 8 ft) in length, with adult females larger than males. The Gulf sturgeon is distinguished from the geographically disjunct Atlantic coast subspecies (*A. o. oxyrinchus*) by its longer head, pectoral fins, and spleen (Vladykov 1955; Wooley 1985). King et al. (2001) have documented substantial divergence between *A. o. oxyrinchus* and *A. o. desotoi* using microsatellite DNA testing.

2.1.2 Critical Habitat Description

The Service and National Marine Fisheries Service (NMFS) jointly designated Gulf sturgeon critical habitat on April 18, 2003 (68 FR 13370, March 19, 2003). Gulf sturgeon critical habitat includes areas within the major river systems that support the seven currently reproducing subpopulations and associated estuarine and marine habitats. Gulf sturgeon use rivers for spawning, larval and juvenile feeding, adult resting and staging, and moving between the areas that support these life history components. Gulf sturgeons use the lower riverine, estuarine, and marine environment during winter months primarily for feeding and for inter-river movements.

Fourteen areas (units) are designated as Gulf sturgeon critical habitat (Figure 2). Critical habitat units encompass approximately 2,783 km (1,729 mi) of riverine habitats and 6,042 km^2 (2,333 mi^2) of estuarine and marine habitats, and include portions of the following Gulf of Mexico rivers, tributaries, estuarine and marine areas:

Unit 1	Pearl and Bogue Chitto Rivers in Louisiana and Mississippi;
Unit 2	Pascagoula, Leaf, Bowie, Big Black Creek and Chickasawhay Rivers in Mississippi;
Unit 3	Escambia, Conecuh, and Sepulga Rivers in Alabama and Florida;
Unit 4	Yellow, Blackwater, and Shoal Rivers in Alabama and Florida;
Unit 5	Choctawhatchee and Pea Rivers in Florida and Alabama;
Unit 6	Apalachicola and Brothers Rivers in Florida;
Unit 7	Suwannee and Withlacoochee River in Florida;
Unit 8	Lake Pontchartrain (east of causeway), Lake Catherine, Little Lake, the Rigolets, Lake Borgne, Pascagoula Bay and Mississippi Sound systems in Louisiana and Mississippi, and sections of the state waters within the Gulf of Mexico;
Unit 9	Pensacola Bay system in Florida;

Unit 10 Santa Rosa Sound in Florida;
Unit 11 Nearshore Gulf of Mexico in Florida;
Unit 12 Choctawhatchee Bay system in Florida;
Unit 13 Apalachicola Bay system in Florida; and
Unit 14 Suwannee Sound in Florida.

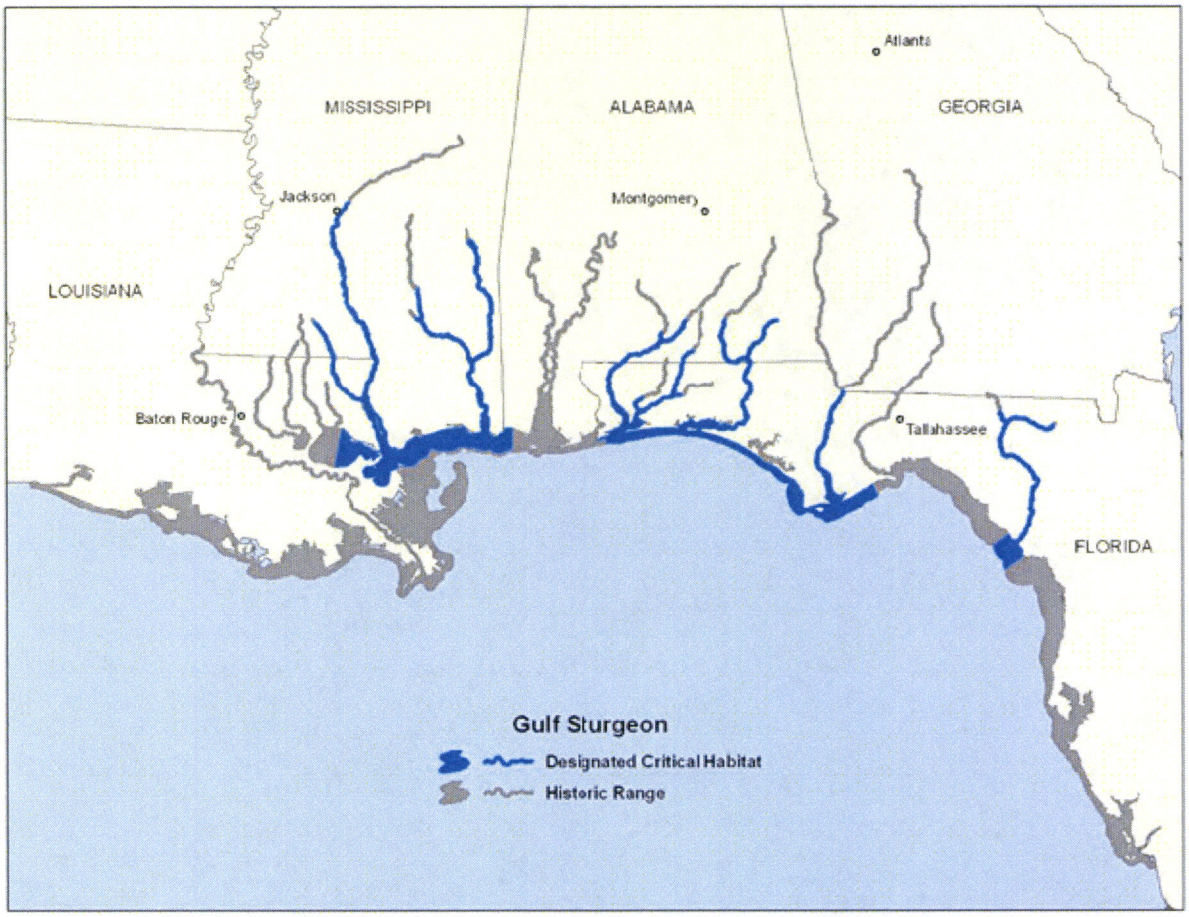

Figure 2. Designated critical habitat and historic range of Gulf sturgeon.

Critical habitat determinations focus on those physical and biological features (primary constituent elements [PCEs]) that are essential to the conservation of the species (50 CFR 424.12). Federal agencies must ensure that their activities are not likely to result in the destruction or adverse modification of designated critical habitats. Therefore, proposed actions that may affect designated critical habitat require an analysis of potential impacts to the PCEs. The PCEs of Gulf sturgeon critical habitat are:

- Abundant food items, such as detritus, aquatic insects, worms, and/or mollusks, within riverine habitats for larval and juvenile life stages; and abundant prey items, such as

amphipods, lancelets, polychaetes, gastropods, ghost shrimp, isopods, mollusks and/or crustaceans, within estuarine and marine habitats and substrates for subadult and adult life stages;

- Riverine spawning sites with substrates suitable for egg deposition and development, such as limestone outcrops and cut limestone banks, bedrock, large gravel or cobble beds, marl, soapstone, or hard clay;
- Riverine aggregation areas, also referred to as resting, holding, and staging areas, used by adult, subadult, and/or juveniles, generally, but not always, located in holes below normal riverbed depths, believed necessary for minimizing energy expenditures during freshwater residency and possibly for osmoregulatory functions;
- A flow regime (*i.e.,* the magnitude, frequency, duration, seasonality, and rate-of-change of freshwater discharge over time) necessary for normal behavior, growth, and survival of all life stages in the riverine environment, including migration, breeding site selection, courtship, egg fertilization, resting, and staging, and for maintaining spawning sites in suitable condition for egg attachment, egg sheltering, resting, and larval staging;
- Water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages;
- Sediment quality, including texture and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; and
- Safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (*e.g.*, an unobstructed river or a dammed river that still allows for passage).

