DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2011–0050; 4500030113]

RIN 1018–AW92

Endangered and Threatened Wildlife and Plants; Determination of Endangered Species Status for the Alabama Pearlshell, Round Ebonyshell, Southern Kidneyshell, and Choctaw Bean, and Threatened Species Status for the Tapered Pigtoe, Narrow Pigtoe, Southern Sandshell, and Fuzzy Pigtoe, and Designation of Critical Habitat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service, determine endangered species status for the Alabama pearlshell (*Margaritifera marrianae*), round ebonyshell (*Fusconaia rotulata*), southern kidneyshell (*Ptychobranchus jonesi*), and Choctaw bean (*Villosa choctawensis*), and threatened species status for the tapered pigtoe (*Fusconaia burkei*), narrow pigtoe (*Fusconaia escambia*), southern sandshell (*Hamiota australis*), and fuzzy pigtoe (*Pleurobema strodeanum*), under the Endangered Species Act of 1973, as amended (Act); and designate critical habitat for the eight mussel species. The effect of this regulation is to conserve these eight mussel species and their habitat under the Act.

DATES: This rule becomes effective on November 9, 2012.

ADDRESSES: This final rule, final economic analysis, and the coordinates from which the maps were generated are included in the administrative record for this critical habitat designation and are available on the Internet at *http://www.fws.gov/PanamaCity* and *http://www.regulations.gov* at Docket No. FWS–R4–ES–2011–0050, and at the Panama City FieldOffice. Any additional tools or supporting information that we may develop for this critical habitat designation will also be available at the Fish and Wildlife Service Web site and Field Office set out above, and may also be included in the preamble and/or at *http://www.regulations.gov*. Comments and materials received, as well as supporting documentation used in preparing this final rule, are available for public inspection, by appointment, during normal business hours, at U.S. Fish and Wildlife Service, Panama City Field Office, 1601 Balboa Avenue, Panama City, FL 32405; telephone 850–769–0552; facsimile 850–763–2177.

FOR FURTHER INFORMATION CONTACT: Don Imm, Field Supervisor, U.S. Fish and Wildlife Service, Panama City Field Office, 1601 Balboa Avenue, Panama City, FL 32405; telephone 850–769–0552; facsimile 850–763–2177. If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION: This document consists of: (1) A final rule to list the Alabama pearlshell (*Margaritifera marrianae*), round ebonyshell (*Fusconaia rotulata*), southern kidneyshell (*Ptychobranchus jonesi*), and Choctaw bean (*Villosa choctawensis*) as endangered species, and the tapered pigtoe (*Fusconaia burkei*), narrow pigtoe (*Fusconaia escambia*), southern sandshell (*Hamiota australis*), and fuzzy pigtoe (*Pleurobema strodeanum*) as threatened species; and (2) a final rule to designate critical habitat for the eight species.

Executive Summary

Why we need to publish a rule. Under the Endangered Species Act (Act), a species or subspecies may warrant protection through listing if it is an endangered or threatened species throughout all or a significant portion of its range. We are listing these eight mussels because they have disappeared from portions of their historic ranges or are very rare, and facing numerous ongoing threats. The Alabama pearlshell and southern kidneyshell no longer occur in 50 percent or more of the stream systems in which they were historically found. The round ebonyshell is extremely rare, and its distribution is restricted to the main channel of the Escambia-Conecuh River. Choctaw bean populations in the Escambia River drainage are fragmented, and the species' numbers are low throughout its range. The narrow pigtoe, fuzzy pigtoe, southern sandshell, and tapered pigtoe still occur in much of their known range but have disappeared from many of the tributary and main channel locations from which they were historically known. All are facing a variety of threats. However, habitat degradation and loss as a result of excessive sedimentation, bed destabilization, poor water quality, and environmental contaminants are considered the most significant threats to these eight mussels. We are also designating critical habitat under the Act. Critical habitat is designated on the basis of the best scientific information available after taking into consideration the economic impact, impact on national security, and any other relevant impact of specifying any particular area as critical habitat. In total, approximately 2,404 kilometers (km) (1,494 miles (mi.)) of stream and river channels in nine units in Bay, Escambia, Holmes, Jackson, Okaloosa, Santa Rosa, Walton, and Washington Counties, Florida; and Barbour, Bullock, Butler, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Monroe, and Pike Counties, Alabama, are being designated.

The basis for our action. Under the Act, a species may be listed as an endangered or threatened species based on any of five factors: (A) The present destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its existence. These eight mussel species are facing threats due to three of these five factors (A, D and E). The Act also requires that the Service designate critical habitat at the time of listing to the maximum extent prudent and determinable. We have determined that the designation is prudent and critical habitat is determinable for each of the eight species (see Critical Habitat section below).

We prepared an economic analysis. To ensure that we consider the economic impacts, we prepared an economic analysis of the designation of critical habitat. We published an announcement and solicited public comments on the draft economic analysis. The analysis found that the estimated incremental economic cost of this critical habitat designation to be $1.70 million over a 20-year time frame. The majority of the economic impacts are associated with the transportation sector, particularly consultation costs associated with the replacement and maintenance of bridges and roads.

We requested peer review of the methods used in our proposed listing and critical habitat designation. We specifically requested that four knowledgeable individuals with scientific expertise on freshwater mussel conservation and biology, and who are familiar with the eight species and the three river basins in which they occur, review the scientific information and methods in the proposed rule. The peer reviewers generally concurred with our methods and conclusions and provided additional information,

clarifications, and suggestions to improve the final rule.

We sought public comment on the designation. During the first comment period, we received five comment letters directly addressing the proposed listing and critical habitat designation. During the second comment period, we received four comment letters addressing the proposed listing and critical habitat designation, and the draft economic analysis.

Background

It is our intent to discuss in this final rule only those topics directly relevant to the listing and designation of critical habitat for the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe under the Act (16 U.S.C. 1531 *et seq.*). For more information on the biology, ecology, and critical habitat of these eight mussel species refer to the proposed rule published in the **Federal Register** on October 4, 2011 (76 FR 61482). Information on the associated draft economic analysis for the proposed rule was published in the **Federal Register** on March 27, 2012 (77 FR 18173).