2.1.3 Life History

Like most sturgeons, the Gulf sturgeon is characterized by large size, longevity, delayed maturation, high fecundity, and far-ranging movements. Gulf sturgeon typically live for 20-25 years, but can reach ages of at least 42 years old (Huff 1975). Age at sexual maturity ranges from 8-12 years for females and 7-9 years for males (Huff 1975). High fecundity has been demonstrated by Chapman et al. (1993), who estimated that mature female Gulf sturgeon weighing between 29 and 51 kg (64 and 112 lb) produce an average of 400,000 eggs. Long-range migrations from the open Gulf of Mexico to bays and estuaries to coastal rivers are also common. Migratory behavior of the Gulf sturgeon is likely influenced by sex and reproductive status (Fox et al. 2000), change in water temperature (Wooley and Crateau 1985; Chapman and Carr 1995; Foster and Clugston 1997), and increased river flow (Chapman and Carr 1995; Heise et al. 1999a, b; Sulak and Clugston 1999; Ross et al. 2000 and 2001b; Parauka et al. 2001).

In general, all life stages of Gulf sturgeon migrate into rivers in the spring (from late February to May), where sexually mature sturgeon spawn when the river temperatures rises to between 17-25°C. Similar to Atlantic sturgeon, Gulf sturgeon are believed to exhibit a long inter-spawning period, with male Gulf sturgeon capable of annual spawning, but females requiring more than one year between spawning events (Huff 1975; Fox et al. 2000) and only a small percentage of females spawn in a given year (Sulak and Clugston 1999; Pine et al. 2001). Therefore, Gulf sturgeon population viability is highly sensitive to changes in adult female mortality and abundance (Pine et al. 2001; Flowers 2008).

Spawning occurs in the upper reaches of rivers, at least 100 km (62 miles) upstream of the river mouth (Sulak et al. 2004), in habitats consisting of one or more of the following: limestone bluffs and outcroppings, cobble, limestone bedrock covered with gravel and small cobble, gravel, and sand (Marchant and Shutters 1996; Sulak and Clugston 1999; Heise et al. 1999a; Fox et al. 2000; Craft et al. 2001; USFWS unpub. data 2005; Pine et al. 2006). These hard bottom substrates are required for egg adherence and shelter for developing larvae (Sulak and Clugston 1998). Documented spawning depths range from 1.4 to 7.9 m (4.6 to 26 ft) (Fox et al. 2000; Ross et al. 2000; Craft et al. 2001; USFWS unpub. data 2005; Pine et al. 2006).

Gulf sturgeon eggs are demersal and adhesive, and require at least 2 to 4 days to hatch (Parauka et al. 1991; Chapman et al. 1993). After hatching, larval Gulf sturgeon are particularly sensitive to water temperatures above 25°C (Chapman and Carr 1995). Young-of-year (YOY) fish disperse widely throughout the river and remain in freshwater for 10 to 12 months after spawning occurs (Sulak and Clugston 1999). They are typically found in open sand-bottom habitat away from the shoreline and vegetated habitat.

Throughout early spring to late autumn, Gulf sturgeon of all ages remain in freshwater until fall (6 to 9 months) (Odenkirk 1989; Foster 1993; Clugston et al. 1995; Fox et al. 2000; Sulak et al. 2009). They typically occupy discrete areas either near the spawning grounds (Wooley and Crateau 1985; Ross et al. 2001b) or downstream areas referred to as summer resting or holding areas. These resting areas are often located in deep holes, and sometimes shallow areas, along straight-aways ranging from 2 to 19 m (6.6 to 62.3 ft) deep (Wooley and Crateau 1985; Morrow et al. 1998; Ross et al. 2001a, b; Craft et al. 2001; Hightower et al. 2002), and frequently near (not in) natural springs (Clugston et al. 1995; Foster and Clugston 1997; Hightower et al. 2002). The substrates consisted of mixtures of limestone and sand (Clugston et al. 1995), sand and gravel (Wooley and Crateau 1985; Morrow et al. 1998), or just sandy substrate (Hightower et al. 2002). With the exception of YOY fish, Gulf sturgeon do not typically feed during freshwater residency (Mason and Clugston 1993; Gu et al. 2001). Sulak et al. (2012) reported that the vast majority (~94%) of juvenile, subadult, and adult Gulf sturgeon sampled from the Suwannee River exhibited complete feeding cessation for the 8-9 month summer residency; however, a small percentage (~6%) of juveniles and subadults did feed in freshwater.

All non-YOY begin to migrate downstream from fresh to saltwater around September (at about 23°C [73°F]) through November (Huff 1975; Wooley and Crateau 1985; Foster and Clugston 1997), and they spend the cool months in estuarine areas, bays, or in the Gulf of Mexico (Odenkirk 1989; Foster 1993; Clugston et al. 1995; Fox et al. 2002). During the fall migration, Gulf sturgeon may require a period of physiological acclimation to changing salinity levels, referred to as osmoregulation or staging (Wooley and Crateau 1985). This period may be short (Fox et al. 2002) as sturgeon develop an active mechanism for osmoregulation and ionic balance by age 1 (Altinok et al. 1998). Some adult Gulf sturgeon may also spawn in the fall (Randall and Sulak 2012).

Throughout fall and winter, juveniles feed in the lower salinity areas in the river mouth and estuary (Sulak and Clugston 1999; Sulak et al. 2009), while subadults and adults migrate and feed in the estuaries and nearshore Gulf of Mexico habitat (Foster 1993; Foster and Clugston

1997; Edwards et al. 2003, 2007; Parkyn et al. 2007). Some Gulf sturgeon may also forage in the open Gulf of Mexico (Edwards et al. 2003).

The Gulf sturgeon is a benthic (bottom dwelling) suction feeder: it feeds mostly upon small invertebrates in the substrate using its highly protrusible tubular mouth. The type of invertebrates ingested varies by habitat but are mostly soft-bodied animals that occur in sandy substrates. Young-of-the-year Gulf sturgeon feed on freshwater aquatic invertebrates, mostly insect larvae and detritus (Mason and Clugston 1993; Sulak and Clugston 1999; Sulak et al. 2009). Juveniles (less than 5 kg (11 lbs), ages 1 to 6 years) forage in lower salinity habitats near the river mouth and in the estuaries, and subadults and adults feed in the estuary and nearshore feeding grounds in the Gulf of Mexico (Foster 1993; Foster and Clugston 1997; Edwards et al. 2003, 2007; Parkyn et al. 2007). Prey in estuarine and marine habitats include amphipods, brachiopods, lancelets, polychaetes, gastropod mollusks, shrimp, isopods, bivalve mollusks, and crustaceans (Huff 1975; Mason and Clugston 1993; Carr et al. 1996; Fox et al. 2000; Fox et al. 2002). Ghost shrimp (*Lepidophthalmus louisianensis*) and haustoriid amphipods (e.g., *Lepidactylus* spp.) are strongly suspected to be important prey for adult Gulf sturgeon over 1 m (3.3 ft) in length (Heard et al. 2000; Fox et al. 2002).

Previous tagging studies indicated that Gulf sturgeon exhibit river fidelity (USFWS and GSMFC 1995). Stabile et al. (1996) identified five regional or river-specific stocks (from west to east): (1) Lake Pontchartrain and Pearl River, (2) Pascagoula River, (3) Escambia/Conecuh and Yellow Rivers, (4) Choctawhatchee River, and (5) Apalachicola, Ochlockonee, and Suwannee Rivers. Dugo et al (2004) reported that genetic structure occurs at the drainage level for the Pearl, Pascagoula, Escambia/Conecuh, Yellow, Choctawhatchee, and Apalachicola rivers (no samples were taken from the Suwannee population). Gulf sturgeon do make inter-river movements (USFWS unpubl. data 2012), and more genetic research is needed to determine if inter-stock movement is resulting in inter-stock reproduction.

2.1.4 Population Status

Historically, the Gulf sturgeon occurred from the Mississippi River east to Tampa Bay (Figure 2). Its present range extends from Lake Pontchartrain and the Pearl River system in Louisiana and Mississippi east to the Suwannee River in Florida. Sporadic occurrences have been recorded as far west as the Rio Grande River between Texas and Mexico, and as far east and south as Florida Bay (Wooley and Crateau 1985; Reynolds 1993).