Previous Federal Actions

On October 4, 2011, we published the proposed rule to list and designate critical habitat for these eight mussels (76 FR 61482). Federal actions for these species prior to October 4, 2011, are outlined in the proposed rule. Publication of the proposed rule opened a 60-day comment period, which closed on December 5, 2011. On March 27, 2012 (77 FR 18173), we reopened the comment period for 30 days, from March 27 through April 26, 2012, in order to announce the availability of and receive comments on a draft economic analysis, and to extend the comment period on the proposed listing and critical habitat designation.

Introduction

North American freshwater mussel fauna is the richest in the world and historically numbered around 300 species (Williams *et al.* 1993, p. 6). Freshwater mussels are in decline, however, and in the past century have become more imperiled than any other group of organisms (Williams *et al.* 2008, p. 55; Natureserve 2011). Approximately 66 percent of North America's freshwater mussel species are considered vulnerable to extinction or possibly extinct (Williams *et al.* 1993, p. 6). Within North America, the southeastern United States is the hot spot for mussel diversity. Seventy-five percent of southeastern mussel species are in varying degrees of rarity or possibly extinct (Neves *et al.* 1997, pp. 47–51). The central reason for the decline of freshwater mussels is the modification and destruction of their habitat, especially from sedimentation, dams, and degraded water quality (Neves *et al.* 1997, p. 60; Bogan 1998, p. 376). These eight mussels, like many other southeastern mussel species, have undergone reductions in total range and population density.

These eight species are all freshwater bivalve mussels of the families Margaritiferidae and Unionidae. The Alabama pearlshell is a member of the family Margaritiferidae, while the round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe belong to the family Unionidae. These mussels are endemic to (found only in) portions of three Coastal Plain rivers that drain south-central and southeastern Alabama and northwestern Florida: the Escambia (known as the Escambia River in Florida and the Conecuh River in Alabama), the Yellow, and the Choctawhatchee. All three rivers originate in Alabama and flow across the Florida panhandle before emptying into the Gulf of Mexico, and are entirely contained within the East Gulf Coastal Plain Physiographic Region. The Alabama pearlshell is also known from three locations in the Mobile River Basin; however, only one of those is considered to be currently occupied.

General Biology

Freshwater mussels generally live embedded in the bottom of rivers, streams, and other bodies of water. They siphon water into their shells and across four gills that are specialized for respiration and food collection. Food items include detritus (disintegrated organic debris), algae, diatoms, and bacteria (Strayer *et al.* 2004, pp. 430–431). Adults are filter feeders and generally orient themselves on or near the substrate surface to take in food and oxygen from the water column. Juveniles typically burrow completely beneath the substrate surface and are pedal (foot) feeders (bringing food particles inside the shell for ingestion that adhere to the foot while it is extended outside the shell) until the structures for filter feeding are more fully developed (Yeager *et al.* 1994, pp. 200–221; Gatenby *et al.* 1996, p. 604).

Sexes in margaritiferid and unionid mussels are usually separate. Males release sperm into the water column, which females take in through their siphons during feeding and respiration. Fertilization takes place inside the shell. The eggs are retained in the gills of the female until they develop into mature larvae called glochidia. The glochidia of most freshwater mussel species, including all eight species addressed in this rule, have a parasitic stage during which they must attach to the gills, fins, or skin of a fish to transform into a juvenile mussel. Depending on the mussel species, females release glochidia either separately, in masses known as conglutinates, or in one large mass known as a superconglutinate. The duration of the parasitic stage varies by mussel species, water temperature, and perhaps host fish species. When the transformation is complete, the juvenile mussels drop from their fish host and sink to the stream bottom where, given suitable conditions, they grow and mature into adults.

Survey Data

Recent distributions are based on surveys conducted from 1995 to 2012. Historical distributions are based on collections made prior to 1995. Historical distribution data from museum records and surveys dated between the late 1800s and 1994 are sparse, and most of these species were more than likely present throughout their respective river basins. Knowledge of historical and current distribution and abundance data were summarized from Butler 1989; Williams *et al.* 2000 (unpublished), Blalock-Herod *et al.* 2002, Blalock-Herod *et al.* 2005, Pilarczyk *et al.* 2006, and Gangloff, and Hartfield 2009. In addition, a status survey was conducted in 2010–2012 by M.M. Gangloff and the final report is in preparation. These studies represent a compilation of museum records and recent status surveys conducted between 1990 and 2007. We also used various other sources to identify the historical and current locations occupied by these species. These include surveys, reports, and field notes prepared by biologists from the Alabama Department of Conservation and Natural Resources, Marion, AL; Geological Survey of Alabama, Tuscaloosa, AL; Florida Fish and Wildlife Conservation Commission, Gainesville, FL; U.S. Geological Survey, Gainesville, FL; Alabama Malacological Research Center, Mobile, AL; Troy University, Troy, AL; Appalachian State University, Boone, NC; various private consulting groups; and the U.S. Fish and Wildlife Service, Daphne, AL, and Panama City, FL. In addition, we obtained occurrence data from the collection databases of the Museum of Fluviatile Mollusks (MFM), Athearn collection; Auburn University Natural History Museum (AUNHM),

Auburn, AL; and Florida Museum of Natural History (FLMNH), Gainesville, FL.

Assessing Status

Assessing the state of a freshwater mussel population is challenging. We looked at trends in distribution (range) by comparing recent occurrence data to historical data, and we examined recent abundance (numbers). One difficulty of investigating population trends over time in these species is the lack of historical collection data within the drainages. Athearn (1964, p. 134) noted the streams of western Florida were inadequately sampled, particularly the lower Choctawhatchee, Yellow, and the lower Escambia Rivers. Blalock-Herod *et al.* (2005, p. 2) stated that little collecting effort had been expended in the Choctawhatchee River drainage as compared to other nearby river systems like the Apalachicola and Mobile river drainages. This paucity of historical occurrence data may create the appearance of an increase in the number of localities that support a species or an expanding range; however, this is likely due to increased sampling efforts and to better sampling methods, like the use of SCUBA gear.