In the late 19th century and early 20th century, the Gulf sturgeon supported an important commercial fishery, providing eggs for caviar, flesh for smoked fish, and swim bladders for isinglass, which is a gelatin used in food products and glues (Huff 1975; Carr 1983). Gulf sturgeon numbers declined due to overfishing throughout most of the 20th century. The decline was exacerbated by habitat loss associated with the construction of dams and sills (low dams), mostly after 1950. In several rivers throughout the species' range, dams and sills have severely restricted sturgeon access to historic migration routes and spawning areas (Wooley and Crateau 1985; McDowall 1988).

On September 30, 1991, the Service and the National Marine Fisheries Service (NMFS) listed the Gulf sturgeon as a threatened species under the Act (56 FR 49653). Threats and potential threats identified in the listing rule included: construction of dams, modifications to habitat associated with dredging, dredged material disposal, de-snagging (removal of trees and their roots) and other navigation maintenance activities; incidental take by commercial fishermen; poor water quality associated with contamination by pesticides, heavy metals, and industrial contaminants; aquaculture and incidental or accidental introductions; and the Gulf sturgeon's long maturation and limited ability to recolonize areas from which it is extirpated.

The Service and NMFS conducted a 5 year status review in 2009 where we concluded that the following threats continue to affect Gulf sturgeon and its habitat: impacts to habitats by dams, dredging, point and nonpoint discharges, climate change, bycatch, red tide, and collisions with boats (USFWS and NMFS 2009). Additional threats may include ship strikes and potential hybridization due accidental release of non-native sturgeon. These threats persist to varying degrees in different portions of the species range. The juvenile stage of Gulf sturgeon life history is the least understood, and perhaps the most vulnerable as this cohort remains in the river for the first years of its life and is therefore exposed to most of the threats faced by the species and its habitat. Further, the species long-lived, late-maturing, intermittent spawning characteristics make recovery a slow process.

Currently, seven rivers are known to support reproducing subpopulations of Gulf sturgeon. Table 2 lists these rivers and most-recent estimates of subpopulation size. Abundance numbers indicate a roughly stable or slightly increasing population trend over the last decade in the eastern river systems (Florida), with a much stronger increasing trend in the Suwannee River and a possible decline in the Escambia/Conecuh River. Populations in the western portion of the range (Mississippi and Louisiana) have never been nearly as abundant, and their current status is unknown as comprehensive surveys have not occurred in the past ten years.

At this time, the Service characterizes the status of the species as stable; however, the status of the subpopulations in the Pearl and Pascagoula rivers is uncertain. These rivers do not have current population estimates and have recently been threatened by hurricanes, the Deepwater Horizon oil spill, and a pot-liquor spill in the Pearl River. The Gulf sturgeon continues to meet the definition of a threatened species. While some riverine populations number in the thousands, abundance of most populations is in the hundreds. Loss of a single year class could be catastrophic to some riverine populations with low abundance. Further, while directed fisheries no longer occur, many threats continue and new ones are arising. Data are not yet available to determine if Gulf sturgeon recovery is limited by factors affecting recruitment (e.g., spawning habitat quantity or quality), adult survival (e.g., incidental catch in fisheries directed at other species), or the late-maturing, intermittent reproductive characteristics of the species.

2.1.5 Analysis of the Species/Critical Habitat Likely to be Affected

This BO addresses the effects of replacing the SR-41 Conecuh River Bridge on the Gulf sturgeon and its designated critical habitat. The Gulf sturgeon is found seasonally in the Conecuh River and its tributaries from early spring until late fall.

The Conecuh (Escambia) River is one of seven rivers currently known to support a reproducing subpopulation of Gulf sturgeon. The critical habitat in the Conecuh River system is included in Unit 3 (the Conecuh River mainstem and all Conecuh River distributaries). Unit 3 provides spawning sites and potential summer resting areas for the Conecuh River Gulf sturgeon subpopulation. Road and bridge construction may affect water and sediment quality in the Conecuh River, and alter migratory behavior as a result of physical and acoustic effects from pile driving and other work activities within the river. Therefore, in this BO we limit our analysis of effects to Gulf sturgeon to the Conecuh River subpopulation of the species in critical habitat Unit 3.

Table 2. Estimated size of known reproducing subpopulations of Gulf sturgeon.
In some cases, multiple estimates are presented based on differences in population estimation models used. All estimates apply to a proportion of the population exceeding a minimum size, which varies by researchers according to the sampling method used. CI = confidence interval. NR = not reported.

River	Year of data collection	Abundance Estimate	Lower Bound 95% CI	Upper Bound 95% CI	Source
Pearl	2001	430	323	605	Rogillio et al. 2001
Pascagoula	2000	181	38	323	Ross et al. 2001
Pascagoula	2000	206	120	403	Ross et al. 2001
Pascagoula	2000	216	124	429	Ross et al. 2001
Escambia/Conecuh	2006	451	338	656	USFWS 2007
Yellow	2011	1,036	724	1,348	USFWS 2012 unpub. data
Choctawhatchee	2008	3,314	NR	NR	USFWS 2009
Apalachicola	2005	2,000	NR	NR	Pine and Martell 2009a
Apalachicola	2010	1,292	616	1,968	USFWS 2010 unpub. data
Suwannee	2004	10,000	NR	NR	Pine and Martell 2009a
Suwannee	2006	9,728	6,487	14,664	Randall 2008
Suwannee	2007	14,000	NR	NR	Sulak 2008

2.2 Freshwater Mussels

2.2.1 Species Description

The narrow pigtoe (*Fusconaia escambia*) has a moderately thick, subtriangular to square shaped shell that reaches about 75 mm (3.0 in.). The periostracum (outer shell surface) is usually

reddish brown to black in color. The shell nacre (inner shell surface) is white to salmon in color with iridescence near the posterior margin (Williams and Butler 1994; Williams *et al.* 2008).

The narrow pigtoe is known from the Conecuh/Escambia River drainage in Alabama and Florida, and the Yellow River drainage in Florida. The species inhabits medium creeks to medium rivers, in areas with slow to moderate current, and is typically found in stable substrates of sand, sand and gravel, or silty sand (Williams *et al.* 2008). The narrow pigtoe is somewhat unusual in that it tolerates a small reservoir environment. Reproducing narrow pigtoe populations were found in Point A Lake and Gantt Lake reservoirs in relatively high numbers in areas with firm, stable sand substrates with little or no silt accumulation (Pursifull 2006 pers. obs.). The narrow pigtoe appears to require stable habitat, and is found in relatively high abundance only in a few areas with very stable habitat.

The narrow pigtoe, along with 7 other mussel species, were first identified as candidates for protection under the Endangered Species Act in the May 4, 2004, Federal Register (69 FR 24876). This species was listed as threatened species under the Act on November 9, 2012 (USFWS 2012).

2.2.2 Critical Habitat Description

Critical habitat was designated for the narrow pigtoe and seven other mussel species in 2012 (USFWS 2012). Nine units and 1,494 miles of river and creek channels were designated as critical habitat for the eight species. Five units are designated for the narrow pigtoe and total approximately 1,112 miles of river and creek channels in the Conecuh/Escambia River drainage in Alabama and Florida and the Yellow River drainage in Florida.

Critical habitat identifies specific areas that are essential to the conservation of a listed species and that may require special management considerations or protection. Section 7(a)(2) of the Act requires that each federal agency shall, in consultation with the Service, ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse modification of critical habitat.

The following constituent elements are part of the critical habitat designation and are essential to the conservation of the narrow pigtoe:

1. Geomorphically stable stream and river channels and banks (channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns over time without an aggrading or degrading bed elevation).

2. Stable substrates of sand or mixtures of sand with clay or gravel with low to moderate amounts of fine sediment and attached filamentous algae.

3. A hydrologic flow regime (magnitude, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species are found, and to maintain connectivity of rivers with the floodplain, allowing the exchange of nutrients

and sediment for habitat maintenance, food availability, and spawning habitat for native fishes.

4. Water quality, including temperature (not greater than 32 °C), pH (between 6.0 to 8.5), oxygen content (not less than 5.0 mg/L), hardness, turbidity, and other chemical characteristics necessary for normal behavior, growth, and viability of all life stages.