Another difficulty is the lack basic information for some historical collections, including specific locality, total number of species or individuals collected, or collection date. For these reasons, the only accurate comparison that can be made of so many different sources of historical and recent collection data is whether a particular species was detected (present) or not (absent) during the survey. When examining occurrence data, we considered sampled areas in close proximity as the same sight. Generally, areas sampled that are within 2 river km (1.2 mi) (approximately) of each other are considered the same site, and sampled areas that are more than 2 km apart are considered different sites. Occurences are based on live animals and shell material. The occurrence data we examined using GIS mapping software. A summary historical and recent occurrence data, and current abundance is presented in Table 1.

TABLE 1—EIGHT MUSSEL OCCURRENCE AND ABUNDANCE BY RIVER DRAINAGE—OCCURRENCES ARE BASED ON LIVE AND SHELL MATERIAL AND ABUNDANCE IS BASED ON LIVE INDIVIDUALS

Species	Drainage	Historical (pre-1995)			Current (1995–2012)			General assessment
		Historical sites	Historical sites re-surveyed	Historical sites currently occupied	Current sites [1]	Total live collected	Average abundance [2]	
Margaritifera marrianae Alabama pearlshell.	Alabama	3	3	0	0	0	0	Contracted range, limited distribution, very low numbers.
	Escambia	12	12	4	9	28	3.14	
Fusconaia rotulata round ebonyshell.	Escambia	3	2	2	11	8	1.1	Limited distribution, very low numbers.
Ptychobranchus jonesi southern kidneyshell.	Escambia	10	5	0	0	0	0	Contracted range, limited distribution, very low numbers.
	Yellow	1	1	0	0	0	0	
	Choct	12	11	1	10	41	2.5	
Villosa choctawensis Choctaw bean.	Escambia	7	7	1	7	14	1.4	Fragmented populations (Escambia), localized extirpations, low numbers.
	Yellow	4	3	2	4	15	3.0	
	Choct	11	10	3	37	143	3.9	
Fusconaia burkei tapered pigtoe.	Choct	23	22	13	53	361	6.0	Limited distribution, localized extirpations.
Fusconaia escambia narrow pigtoe.	Escambia	13	10	7	28	166	6.9	Localized extirpations, limited distribution, low numbers.
	Yellow	2	2	1	4	23	2.9	
Hamiota australis southern sandshell.	Escambia	6	4	1	6	20	4	Localized extirpations.
	Yellow	5	4	2	17	65	3.1	
	Choct	18	16	5	34	211	4.5	
Pleurobema strodeanum fuzzy pigtoe.	Escambia	30	18	12	26	52	6.5	Nearly extirpated from Yellow drainage, localized extirpations.
	Yellow	4	4	1	1	1	1	
	Choct	18	15	8	59	587	9.9	

[1] Includes all currently occupied sites, both historic and new.
[2] Average number of live individuals collected per site.

We also considered each species' relative abundance in comparison to other mussel species with which they co-occur. In addition, we relied on various published documents whose authors are considered experts on these species. These publications either described the status of these species or assigned a conservation ranking, and include Williams *et al.* 1993, Williams and Butler 1994; Mirarchi *et al.* 2004, Blalock-Herod *et al.* 2005, and Williams *et al.* 2008.

Most of the eight species have experienced a decline in populations and numbers of individuals within populations, but not all have experienced a decline in range. Recent, targeted surveys for the Alabama pearlshell and southern kidneyshell show a dramatic decline in historical range. The Choctaw bean, narrow pigtoe, fuzzy pigtoe, southern sandshell, and tapered pigtoe still occur in much of their historical range; however, they no longer occur at many locations at which they were historically known, and their numbers appear to be declining. The round ebonyshell's current range is larger than its historical range, but this is attributed to the use of dive equipment in recent surveys that allowed access to the species' deep, main channel habitat. Despite this range extension, the species still has a very limited distribution and is considered to be extremely rare.

Taxonomy, Life History, and Distribution

Alabama Pearlshell

The Alabama pearlshell (*Margaritifera marrianae,* Johnson 1983) is a medium-sized freshwater mussel known from a few tributaries of the Alabama and Escambia River drainages in south-central Alabama (Johnson 1983, pp. 299–304; McGregor 2004, p. 40; Williams *et al.* 2008, pp. 98–99). The pearlshell is oblong and grows up to 95 millimeters (mm) (3.8 inches (in)) in length. The outside of the shell (periostracum) is smooth and shiny and somewhat roughened along the posterior slope. The inside of the shell (nacre) is whitish or purplish and moderately iridescent (refer to Johnson 1983 for a full description).

The Alabama pearlshell is one of five North American species in the family Margaritiferidae. The family is represented by only two genera, *Margaritifera* (Schumacher 1816) and *Cumberlandia* (Ortmann 1912). In Alabama, each genus is represented by a single species—the spectaclecase (*Cumberlandia monodonta*) occurs in the Tennessee River Basin (Williams *et al.* 2008, pp. 94–95), and the Alabama pearlshell occurs in the Escambia and Alabama river basins in south Alabama. Prior to 1983, the Alabama pearlshell was thought to be the same species as the Louisiana pearlshell (*Margaritifera hembeli* Conrad 1838) (Simpson 1914; Clench and Turner 1956), a species now considered endemic to central Louisiana.

The Alabama pearlshell typically inhabits small headwater streams with mixed sand and gravel substrates, occasionally in sandy mud, with slow to moderate current. Very little is known about the life-history requirements of this species. However, Shelton (1995, p. 5 unpub. report) suggests that the Alabama pearlshell, as opposed to the Louisiana pearlshell, which occurs in large colonies, typically occurs in low numbers. The Alabama pearlshell is also believed to occur in male-female pairs. Of the 68 Alabama pearlshell observed by Shelton (1995, p. 5 unpub. report), 85 percent occurred in pairs. Males were always located upstream of the females and were typically not more than 1 meter (m) apart, and juveniles were usually found just a few inches apart. The species is believed to be a long-term brooder, where gravid females have been observed in December. The host fish and other aspects of its life history are currently unknown.