5. The presence of fish hosts. Diverse assemblages of native fish species will serve as a potential indication of host fish presence until appropriate host fishes can be identified for the narrow pigtoe.

2.2.3 Life History

Like other freshwater mussels, the narrow pigtoe feed by filtering food particles from the water column. The specific food habits of this species are unknown, but other freshwater mussels have been documented to feed on detritus (decaying organic matter), diatoms (various minute algae) and other algae and phytoplankton (microscopic floating aquatic plants), and zooplankton (microscopic floating aquatic animals).

The reproductive cycle of the narrow pigtoe is similar to that of other native freshwater mussels. Males release sperm into the water column, and the sperm are then taken in by the females through their siphons during feeding and respiration. The females brood the fertilized eggs in their gills until the larvae are (glochidia) fully developed. Females of some species release their glochidia into the water, either individually (sometimes in mucus strands for suspension), in packets termed conglutinates, or in one large mass known as a superconglutinate (Barnhart *et al.* 2008). In other species (mostly *lampsilines*), females transmit glochidia directly to the host fish by using their mantel flap to lure fish to attack (Barnhart *et al.* 2008). The mussel glochidia that attach to the appropriate fish species will then parasitize the host for a short time while they develop into juvenile mussels. They then detach from their fish host and sink to the stream bottom where they continue to develop, provided they land in suitable substrate with the correct water conditions.

Little is known about the specific reproductive biology of the narrow pigtoe. The species is believed to be a short-term brooder, with females gravid during spring and summer (Williams *et al.* 2008, p. 317). The host fish for the narrow pigtoe is currently unknown.

Some freshwater mussels are long-lived and slow-growing, while others grow quickly and have short life spans. Generally, heavy-shelled species grow slowly and tend to reach higher maximum ages relative to thin-shelled species. A recent age and growth study of 57 freshwater mussel species, mostly from the southern US, found growth and longevity varied greatly across species. A very tight relationship was observed between growth rate and longevity, finding that slow growing mussels (like Amblemini, Pleurobemini, and Quadrulini) tend to reach higher maximum ages than fast growing species (such as Andontini) (Haag and Rypel 2011, p. 238). The life span, growth rate, and many other aspects of narrow pigtoe life history are currently unknown.

2.2.4 Distribution and Status

The narrow pigtoe is endemic to the Conecuh/Escambia River drainage in Alabama and Florida, and to the Yellow River drainage in Florida (Williams *et al.* 2008). In the Conecuh/Escambia River drainage, the narrow pigtoe still occurs in nearly all of its historical range and is known from a total of 28 locations. The species appears to be extirpated from some localized areas, and was not detected at 3 out of 10 historical sites that were surveyed recently. Its abundance in the Conecuh/Escambia River drainage is relatively low, except in a few areas with very stable habitat including Gantt Reservoir in Alabama and the lower portion of the Escambia River near Molino, Florida.

The habitats of freshwater mussels are vulnerable to modification and water quality degradation from a number of human activities. The primary reason for the decline of these mussels has been the modification and destruction of their stream and river habitat, with sedimentation as the leading cause. Their stream habitats are subject to pollution and alteration from a variety of sources including adjacent land use activities, in-water activities, effluent discharges, and impoundments. Nonpoint-source pollution carried by land surface runoff originates from many land use activities and includes sediments, fertilizer, herbicide and pesticide residues, animal wastes, septic tank leakage, gray water discharge, and oils and greases. Current activities that negatively affect mussel populations include unpaved road crossings, improper silviculture and agriculture practices, highway construction, housing developments, pipeline crossings, and cattle grazing. These activities can result in physical disturbance of stream substrates or the riparian zone, excess sedimentation and nitrification, decreased dissolved oxygen concentration, increased acidity and conductivity, and altered flow.

Sedimentation is one of the most significant pollution problems for aquatic organisms (Williams and Butler 1994). Heavy sediment loads can destroy mussel habitat, resulting in a corresponding shift in mussel fauna (Brim Box and Mossa 1999). Excessive sedimentation can lead to rapid changes in stream channel position, channel shape, and bed elevation (Brim Box and Mossa 1999). Sedimentation has also been shown to impair the filter feeding ability of mussels. When in high silt environments, mussels may keep their valves closed more often, resulting in reduced feeding activity (Ellis 1936) and high amounts of suspended sediments can dilute their food source (Dennis 1984). Increased turbidity from suspended sediment can reduce or eliminate juvenile mussel recruitment (Negus 1966, Brim Box and Mossa 1999). Many mussel species use visual cues to attract host fishes; such a reproductive strategy depends on clear water. For example, increased turbidity may impact the southern sandshell life cycle by reducing the chance that a sight-feeding host fish will encounter the visual display of its superconglutinate lure (Haag *et al.* 1995, Blalock-Herod *et al.* 2002). Excessive sedimentation has been observed by biologists surveying for mussels in the streams and rivers of the Conecuh/Escambia and Yellow river basins (USFWS 2012).

2.2.5 Analysis of the Species/Critical Habitat Likely to be Affected

Biologists with AST Environmental conducted a mussel survey at the SR-41 bridge site during October 2014. The survey targeted all available mussel habitats in an area extending from 50 m

upstream to 100 m downstream of the bridge crossing. Surveyors used mask and snorkel along stream margins and in shallow runs and SCUBA in deeper runs and pools. Live or fresh dead shells of nine native mussel species were found at the site. One federally protected mussel was collected, the narrow pigtoe. In total, 31 species of mussels were collected within the 200 meter survey reach.

3.0 ENVIRONMENTAL BASELINE

Under section 7(a)(2) of the Act, when considering the "effects of the action" on federally listed species, we are required to take into consideration the environmental baseline. The environmental baseline includes past and ongoing natural factors and the past and present impacts of all federal, state, or private actions and other activities in the action area (50 CFR 402.02), including federal actions in the area that have already undergone section 7 consultation, and the impacts of state or private actions that are contemporaneous with the consultation in process. The environmental baseline for this opinion considers all projects approved prior to the initiation of formal consultation.

3.1 Gulf Sturgeon

3.1.1 Status of the Species within the Action Area

The action area extends from 130 feet upstream to 1000 feet downstream of the SR-41 Conecuh River crossing. Although the action area does not include the full extent of Gulf sturgeon habitat in the Conecuh River, this project has the potential to affect the entire Conecuh River subpopulation because all life stages must pass up- and downstream of the project. Therefore, the status of the subpopulation in the Conecuh River is the same as its status in the action area.

Ninety percent of the potential Gulf sturgeon spawning habitat is located in Alabama. The limestone or variations of hard clay and sandstone seem to be the reason for selecting areas within the segments of the Escambia/Conecuh and Yellow Rivers in Alabama over coastal Florida segments of those same rivers. The Gulf sturgeon is known to spawn at sites in the Conecuh River upstream of SR-41 in Alabama (Kreiser et al 2008; USFWS 2010-2012 unpub. data). The Escambia/Conecuh River from Point A Dam downstream to Brewton, Alabama contained the most potential Gulf sturgeon spawning habitat of the river systems surveyed - with an estimated 24 miles (USFWS 2002). One holding area, the Quintette Bridge, has been identified in the lower river downstream of SR-41.

This segment of river within the action area has no spawning habitat and is used only for traversing through for annual migrations between the Gulf of Mexico and spawning areas upstream of the SR-41 bridge.

3.1.2 Status of the Critical Habitat within the Action Area

This portion of the environmental baseline section focuses on Unit 3 Conecuh/Escambia River, the designated critical habitat for the Gulf sturgeon in the action area, describing what we know about the physical and biological features (PCEs) that are essential to the species' conservation

within the action area.

Riverine benthic invertebrate communities serve as prey primarily for YOY and juvenile Gulf sturgeon. Lewis (2010) summarized recent invertebrate collections in the action area and found that communities were dominated by midge (*Tendipedidae*) and mayfly (*Ephemeroptera*) larvae, oligochaetes and bivalves (particularly the Asian clam, *Corbicula fluminea*). There is no evidence to indicate the food resources in the Conecuh River are inadequate to support YOY and juvenile Gulf sturgeon at this time.