Historically, the Alabama pearlshell occurred in portions of the Escambia River drainage, and has also been reported from two systems in the Alabama River drainage. The Alabama pearlshell's known historical and current occurrences, by water body and county, are shown in Table 2 below.

TABLE 2—WATER BODIES WITH KNOWN HISTORICAL AND CURRENT OCCURRENCES OF THE ALABAMA PEARLSHELL

Water body	Drainage	County	State	Historical or current
Big Flat Creek	Alabama	Monroe	AL	Historical and Current.
Brushy Creek	Alabama	Monroe	AL	Historical.
Limestone Creek	Alabama	Monroe	AL	Historical.
Amos Mill Creek	Escambia	Conecuh, Escambia	AL	Current.
Autrey Creek	Escambia	Conecuh	AL	Historical.
Beaver Creek	Escambia	Conecuh	AL	Historical.
Bottle Creek	Escambia	Conecuh	AL	Historical and Current.
Brushy Creek	Escambia	Conecuh	AL	Historical.
Burnt Corn Creek	Escambia	Conecuh	AL	Historical and Current.
Horse Creek	Escambia	Crenshaw	AL	Historical.
Hunter Creek	Escambia	Conecuh	AL	Historical and Current.
Jordan Creek	Escambia	Conecuh	AL	Historical and Current.
Little Cedar Creek	Escambia	Conecuh	AL	Historical and Current.
Murder Creek	Escambia	Conecuh	AL	Historical.
Otter Creek	Escambia	Conecuh	AL	Historical and Current.
Sandy Creek	Escambia	Conecuh	AL	Historical and Current.

The Amos Mill population, discovered in 2010, represents a new record, and possibly the only known surviving population in the Sepulga River drainage. The Burnt Corn and Otter Creek populations reaffirm historical records that had not been reported in nearly 30 years. Two of the Sandy Creek locations, discovered in 2011, are new populations. Since the late 1990s, more than 70 locations within the Alabama River Basin were surveyed for mollusks (McGregor *et al.* 1999, pp. 13–14; Powell and Ford 2010 pers. obs.; Buntin and Fobian 2011 pers. comm.), 35 of which were located in the Limestone and Big Flat Creek drainages, and no live Alabama pearlshell were reported. The last documented occurrence in Big Flat Creek was a fresh dead individual collected in 1995 (Shelton 1999 in litt.), and the last reported occurrence in the Limestone Creek drainage was 1974, where Williams (2009 pers. comm.) reported it as common. Despite numerous visits, the pearlshell has not been collected in this system since 1974. A fresh dead individual collected by Shelton in 1995,

represents the most recent record from the Big Flat Creek drainage.

Recent data suggest that, of the nine remaining populations, the largest may occur in Little Cedar and Otter Mill creeks. In 2011, Fobian and Pritchett reported new populations at two locations in an unnamed tributary to Sandy Creek. Although this is not the first report from the Sandy Creek basin, it is the first for the two unnamed tributaries. In 2010, Buntin and Fobian (2011 pers. comm.) reported 10 live individuals from Otter Creek. This is the first time since 1981 that the pearlshell has been reported from this drainage. Also in 2010, Powell and Ford reported three live individuals, and several relic shells, from Amos Mill Creek, in Escambia County, AL. This is the first report of the pearlshell from this drainage, and county, and the first live individual from the Sepulga River system in nearly 50 years. Little Cedar Creek supported good numbers of Alabama pearlshell in the late 1990's (54 individuals reported in 1998). However, during a qualitative search of the same area in 2005, only two live pearlshell were found (Powell 2005 pers. obs.), and in 2006, three live pearlshells were observed (Johnson 2006 in litt.). Live Alabama pearlshell have not been observed in Hunter Creek since 1998, when eight live individuals were reported (Shelton 1999 in litt.). During two visits to the stream in 1999, Shelton found no evidence of the species (Shelton 1999 in litt.), and reported high levels of sedimentation. However, in 2005 the shells of three fresh dead Alabama pearlshells were reported from Hunter Creek, indicating the persistence of the species in that drainage (Powell, pers. obs. 2005).

Evidence suggests that much of the rangewide decline of this species has occurred within the past few decades. Specific causes of the decline and disappearance of the Alabama pearlshell from historical stream localities are unknown. However, they are likely related to past and present land use patterns. Many of the small streams historically inhabited by the Alabama pearlshell are impacted to various degrees by nonpoint-source pollution.

Round Ebonyshell

The round ebonyshell (*Fusconaia rotulata,* Wright 1899) is a medium-sized freshwater mussel endemic to the Escambia River drainage in Alabama and Florida (Williams *et al.* 2008, p. 320). The round ebonyshell is round to oval in shape and reaches about 70 mm (2.8 in.) in length. The shell is thick and the exterior is smooth and dark brown to black in color. The shell interior is white to silvery and iridescent (Williams and Butler 1994, p. 61; Williams *et al.* 2008, p. 319). The round ebonyshell was originally described by B.H. Wright in 1899 and placed in the genus *Unio.* Simpson (1900) reexamined the type specimen and assigned it to the genus *Obovaria.* Based on shell characters, Williams and Butler (1994, p. 61) recognized it as clearly a species of the genus *Fusconaia,* and its placement in the genus is supported genetically (Lydeard *et al.* 2000, p. 149).

Very little is known about the habitat requirements or life history of the round ebonyshell. It occurs in small to medium rivers, typically in stable substrates of sand, small gravel, or sandy mud in slow to moderate current. It is believed to be a short-term brooder, and gravid females have been observed in the spring and summer. The fish host(s) for the round ebonyshell is currently unknown (Williams *et al.* 2008, p. 320).

The round ebonyshell is known only from the main channel of the Escambia-Conecuh River and is the only mussel species endemic to the drainage (Williams *et al.* 2008, p. 320). Due to recent survey data, its known range was extended downstream the Escambia River to Molino, Florida (Gangloff 2012 pers. comm.), and upstream in the Conecuh River to just above the Covington County line in Alabama (Williams *et al.* 2008, p. 320). The round ebonyshell's known historical and current occurrences, by water body and county, are shown in Table 3 below.