In a 2007 survey of the Conecuh River for potential spawning sites, the Alabama portion of the Conecuh River had the most potential Gulf sturgeon spawning habitat in this river system with 37 sites all above the SR-41bridge. The sites identified from Point A Dam, Alabama down to Brewton, Alabama consist of rock, limestone, clay bluffs and walls, limestone and rock outcroppings, shoals, and hard substrate and cobble. Fertilized Gulf sturgeon eggs were collected at five sites in the Conecuh River, Alabama (Craft et al. 2001). The egg collections sites were characterized by high limestone walls and hard substrate, and were either in a deep hole or a river bend or along a limestone wall. None of the characteristics of good Gulf sturgeon spawning habitat is found in the project action area, therefore no spawning habitat will be considered in this opinion.

The Conecuh/Escambia River Basin is increasingly impacted by non-point-source pollutants, such as agricultural runoff, sedimentation, and gravel mining operations. Although there are impacts to spawning sites from sedimentation, the status of this constituent element is stable. We are unaware of specific spawning habitat alterations that may limit the ability of the designated critical habitat to function for the conservation of the species. At this time, it appears that water quality in the Conecuh River critical habitat unit is adequate for the conservation of Gulf sturgeon.

Assessments of sediment contamination in the Conecuh River have not been conducted, but it is reasonable to suspect some level of contamination since the basin has experienced extensive logging and receives nonpoint source pollution and sedimentation from agricultural areas, and unpaved roads.

At this time, the status of the sediment quality PCE of Gulf sturgeon critical habitat in the Conecuh River is not pristine, but we do not have evidence that it is limiting the ability of the designated critical habitat to function for the conservation of the species. We are not aware of sediment quality impairments that have resulted in death, injury, or reduced growth and reproductive success to Gulf sturgeon in this system, and the subpopulation appears to be stable.

3.1.3 Factors Affecting the Species Environment within the Action Area.

No other actions affecting the species environment are expected within the action area.

3.2 Freshwater Mussels

3.2.1 Status of the Species within the Action Area

The 2014 mussel survey shows that densities of all mussels (including federally protected) are relatively low near the bridge compared to densities up- and downstream of the bridge. In general, mussels were most abundant near the boat ramp downstream and were scarce near the bridge.

The survey indicated that 1 narrow pigtoe was present within project area. Based on limited survey data collected from other main channel locations within the Conecuh River, it appears that the narrow pigtoe populations within the action area are average to below average. As described in the status of the species above, populations of this species is currently declining within the Conecuh River drainage. It appears that their populations within the action area are similarly declining.

3.2.2 Status of the Critical Habitat within the Action Area

The action area includes 3,280 feet downstream and 130 feet upstream of the existing bridge site where direct and indirect impacts from the proposed project could occur within Unit GCM1 which is critical habitat for the Choctaw bean (*Villosa choctawensis*), Fuzzy pigtoe (*Pleurobema strodeanum*), Southern sandshell (*Lampsilis australis*), Southern kidneyshell (*Ptychobranchus jonesi*), Narrow pigtoe (*Fuscanaia escambia*), and the Round ebonyshell (*Obovaria rotulata*). Therefore, approximately 3500 feet of critical habitat in the Escambia/Conecuh River Unit is within the action area.

The constituent elements necessary for critical habitat are present within the project area and show some indications of impact from previous bridge construction and demolition activities, and by the existing structure.

It was noted during the 2014 survey that mussels were most abundant at the downstream end of the study reach at the public boat ramp. Habitat was more favorable in this reach where the left descending bank of the Conecuh River is stabilized by riprap placed near the boat ramp. Shifting, unstable sand was noted in the main channel possibly as a result of localized bank erosion. Mussels were much fewer near the bridge, possibly as a result of impacts resulting from the bridge piers. These structures may cause local alterations to flow patterns, increased bed scour around the piers, and changes in bed elevation.

The Conecuh River is subject to a variety of nonpoint pollution sources such as urban runoff from Brewton and input from wastewater facilities. Currently, stormwater discharges directly into the river from the existing bridge. There could be temporary and permanent localized impacts to water quality due to runoff carrying contaminants and sediments into the river from the bridge and nearby roadway.

3.2.3 Factors Affecting the Species' Environment within the Action Area

This section describes factors affecting the environment of the species or critical habitat in the action area. The baseline includes State, tribal, local, and private actions already affecting the species or that will occur contemporaneously with the consultation in progress. The existing SR-41 roadway and bridge, and a downstream boat ramp are within the action area, and past construction of these structures and the presence of bridge pilings and rip rap in the waterway have impacted the aquatic habitat in the action area. The survey report indicated that the existing bridge structure may be impacting local habitat conditions based on the fact that mussel densities increased with distance from the bridge. The report also noted that much of the substrate in the main channel of the action area was comprised of unstable, shifting sand, and attributed this to bank erosion due to local riparian disturbances. We are not aware of other specific factors affecting the environment within the action area.

4.0 EFFECTS OF THE ACTION

4.1 Factors to be Considered

This section includes an analysis of the direct and indirect effects of the proposed action on the species and critical habitat and its interrelated and interdependent activities. Our analysis of the effect of road and bridge construction considers the following factors:

The proposed action will affect designated critical habitat and all life stages of Gulf sturgeon in the Conecuh River because all life stages must pass up and downstream of the project. The proposed action will affect designated critical habitat and all life stages of the narrow pigtoe in the Conecuh River.

The action area is a 3500 foot segment of the Conecuh River channel in Escambia County, Alabama that begins 130 upstream of the existing bridge to 3,280 feet downstream. The Gulf sturgeon is known to reproduce in seven rivers across its range, and all seven rivers are designated critical habitat. The Escambia/Conecuh River critical habitat unit is in the center of the species' range; however, critical habitat will only be affected in the Conecuh River from 130 feet upstream of the bridge to 3,280 feet downstream. Therefore, less than 1% of designated Gulf sturgeon riverine critical habitat may be affected by the proposed action. The Conecuh River subpopulation was estimated to be 451 net-vulnerable individuals in 2007.

Total critical habitat designated for the narrow pigtoe is 689 miles. The Conecuh River (GCM Unit 3) comprises approximately 10% of total critical habitat for the narrow pigtoe.

The construction let timeframe is currently in November 2015, with construction expected to begin in the Fall of 2015. Four drill shafts will be placed in the main channel of the Conecuh River. There are two shafts each for bents 9 and 10.

Drilling shafts in the main channel (bents 9 and 10) is allowed during the Gulf sturgeon freshwater life cycle (March through October) if work is done within the coffer dam. Demolition of the existing bridge structure will not occur during the Gulf sturgeon freshwater life cycle

(March through October) of any year. In-river demolition of the existing bridge and dismantling of the temporary work bridge is expected to occur November to March of any year after the completed construction of the new Conecuh River Bridge.

Direct impacts may consist of: injuring, crushing or burying individual Gulf sturgeon and their prey species by construction activities with machinery, and/or sediment suspension and deposition during construction and demolition, especially if piles are removed; disturbance of individuals due to increased noise and vibrations from drilling shafts; displacement of individuals; and habitat loss due to the addition of in-river structures, increased scour, riparian vegetation removal, decreased woody debris, potential increases in stream temperature, and the addition of fine sediments. Indirect impacts from construction may consist of altered water quality, habitat quality, and behavior of Gulf sturgeon within the stream segment. Altered behavior could include increased stress responses and disruption of migration due to construction activities (*e.g.*, elevated noise, sediment controls or equipment blocking passage, etc.), resulting in lost or reduced recruitment and/or reduced feeding due to construction activities. Elevated levels of fine sediments may affect breathing, feeding, and reproduction. Invertebrate populations, a food source for YOY and juvenile sturgeon, may also be depressed.