TABLE 3—WATER BODIES WITH KNOWN HISTORICAL AND CURRENT OCCURRENCES OF THE ROUND EBONYSHELL

Water body	Drainage	County	State	Historical or current
Conecuh River	Escambia	Escambia, Covington	AL	Historical and Current.
Escambia River	Escambia	Escambia, Santa Rosa	FL	Historical and Current.

The round ebonyshell has a very restricted distribution (Williams and Butler 1994, p. 61), with its current range (based on live individuals and shell material) confined to approximately 144 km (89 mi) of the Escambia-Conecuh River main channel. The round ebonyshell is also considered to be extremely rare (Williams *et al.* 2008, p. 320). Researchers collected a total of three live individuals during a 2006 dive survey (Shelton *et al.* 2007, pp. 8–10 unpub. report), and 4 more were collected during a dive survey in 2011 (Gangloff 2012 pers. comm). At stations where the species was present in the 2011 survey, 219 mussels were collected for every 1 round ebonyshell. Because its distribution is limited to the main channel of one river, the round ebonyshell is particularly vulnerable to catastrophic events such as flood scour and contaminant spills, and to activities that cause streambed destabilization like gravel mining, dredging, and de-snagging for navigation. Due to its limited distribution and rarity, McGregor (2004, p. 56) considered the round ebonyshell vulnerable to extinction, and classified it as a species of highest conservation concern in Alabama. Williams *et al.* (1993, p. 11) considered the round ebonyshell as endangered throughout its range.

Southern Kidneyshell

The southern kidneyshell (*Ptychobranchus jonesi,* van der Schalie 1934) is a medium-sized freshwater mussel known from the Escambia and Choctawhatchee River drainages in Alabama and Florida, and the Yellow River drainage in Alabama (Williams *et al.* 2008, p. 624). The southern kidneyshell is elliptical and reaches about 72 mm (2.8 in.) in length. Its shell is smooth and shiny, and greenish yellow to dark brown or black in color, sometimes with weak rays. The shell interior is bluish white with some iridescence (Williams and Butler 1994, p. 126; Williams *et al.* 2008, p. 624). The southern kidneyshell was described by H. van der Schalie (1934) as *Lampsilis jonesi.* Following the examination of gills of gravid females, Fuller and Bereza (1973, p. 53) determined it belonged in the genus *Ptychobranchus.* When gravid, the marsupial gills form folds along the outer edge, a characteristic unique to the genus *Ptychobranchus* (Williams *et al.* 2008, p. 609).

Very little is known about the habitat requirements or life history of the southern kidneyshell. It is typically found in medium creeks to small rivers in firm sand substrates with slow to moderate current (Williams *et al.* 2008,

pp. 625). A recent status survey in the Choctawhatchee basin in Alabama found its preferred habitat to be stable substrates near bedrock outcroppings (Gangloff and Hartfield 2009, p. 25). The southern kidneyshell is believed to be a long-term brooder, with females gravid from autumn to the following spring or summer. Preliminary reproductive studies found that females release their glochidia in small conglutinates that are bulbous at one end and tapered at the other (Alabama Aquatic Biodiversity Center 2006, unpub. data). Host fish for the southern kidneyshell are currently unknown; however, darters serve as primary glochidial hosts to other members of the genus *Ptychobranchus* (Luo 1993, p. 16; Haag and Warren 1997, p. 580).

The southern kidneyshell is endemic to the Escambia, Choctawhatchee, and Yellow River drainages in Alabama and Florida (Williams *et al.* 2008, p. 624), but is currently known only from the Choctawhatchee River drainage. The southern kidneyshell's known historical and current occurrences, by water body and county, are shown in Table 4 below.

TABLE 4—WATER BODIES WITH KNOWN HISTORICAL AND CURRENT OCCURRENCES OF THE SOUTHERN KIDNEYSHELL

Water body	Drainage	County	State	Historical or current
Burnt Corn Creek	Escambia	Escambia	AL	Historical.
Jordan Creek	Escambia	Conecuh	AL	Historical.
Sepulga River	Escambia	Conecuh	AL	Historical.
Conecuh River	Escambia	Covington, Crenshaw	AL	Historical.
Patsaliga Creek	Escambia	Covington, Crenshaw	AL	Historical.
Little Patsaliga Creek	Escambia	Crenshaw	AL	Historical.
Hollis Creek	Yellow	Covington	AL	Historical.
Choctawhatchee River	Choctawhatchee	Walton	FL	Historical.
Sandy Creek	Choctawhatchee	Walton	FL	Historical.
Holmes Creek	Choctawhatchee	Washington	FL	Current.
Choctawhatchee River	Choctawhatchee	Geneva, Dale	AL	Historical and Current.
Pea River	Choctawhatchee	Geneva, Coffee, Dale, Pike, Barbour.	AL	Historical and Current.
Flat Creek	Choctawhatchee	Geneva	AL	Historical.
Whitewater Creek	Choctawhatchee	Coffee	AL	Historical.
West Fork Choctawhatchee River	Choctawhatchee	Dale, Barbour	AL	Historical and Current.
East Fork Choctawhatchee River	Choctawhatchee	Dale, Henry	AL	Historical.

Since 1995, the southern kidneyshell has been detected at only 10 locations within the Choctawhatchee River drainage. The species appears to have been common historically (in 1964, H. D. Athearn collected 98 individuals at one site on the West Fork Choctawhatchee), but it is currently considered one of the most imperiled species in the United States (Blalock-Herod *et al.* 2005, p. 16; Williams *et al.* 2008, p. 625). In addition to a reduction in range, its numbers are very low. A 2006–2007 status survey in the Alabama portion of the Choctawhatchee basin found the southern kidneyshell was extremely rare. A total of 13 were encountered alive, and the species comprised less than 0.3 percent of the total mussel assemblage (Gangloff and Hartfield 2009, p. 249). It is classified as a species of highest conservation concern in Alabama by McGregor (2004, p. 83), and considered threatened throughout its range by Williams *et al.* (1993, p. 14)

Choctaw Bean

The Choctaw bean (*Villosa choctawensis,* Athearn 1964) is a small freshwater mussel known from the Escambia, Yellow, and Choctawhatchee River drainages of Alabama and Florida. The oval shell of the Choctaw bean reaches about 49 mm (2.0 in.) in length, and is shiny and greenish-brown in color, typically with thin green rays, though the rays are often obscured in darker individuals. The shell interior color varies from bluish white to smoky brown with some iridescence (Williams and Butler 1994, p. 100; Williams *et al.* 2008, p. 758). The sexes are dimorphic, with females truncate or widely rounded posteriorly, and sometimes slightly more inflated (Athearn 1964, p. 137). The Choctaw bean was originally described by H.D. Athearn in 1964.