Direct and indirect effects to the sturgeon may occur primarily within the Conecuh River from 130 feet upstream of the bridge and downstream as far as 3,280 feet. Activities that cause erosion and sedimentation into the stream could extend over 3,280 feet downstream and even farther under very high rainfall conditions; however, erosion control measures should greatly reduce these effects. In addition, road capacity improvement projects can lead to additional development within the watershed. The following agreed-upon conservation measures will greatly reduce the direct and indirect impacts from the project: the use of environmentally-sensitive bridge construction; timing of in-river bridge construction and demolition activities to avoid the freshwater life cycle period (March through October); prohibiting in-river night time piling installation from March through October; using BMPs to control erosion, sedimentation, and turbidity; and conveying stormwater to ponds or other methods for pre-treatment before discharge.

River habitat will be impacted permanently by the construction of the two bents within the river main channel (bents 9 and 10). Suitable river habitat at the construction site will also be affected for the duration of the construction and demolition and likely for some period after completion of the projects. Direct impacts may consist of: injuring, crushing or burying individual mussels by construction activities with machinery, and/or sediment suspension and deposition; disturbance of host fish due to increased noise and vibrations from drilling shafts; displacement of individuals; and habitat loss due to the addition of in-river structures, increased scour, riparian vegetation removal, decreased woody debris, potential increases in stream temperature, and the addition of fine sediments. Indirect impacts from construction may consist of altered water quality and habitat quality within the stream segment. Measures to reduce effects include erosion control measures, avoiding work during the 2015 mussel reproductive season (April to mid-June), and relocating individual mussels from the area where the project effects are most likely to occur.

The duration of impacts will be both short- and long-term. Impacts potentially can occur during

the period of excavating and grading the river embankments and during construction of the temporary work platforms. Impacts are also likely to occur during demolition, especially from sediment disturbance when the piles are removed or cut. Some indirect impacts due to the presence of the bridge will be permanent, resulting from the continuing presence of the structure itself in a new, although previously impacted, location. These effects may be both short-term (such as periodic maintenance activities) and long-term (altered river hydrology and geomorphology; increased magnitude and frequency of floods and debris flows, etc.). Roads can be a major sediment source throughout their existence. Vehicular traffic is a source of chemical contamination from metals, petroleum products, and occasional toxic spills. Roads may also provide a new access point for human activity, thereby causing the spread of non-native plants, fish and mollusks, and pathogens.

Construction activities will result in a prolonged, one-time disturbance to critical habitat within the Action Area and to the Conecuh River subpopulation of Gulf sturgeon and the freshwater mussel populations. Drilling shaft for the pilings will occur as short-term pulses (*i.e.* hours), separated by virtually instantaneous and complete recovery periods. These disturbances are likely to occur intermittently throughout the day. Pile removal or cutting will also occur as short-term pulses over a similar frequency and duration in the late fall and winter. In the main channel (bents 9 and 10), no in-river work activities associated with temporary work bridge construction, replacement bridge construction, and bridge demolition will occur during the March through October the freshwater life cycle period for Gulf sturgeon with the exception of work within the coffer dams. Night-time disturbance will not occur in-river (bents 9 and 10) when Gulf sturgeon may be present (March through October).

Water quality impairment will also occur as short-term pulses (*i.e.*, minutes to hours) during construction and demolition, most likely due to sediment disturbance from pile drilling removal or cutting and/or erosion during precipitation events. Water quality impairment may continue due to stormwater runoff for the design life of the bridge. Physical habitat alteration due to modification and replacement of existing in-river and over-water structure also occur intermittently during construction, and will remain as the final, as-built project footprint for the design life of the bridge.

The direct and temporary impacts are expected to occur during the construction phase of the project. Since work for the entire project could take up to two years, the impacts of the proposed action are expected to affect multiple generations of Gulf sturgeon. We also expect individual Gulf sturgeon to use the areas in the project footprint routinely from March through October and to recolonize daily if they are temporarily displaced during construction or demolition.

We do not have population estimates for this mussel species; however, considering their densities in this area and the size of the impacted area, we expect that relatively few individuals will be permanently affected. The proposed project will impact a relatively small amount of habitat within the action area, much less than 1% of the designated critical habitat in the Conecuh River drainage. It is anticipated that most of the impacts will be temporary degradation, and that only a very small amount of habitat that will be permanently altered or destroyed. It is expected that the majority of individuals of this species will recover from the effects of the proposed project and that most of the habitat in the action area will eventually recover from impacts of the

project.

The intensity and severity of the impacts will be reduced by implementing many of the conservation measures in the proposal. These measures include but are not limited to, the use of environmentally-sensitive bridge construction; timing of in-river (bents 9 and 10) replacement bridge and work platform construction, and demolition related activities to avoid the main sturgeon freshwater life cycle period (March through October); prohibiting night-time piling installation (bents 9 and 10) from March through October; drilling shafts rather than pile driving to reduce noise levels and vibration; using BMPs to control erosion, sedimentation, and turbidity; and conveying stormwater to treatment ponds or other methods to eliminate direct run off into the river.

4.2 Analysis for Effects of the Action

This analysis will focus on the effects of the proposed work activities on the aquatic environment and adjacent riparian areas. The effects of roads and bridges on aquatic systems have been well-studied and can extend considerable distances beyond the project's construction footprint. Actions that may result in direct impacts to listed species include land clearing and grading, the construction of a temporary access road and work structure, the installation of new bridge structures, the demolition and removal of the existing bridge structures, and potential toxic spills. All of these activities have the potential to kill and injure Gulf sturgeon and mussels (as well as their host fish), either by crushing them; poisoning them with the release of some toxic substance; or causing sedimentation, which may suffocate them. These actions also may result in direct impacts to their habitat. Construction of this new bridge will require the placement of two bents in the river channel. In addition the presence of the bents within the channel will alter flow patterns which could cause substrate instability and bank erosion around and immediately downstream of the shafts.

The physical placement of bents may crush and kill individuals of the species that are within the work area, especially mussels which have very limited mobility. Erosion control material may impede movements and migration of sturgeon through and around the area. Toxic materials, *e.g.* petroleum products and other contaminants may inadvertently be released in the work area and cause physical harm to these aquatic species. Noise and vibration from heavy equipment and construction activities may increase ambient sound levels and/or cause disturbance which alters fish behavior.

All these impacts discussed have the potential to detrimentally affect Gulf sturgeon and freshwater mussels. However, the work activities with the greatest likelihood to affect listed aquatic species are associated with: piling installation and removal, especially within the river; land clearing/grubbing/filling activities in the adjacent riparian areas; and demolition of the existing bridge. The greatest potential effects will likely be from reduced water quality.

Road and bridge construction commonly result in increased sedimentation in riverine environments. Sediment and contaminants are likely to be released into the water by construction activities that are part of the proposed action, including geotechnical surveys, excavation, grading, filling, pile installation and removal, and in-river work that is necessary to

rehabilitate or construct the road and bridges, construct and maintain the stormwater facilities, and remove the existing bridge. Soil disturbance will increase the rate at which wind and water erosion will carry sediment into the Conecuh River. Pile installation and removal will also disturb the sediments in the footprint and result in some re-suspension of material into the water column. However, because the piles occupy a small area of primarily sandy substrates that are often rearranged by river currents, any increase in turbidity will likely be small and in a short-term pulse.

The Gulf sturgeon and their critical habitat are likely to be affected by reduced water quality through increased sedimentation and contamination associated with road and bridge construction and demolition, and stormwater discharge. Sedimentation from soil disturbance in and near the stream may interfere with proper respiratory functioning, smother in-stream habitat and reduce the prey base for YOY and juvenile Gulf sturgeon, and reduce channel capacity. Loss of channel capacity leads to greater bank erosion, channel widening, increased temperatures and other alterations adverse to the Gulf sturgeon. However, the erosion control plan should reduce the potential for impacts to Gulf sturgeon and its critical habitat. However, due to stormwater treatment, and the relatively small amount of time that any heavy equipment will be in the water and the use of proposed conservation measures, any increase in contaminants is likely to be small and infrequent.

Increase suspended solids (turbidity) in the water column has the potential to impair the ability for freshwater mussels to breathe and feed. The activities may cause disturbances that cause mussels to close their valves for long periods of time, affecting normal feeding, respiration, and reproductive activities. In addition, downstream mussel populations will be protected from silt and sediment displaced by construction activities through a combination of silt fencing and turbidity barriers, as well as minimizing disturbance of riverside wetlands and banks. The following agreed-upon conservation measures will greatly reduce the impacts to mussels from the project: the use of environmentally-sensitive bridge construction; using BMPs to control erosion, sedimentation, and turbidity; and conveying stormwater to ponds for pre-treatment before discharge.