Very little is known about the habitat requirements or life history of the Choctaw bean. It is found in medium creeks to medium rivers in stable substrates of silty sand to sandy clay with moderate current. It is believed to be a long-term brooder, with females gravid from late summer or autumn to the following summer. Its fish host is currently unknown (Williams *et al.* 2008, p. 758).

The Choctaw bean is known from the Escambia, Yellow, and Choctawhatchee River drainages in Alabama and Florida (Williams *et al.* 2008, p. 758). The Choctaw bean's known historical and current occurrences, by water body and county, are shown in Table 5 below.

TABLE 5—WATER BODIES WITH KNOWN HISTORICAL AND CURRENT OCCURRENCES OF THE CHOCTAW BEAN

Water body	Drainage	County	State	Historical or current
Escambia River	Escambia	Escambia, Santa Rosa	FL	Historical and Current.
Burnt Corn	Escambia	Conecuh	AL	Current.
Murder Creek	Escambia	Conecuh	AL	Historical.
Pigeon Creek	Escambia	Butler	AL	Historical.
Patsaliga Creek	Escambia	Crenshaw	AL	Historical and Current.
Little Patsaliga Creek	Escambia	Crenshaw	AL	Historical.
Olustee Creek	Escambia	Pike	AL	Current.
Conecuh River	Escambia	Crenshaw, Pike	AL	Current.
Yellow River	Yellow	Okaloosa	FL	Historical and Current.
Five Runs Creek	Yellow	Covington	AL	Historical and Current.

TABLE 5—WATER BODIES WITH KNOWN HISTORICAL AND CURRENT OCCURRENCES OF THE CHOCTAW BEAN—Continued

Water body	Drainage	County	State	Historical or current
Yellow River	Yellow	Covington	AL	Historical and Current.
Choctawhatchee River	Choctawhatchee	Walton, Washington, Holmes	FL	Historical and Current.
Holmes Creek	Choctawhatchee	Washington	FL	Current.
Bruce Creek	Choctawhatchee	Walton	FL	Current.
Wrights Creek	Choctawhatchee	Holmes	FL	Current.
Choctawhatchee River	Choctawhatchee	Geneva, Dale	AL	Historical and Current.
Pea River	Choctawhatchee	Geneva, Coffee, Pike, Barbour	AL	Historical and Current.
Limestone Creek	Choctawhatchee	Walton	FL	Current.
Flat Creek	Choctawhatchee	Geneva	AL	Current.
Whitewater Creek	Choctawhatchee	Coffee	AL	Current.
Pea Creek	Choctawhatchee	Barbour	AL	Current.
Big Sandy Creek	Choctawhatchee	Bullock	AL	Current.
Claybank Creek	Choctawhatchee	Dale	AL	Current.
West Fork Choctawhatchee River	Choctawhatchee	Dale, Barbour	AL	Historical and Current.
Judy Creek	Choctawhatchee	Dale	AL	Current.
Pauls Creek	Choctawhatchee	Barbour	AL	Current.
East Fork Choctawhatchee River	Choctawhatchee	Henry, Barbour	AL	Historical and Current.

The Choctaw bean persists in most of its historic range. However, it has experienced localized extirpations and its numbers are low, particularly in the Escambia and Yellow river drainages. Of 7 historical sites known to support the species within the Escambia River drainage, 1 location currently supports the species. Also, its numbers within the drainage are very low; a total of 14 individuals have been collected since 1995. Within the Yellow River drainage, the Choctaw bean is currently known from 4 locations which yielded 15 individuals total. In the Choctawhatchee River drainage, 3 of 10 historical sites examined recently continue to support the species. The Choctaw bean continues to persist in most areas and is currently known from a total of 37 locations throughout the drainage.

Heard (1975, p. 17) assessed the status of the Choctaw bean in 1975 and stated that it was formerly abundant in the main channel of the Choctawhatchee River in Florida, but has become quite rare. McGregor (2004, p. 103) considered the Choctaw bean vulnerable to extinction due to its limited distribution and habitat degradation, and classified it as a species of high conservation concern in Alabama. Williams *et al.* (1993, p. 14) considered the Choctaw bean as threatened throughout its range.

Tapered Pigtoe

The tapered pigtoe (*Fusconaia burkei,* Walker 1922) is a small to medium-sized mussel endemic to the Choctawhatchee River drainage in Alabama and Florida (Williams *et al.* 2008, p. 296). The elliptical to subtriangular shell of the tapered pigtoe reaches about 75 mm (3.0 in.) in length, and is sculptured with plications (parallel ridges) that radiate from the posterior ridge. In younger individuals, the shell exterior is greenish brown to yellowish brown in color, occasionally with faint dark-green rays, and with pronounced sculpture often covering the entire shell; in older individuals, the shell becomes dark brown to black with age, and sculpture is often subtle. The shell interior is bluish white (Williams *et al.* 2008, p. 295). The tapered pigtoe was described by B. Walker (in Ortmann and Walker 1922) as *Quincuncina burkei,* a new genus and species. In the description, Ortmann noted the species had gill features characteristic of the genus *Fusconaia;* however, this was dismissed based on the presence of sculpture on the shell. Genetic analysis by Lydeard *et al.* (2000, p. 149) determined it to be a sister taxon to *Fusconaia escambia.* Based on soft anatomy similarity, Williams *et al.* (2008, p. 296) recognized *burkei* as belonging to the genus *Fusconaia.* Recent molecular studies by Campbell and Lydeard (2012, p. 28) support the distinctiveness of *burkei* as a species and its assignment to the genus *Fusconaia.*

The tapered pigtoe is found in medium creeks to medium rivers in stable substrates of sand, small gravel, or sandy mud, with slow to moderate current (Williams *et al.* 2008, p. 296). The reproductive biology of the tapered pigtoe was studied by White *et al.* (2008). It is a short-term brooder, with females gravid from mid-March to May. The blacktail shiner (*Cyprinella venusta*) was found to serve as a host for tapered pigtoe glochidia in the preliminary host trial (White *et al.* 2008, p. 122–123).

The tapered pigtoe is endemic to the Choctawhatchee River drainage in Alabama and Florida (Williams *et al.* 2008, p. 296). Its historical and current distribution includes several oxbow lakes in Florida, some with a flowing connection to the main channel. The tapered pigtoe's known historical and current occurrences, by water body and county, are shown in Table 6 below.

TABLE 6—WATER BODIES WITH KNOWN HISTORICAL AND CURRENT OCCURRENCES OF THE TAPERED PIGTOE

Water body	Drainage	County	State	Historical or current
Pine Log Creek	Choctawhatchee	Washington, Bay	FL	Current.
Choctawhatchee River	Choctawhatchee	Walton, Washington, Holmes	FL	Historical and Current.
Crews Lake	Choctawhatchee	Washington	FL	Current.
Crawford Lake	Choctawhatchee	Washington	FL	Historical.
Horseshoe Lake	Choctawhatchee	Washington	FL	Historical.
Holmes Creek	Choctawhatchee	Washington, Holmes, Jackson	FL	Historical and Current.
Bruce Creek	Choctawhatchee	Walton	FL	Current.
Sandy Creek	Choctawhatchee	Walton	FL	Current.
Blue Creek	Choctawhatchee	Holmes	FL	Current.

TABLE 6—WATER BODIES WITH KNOWN HISTORICAL AND CURRENT OCCURRENCES OF THE TAPERED PIGTOE—Continued

Water body	Drainage	County	State	Historical or current
Wrights Creek	Choctawhatchee	Holmes	FL	Current.
Tenmile Creek	Choctawhatchee	Holmes	FL	Historical.
West Pittman Creek	Choctawhatchee	Holmes	FL	Current.
East Pittman Creek	Choctawhatchee	Holmes	FL	Historical and Current.
Parrot Creek	Choctawhatchee	Holmes	FL	Current.
Limestone Creek	Choctawhatchee	Walton	FL	Historical and Current.
Eightmile Creek	Choctawhatchee	Walton	FL	Current.
Flat Creek	Choctawhatchee	Geneva	AL	Historical and Current.
Pea River	Choctawhatchee	Coffee, Dale, Pike, Barbour	AL	Historical and Current.
Big Creek (Whitewater Creek tributary).	Choctawhatchee	Pike	AL	Current.
Big Creek (Pea River tributary)	Choctawhatchee	Barbour	AL	Current.
Pea Creek	Choctawhatchee	Barbour	AL	Current.
Hurricane Creek	Choctawhatchee	Geneva	AL	Historical.
Choctawhatchee River	Choctawhatchee	Dale	AL	Historical.
Little Choctawhatchee River	Choctawhatchee	Dale, Houston	AL	Historical.
Panther Creek	Choctawhatchee	Houston	AL	Historical.
Bear Creek	Choctawhatchee	Houston	AL	Historical.
West Fork Choctawhatchee River	Choctawhatchee	Dale, Barbour	AL	Historical and Current.
Judy Creek	Choctawhatchee	Dale	AL	Current.
Pauls Creek	Choctawhatchee	Barbour	AL	Current.

The tapered pigtoe appears to be absent from portions of its historic range and found only in isolated locations (Blalock-Herod *et al.* 2005, p. 17). The species was not detected at 9 of the 22 historical sites examined during recent status surveys. Most of those are in the middle portion of the drainage in Alabama, and the species appears to be declining in this portion of its range. The tapered pigtoe is currently known from a total of 53 locations within the Choctawhatchee River drainage. The species persists mainly in the lower portions of the drainage and in isolated locations in Alabama.

Due to its limited distribution, rarity, and habitat degradation, Blalock-Herod (2004, p. 105) considered the tapered pigtoe vulnerable to extinction, and classified it as a species of high conservation concern in Alabama. The tapered pigtoe is considered threatened throughout its range by Williams *et al.* (1993, p. 14).

Narrow Pigtoe

The narrow pigtoe (*Fusconaia escambia,* Clench and Turner 1956) is a small to medium-sized mussel known from the Escambia River drainage in Alabama and Florida, and the Yellow River drainage in Florida. The subtriangular to squarish shaped shell of the narrow pigtoe reaches about 75 mm (3.0 in.) in length. The shell is moderately thick and is usually reddish brown to black in color. The shell interior is white to salmon in color with iridescence near the posterior margin (Williams and Butler 1994, p. 77; Williams *et al.* 2008, p. 316). The narrow pigtoe was originally described by W. J. Clench and R. D. Turner in 1956. Both molecular (Campbell and Lydeard 2012, p. 28) and morphological (Williams *et al.* 2008, p. 316) evidence support the distinctiveness of *escambia* as a species and its assignment to the genus *Fusconaia.*

Little is known about the habitat requirements or life history of the narrow pigtoe. It is found in medium creeks to medium rivers, in stable substrates of sand, sand and gravel, or silty sand, with slow to moderate current. It is believed to be a short-term brooder, with females gravid during spring and summer. The host fish for the narrow pigtoe is currently unknown (Williams *et al.* 2008, p. 317). The species is somewhat unusual in that it tolerates a small reservoir environment (Williams 2009 pers. comm.). Reproducing narrow pigtoe populations were found recently in some areas of Point A Lake and Gantt Lake reservoirs.