Indirect effects are defined as those that are caused by or result from the proposed action and are later in time but are still reasonably certain to occur. The infrastructure improvements associated with bridge replacements/upgrades could indirectly affect and improve traffic levels, better accommodate larger vehicles, or reduce travel times, all of which could have land development impacts outside the project area. Given that the project involves the replacement of existing structure in essentially the same location, and that traffic capacity will remain the same for the new bridge, it is not likely that the new structure would increase accessibility to the adjacent land or result in changes in the type or volume of traffic using the structure.

We must consider along with the effects of the action the effects of other federal activities that are interrelated to, or interdependent with, the proposed action (50 CFR sect. 402.02). Interrelated actions are part of a larger action and depend on the larger action for their justification. Interdependent actions have no independent utility apart from the proposed action. At this time, the Service is unaware of actions that satisfy the definitions of interrelated and

interdependent actions that will not themselves undergo section 7 in the future, or that are not already included in the Baseline.

5.0 CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service is not aware of any specific plans within the Action Area that would not be covered under section 7.

6.0 CONCLUSION

Gulf Sturgeon

Our analysis indicates that the proposed project would have a negative, but not appreciable effect on the survival and recovery of Gulf sturgeon. Most direct and indirect effects will occur within the 200-ft work area, although some effects (*e.g.* noise, sedimentation, vibration, human activity) may occur further upstream and downstream of the project; however, the effects are considered small, temporary and reversible. Given that the subpopulation of Gulf sturgeon in the Conecuh River is stable or increasing, the probability of species extinction is low. In addition, the proposed project is not likely to appreciably diminish the critical habitat's capability to provide the intended conservation role for the Gulf sturgeon. The nature of effects to critical habitat is relatively small, dynamic, and would not produce permanent alterations to any PCE.

After reviewing the current status of the Gulf sturgeon, the environmental baseline for the action area, the effects of the action, and the cumulative effects, it is the Service's biological opinion that the proposed replacement of the SR-41 bridge on the Conecuh River is not likely to jeopardize the continued existence of the Gulf sturgeon or destroy or adversely modify its designated critical habitat.

Freshwater Mussels

After reviewing the current status of the narrow pigtoe; the environmental baseline for the action area; the effects of bridge construction and demolition; measures identified in the ALDOT's BA to help minimize the potential impacts of the proposed project and assist in the protection, management, and recovery of the species; the absence of previously issued Service biological opinions that have allowed incidental take; any potential interrelated and interdependent actions associated with the proposed action; and any potential cumulative effects, it is the Service's biological opinion that the SR-41 Conecuh River bridge replacement project, as proposed is not likely to jeopardize the continued existence of the narrow pigtoe. Critical habitat will not be adversely modified or destroyed by implementing this project as proposed.

7.0 INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take

of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering [50 CFS §17.3]. Incidental take is defined as take that is incidental to, and not the purpose of, an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by ALDOT so that they become binding conditions of any contract, grant or permit issued by the FHWA, as appropriate, for the exemption in section 7(o)(2) to apply. FHWA and ALDOT have a continuing duty to regulate the activity covered by this incidental take statement. If FHWA and ALDOT: (1) fail to assume and implement the terms and conditions or, (2) fail to require any contracted group to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, FHWA and ALDOT must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(I)(3)]

7.1 Amount Or Extent Of Take Anticipated

Gulf Sturgeon

Incidental take is expected to be in the form of temporary direct and indirect impacts resulting from construction activities, elevated noise levels and vibration, human disturbance, impaired water quality, and habitat degradation. While injury or mortality of individuals is possible, the risk will be reduced by the use of environmentally-sensitive bridge construction techniques, and conservation measures that minimize the impacts of pile installation, erosion, and ground disturbance. As described above (Effects of the Action), we cannot quantify the number of individuals that may be directly or indirectly affected by the proposed action because it depends on the number of individuals in the area of impact, which varies widely based on time of year and habitat condition. Therefore, take cannot be accurately quantified as the number of individual Gulf sturgeon that is reasonably certain to be injured or killed, or indirectly impacted through habitat degradation. Thus, Gulf sturgeon take in the form of physical harm and mortality is limited to one Gulf sturgeon. Take in the form of harassment is expected to include all Gulf sturgeon using the 430-foot action area during in stream construction and destruction of the new and former bridge. Table 3 summarizes expected take below.

Freshwater Mussels

The Service anticipates that incidental take of no more than 10 narrow pigtoes may occur as the result of the proposed project within a 430-foot impact zone. These numbers are higher than the observed number of this species found in the impact zone because all individuals of the species may not have been found during the survey. Current knowledge does not provide for extrapolation of the true number present based on the number that was observed. The level of take is, therefore, an educated guess based on our knowledge that the detection of individuals will depend on numerous variables such as species, life stage, water velocity, depth, and clarity, survey methods and effort, surveyor experience, season, catchment size, and substrate. These and other factors may confound an accurate count of all mussels present in the impact area. However, we believe these numbers represent a reasonable expectation of the total number of individuals present in the impact area and will allow for the completion of the project without undue risk to the species present. Take of these species is expected in the form of kill, harm, and harassment through bridge construction and removal, and also as a result of effects associated with sedimentation and other habitat alterations, some of which may occur later in time.

At this time, 1 narrow pigtoe is known to be in the construction impact zone. Another survey will be completed prior to construction.

Table 3. The riverine habitat and associated individuals affected by the proposed project. This estimate is based on the best available information.

Species	***Habitat***	***Individuals***	***Take Type***
Gulf sturgeon	430 linear feet	*All adult and juvenile sturgeon within the action area that may be harassed by construction work activities and increased turbidity levels. Take in the form of kill of one Gulf sturgeon can be anticipated for this project.*	*Harm, Harass, or Kill*
Narrow pigtoe		*10*	*Harm, Harass, or Kill*

7.2 Effect Of The Take

In the accompanying biological opinion, the Service determined that this level of anticipated take will not result in jeopardy to the Gulf sturgeon and narrow pigtoe, or the destruction or adverse modification of their designated critical habitat. Measures to reduce potential impacts to the Gulf sturgeon and narrow pigtoe and their critical habitat have been incorporated into the plans for this road construction project.

7.3 Reasonable And Prudent Measures

The Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize the incidental take of Gulf sturgeon, freshwater mussels, and their critical habitat as a result of replacing the SR-41 Conecuh River Bridge. Each RPM will be implemented by associated terms and conditions given in the section to follow. FHWA, as the lead federal agency, shall assure that the following reasonable and prudent measures, with their

associated terms and conditions are implemented by the ALDOT and their contractor.

RPM 1: Gulf sturgeon and freshwater mussel protection, and habitat protection and restoration procedures to minimize impacts from all the construction activities shall be implemented.

RPM 2: Ensure that the terms and conditions are accomplished and completed as detailed in this incidental take statement including completion of reporting requirements.

7.4 Terms and Conditions

In order to be exempt from the prohibition of section 9 of the Act, FHWA must ensure that the ALDOT and their contractors comply with the following terms and conditions, which implement the preceding reasonable and prudent measures. All conservation measures described in the BA and listed above are hereby incorporated by reference as terms and conditions within this document pursuant to 50 CFR § 402.14(I) with the addition of the following terms and conditions. All terms and conditions are non-discretionary.

RPM 1

1.1 The ALDOT will provide an information package at the Pre-Construction Conference to educate the Contractor on the subject of the listed species, the laws protecting such species, and the civil and criminal penalties for harming, harassing, or killing such species.

1.2 The Contractor will consider and implement where practical innovative, environmentally sensitive construction techniques to avoid/minimize impacts to listed species and sensitive areas.

1.3 All timing restrictions applicable to construction of the permanent bridge will also apply to construction of the temporary in-river work structure.

1.4 The Erosion Control Plan/Stormwater Plan will be provided to the Service for comment prior to the start of work. Substantive changes to the Plan during construction will also be reported to the Service.

1.5 The Erosion/Stormwater Control Plan will be strictly adhered to, including the installation and maintenance of structures and demolition of the current structure. Temporary erosion control devices will be installed prior to clearing and grubbing activities. Other measures in the plan will include:

a. All turbidity barriers placed in the river will be consistent with the *Gulf Sturgeon Protection Guidelines*. Floating silt booms are expected to extend from the water surface to the rivers bottom during normal flow.
b. Stockpiled materials will be placed in a manner to prevent rain runoff from washing materials into the river.
c. The Erosion Control Plan will include redundant measures for the width of the ROW along the Conecuh River to provide "back-up protection" should one layer

of protection be breached. An example would be a double row of silt fencing.

d. The Erosion Control Plan will include daily monitoring of erosion control devices that protect the waters of the Conecuh River.

1.6 In the event of erosion control failure with impacts to the Conecuh River, the Contractor will notify the ALDOT, FHWA, and Service to determine: (1) whether incidental take was exceeded, (2) if additional protection measures are needed to avoid future impacts to listed species from sedimentation, and (3) if stream restoration is needed. The Service will be available to assist the ALDOT with development of a stream restoration plan should it become necessary

1.7 Stream turbidity will be monitored by the Contractor or his designee before construction in various places on the river (upstream, downstream, etc.) to establish a baseline. During construction and demolition, the Contractor will be responsible for monitoring turbidity levels daily for any earthwork activities near the Conecuh River to ensure that turbidity levels do not increase above the level allowed by the ADEM permit. Construction activities found to be associated with the increased turbidity levels will not be allowed to resume until the turbidity levels return to that of ambient. All other construction activities having no effect on the deviant turbidity levels will be allowed to resume once the source has been identified.

1.8 Boats and barges (if used) in support of construction activities will be removed from the main Gulf sturgeon migration route during periods of inactivity. At no time will barges be allowed to rest on the river bottom.

1.9 A post-construction field review will be conducted by ALDOT and the Service to determine if the project has impacted the Conecuh River and if stream restoration is needed.

1.10 Conservation measures and best management practices outlined in these terms and condition shall be included as enforceable provisions of the construction contract. Failure to comply with all applicable conservation measures outlined in the opinion, unless they conflict with provisions in these terms and conditions, and all terms and conditions included here may invalidate protective coverage of ESA section 7(o)(2) regarding the incidental take of listed species.

RPM 2

2.1 Upon locating a dead, injured, or sick individual of an endangered or threatened species, notification must be made to the Fish and Wildlife Service Law Enforcement Office, Daphne, Alabama at (251) 441-5787 within 24 hours. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury.

2.2 A report describing the actions taken to implement the terms and conditions of this incidental take statement shall be submitted to the Project Leader, U.S. Fish and Wildlife

Service, 1208 Main Street, Daphne, AL 36526, within 60 days of the completion of construction. This report shall include the dates of work, assessment and actions taken to address impacts to the Gulf sturgeon and freshwater mussels, if they occurred.

8.0 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by conducting conservation programs for the benefit of endangered and threatened species. Towards this end, conservation recommendations are discretionary activities that an action agency may undertake to minimize or avoid the adverse effects of a proposed action, help implement recovery plans, or develop information useful for the conservation of listed species.

1. Fund research to determine effectiveness of mussel relocation in conjunction with bridge replacements
2. Fund research to determine optimum time of the year to conduct surveys for mollusk species.
3. Develop guidelines for spanning waterways that currently have protected species and critical habitat.

9.0 REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the BA. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information shows that the action may affect listed species in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. This biological opinion was formulated by evaluating the effects of the action assuming that construction would begin within the next five years. If the let date does not occur within five years of this biological opinion, the Service would consider that the action was modified in a manner not considered in this opinion, and we would recommend reinitiating formal consultation.

We appreciate the cooperation of FHWA, ALDOT, and their consultants in preparing this biological opinion. We look forward to working closely with you in implementing its provisions and other conservation actions for listed species. Please contact Mr. Bruce Porter at (251) 441-5864 for questions/comments on this consultation.

Sincerely,

William J. Pearson
Project Leader
Alabama Ecological Services Field Office

cc: (electronic copies)
ALDOT, Environmental Technical Services, Montgomery, AL 36110
FHWA, Alabama Division, Montgomery, AL 36117
U.S. Army Corps of Engineers, Mobile District, Attn: Ms. Leslie Turney, Mobile, AL
USFWS, Panama City Field Office (Attn: Ms. Sandra Pursiful), Panama City, FL

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APPENDIX A

Construction Special Provisions
Gulf Sturgeon Protection Guidelines

September 2012

CONSTRUCTION SPECIAL PROVISIONS
GULF STURGEON PROTECTION GUIDELINES
(PURSUANT TO NMFS AND USFWS)

The Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is listed under the Endangered Species Act as threatened. It is managed under the joint jurisdiction of the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS). Potential habitat for the Gulf sturgeon is located within the limits of this project.

The following special provisions will be incorporated into any construction contract where involvement with sturgeon may occur:

The ALDOT has coordinated with the NMFS and USFWS early in the project development stage. The following provisions are intended to avoid/ protect known spawning habitats, nursery areas, feeding areas and thermal refuges.

1. The Alabama Department of Transportation (ALDOT) shall advise all ALDOT project personnel and Contractor personnel on the project that there are civil and criminal penalties for harming, harassing or killing sturgeon. The ALDOT and the Contractor will be held responsible for any sturgeon harmed, harassed, or killed as a result of the project activity.

2. The ALDOT shall provide information to all ALDOT and Contract personnel for identification of sturgeon.

3. Appropriate work shift personnel will be instructed in the appearance, habits, biology, migratory patterns, and preservation of sturgeon. At least one of these trained personnel will be on site during construction activities to maintain a constant surveillance for these species, assure the cessation of activities (such as dredging, excess turbidity, and construction barge activity), which may endanger these species, and assure that uninhibited passage for the animals is provided.

4. Post signs on site warning of the presence of sturgeon, of their endangered status and federal protection, and precautions needed.

5. Turbidity from construction activity will be adequately controlled to prevent degradation of the quality and transparency of the water. When sturgeon are present, turbidity curtains of appropriate dimension will be used to restrict the animals' access to the work area. Pollution booms or turbidity curtains should use tangle resistant or hemp rope when anchoring, or employ surface anchors' to prevent entangling sturgeon. Continuous surveillance will be maintained in order to free animals which may become trapped in silt or turbidity barriers.

6. No dredging of the river bottom will be conducted for barge access.

7. Drilled shaft pile construction will be used whenever prudent and feasible as determined by ALDOT.

8. Care shall be taken in lowering equipment or material below the water surface and into the stream bed. These precautions will be taken to ensure no harm occurs to any sturgeon which may enter the construction area undetected.

9. Construction debris shall not be discarded into the water.

10. If the use of explosives is necessary, the following protection measures will be employed;

    a. In riverine areas:
       - No blasting will occur in known spawning, staging, feeding, or nursery areas.
       - In-water explosive work should be avoided between the months of March to October.
       - If explosive work becomes necessary within the March to October time frame, a non-lethal "Fish Scare" charge will be detonated one minute prior to detonation of the underwater blast.

    b. In estuarine areas:
       - No blasting will occur in known spawning, staging, feeding, or nursery areas.
       - In-water explosive work should be avoided between the months of October to April.
       - If explosive work becomes necessary within the October to April time frame, a non-lethal "Fish Scare" charge will be detonated one minute prior to detonation of the underwater blast.

    c. In the event that a sturgeon is killed during blasting, the NMFS and the USFWS will be notified immediately.

National Marine Fisheries Service by email at: takereport.nmfsser@noaa.gov	US Fish and Wildlife Service 1208 Main St Daphne, AL 36526 Tel: (251) 441-5181

11. Any sturgeon carcass will be secured on site or held in a freezer until an agency representative arranges for its transport for analysis.

12. Following completion of the project, a report summarizing any involvement with sturgeon will be prepared for USFWS and NMFS.