The narrow pigtoe is endemic to the Escambia River drainage in Alabama and Florida, and to the Yellow River drainage in Florida (Williams *et al.* 2008, p. 317). The narrow pigtoe's known historical and current occurrences, by water body and county, are shown in Table 7 below.

TABLE 7—WATER BODIES WITH KNOWN HISTORICAL AND CURRENT OCCURRENCES OF THE NARROW PIGTOE

Water body	Drainage	County	State	Historical or current
Escambia River	Escambia	Escambia, Santa Rosa	FL	Historical and Current.
Conecuh River	Escambia	Escambia, Covington, Crenshaw, Pike.	AL	Historical and Current.
Burnt Corn Creek	Escambia	Conecuh	AL	Current.
Murder Creek	Escambia	Conecuh	AL	Historical and Current.
Bottle Creek	Escambia	Conecuh	AL	Historical.
Panther Creek	Escambia	Butler	AL	Historical.
Persimmon Creek	Escambia	Butler	AL	Current.
Three Run Creek	Escambia	Butler	AL	Current.
Patsaliga Creek	Escambia	Covington, Crenshaw	AL	Current.
Yellow River	Yellow	Santa Rosa, Okaloosa	FL	Historical and Current.

The narrow pigtoe still occurs in much of its historic range, but may be extirpated from localized areas. In the Escambia River drainage, the narrow pigtoe occurs in nearly all of its historical range and is currently known from 28 locations. It was not detected at 3 out of 10 historical sites examined recently in the drainage. The species is rare in the Yellow River drainage; a total of 23 individuals from 4 locations have been collected since 1995.

McGregor (2004, p. 55) considered the narrow pigtoe vulnerable to extinction because of its limited distribution, rarity, and susceptibility to habitat degradation, and classified it as a species of highest conservation concern in Alabama. Williams *et al.* (1993, p. 11) considered the narrow pigtoe threatened throughout its range.

Southern Sandshell

The southern sandshell (*Hamiota australis,* Simpson 1900) is a medium-sized freshwater mussel known from the Escambia River drainage in Alabama, and the Yellow and Choctawhatchee River drainages in Alabama and Florida (Williams *et al.* 2008, p. 338). The southern sandshell is elliptical in shape and reaches about 83 mm (2.3 in.) in length. Its shell is smooth and shiny, and greenish in color in young specimens, becoming dark greenish brown to black with age, with many variable green rays. The shell interior is bluish white and iridescent. Sexual dimorphism is present as a slight inflation of the posterioventral shell margin of females (Williams and Butler 1994, p. 97; Williams *et al.* 2008, p. 337). The southern sandshell (*Hamiota australis*) was originally described by C. T. Simpson (1900) as *Lampsilis australis.* Heard (1975), however, designated it as a species of *Villosa.* It was placed in the genus *Hamiota* by Roe and Hartfield (2005, pp. 1–3), who confirmed earlier published suggestions by Fuller and Bereza (1973, p. 53) and O'Brien and Brim Box (1999, pp. 135–136) that this species and three others of the genus *Lampsilis* represent a distinct genus. This separation from other *Lampsilis* is supported genetically (Roe *et al.* 2001, p. 2230).

The southern sandshell is typically found in small creeks and rivers in stable substrates of sand or mixtures of sand and fine gravel, with slow to moderate current. It is a long-term brooder, and females are gravid from late summer or autumn to the following spring (Williams *et al.* 2008, p. 338). The southern sandshell is one of only four species that produce a superconglutinate to attract a host. The superconglutinate mimics the shape, coloration, and movement of a fish and is produced by the female mussel to hold all glochidia (larval mussels) from one year's reproductive effort (Haag *et al.* 1995, p. 472). Although the fish host for the southern sandshell has not been identified, it likely uses predatory sunfishes such as basses, like other *Hamiota* species (Haag *et al.* 1995, p. 475; O'Brien and Brim Box 1999, p. 134; Blalock-Herod *et al.* 2002, p. 1885).

The southern sandshell is endemic to the Escambia River drainage in Alabama, and the Yellow and Choctawhatchee River drainages in Alabama and Florida (Blalock-Herod *et al.* 2002, pp. 1882, 1884). The southern sandshell's known historical and current occurrences, by water body and county, are shown in Table 8 below.

TABLE 8—WATER BODIES WITH KNOWN HISTORICAL AND CURRENT OCCURRENCES OF THE SOUTHERN SANDSHELL

Water body	Drainage	County	State	Historical or current
Burnt corn creek	Escambia	Escambia, Conecuh	AL	Historical and Current.
Murder Creek	Escambia	Conecuh	AL	Current.
Jordan Creek	Escambia	Conecuh	AL	Current.
Sepulga River	Escambia	Conecuh	AL	Historical.
Conecuh River	Escambia	Covington, Crenshaw, Pike	AL	Current and Historical.
Little Patsaliga Creek	Escambia	Crenshaw	AL	Historical.
Patsaliga Creek	Escambia	Crenshaw	AL	Current.
Yellow River	Yellow	Okaloosa	FL	Current.
Shoal River	Yellow	Okaloosa, Walton	FL	Current.
Pond Creek	Yellow	Okaloosa	FL	Historical and Current.
Yellow River	Yellow	Covington	AL	Historical and Current.
Five Runs Creek	Yellow	Covington	AL	Historical and Current.
Alligator Creek	Choctawhatchee	Washington	FL	Historical.
Holmes Creek	Choctawhatchee	Holmes, Jackson	FL	Historical.
Bruce Creek	Choctawhatchee	Walton	FL	Current.
West Sandy Creek	Choctawhatchee	Walton	FL	Current.
Choctawhatchee River	Choctawhatchee	Holmes	FL	Historical and Current.
Tenmile Creek	Choctawhatchee	Holmes	FL	Historical.
Wrights Creek	Choctawhatchee	Holmes	FL	Current.
Limestone Creek	Choctawhatchee	Walton	FL	Historical.
Choctawhatchee River	Choctawhatchee	Geneva, Dale	AL	Historical and Current.
Pea River	Choctawhatchee	Geneva, Coffee, Dale, Pike, Barbour.	AL	Historical and Current.
Flat Creek	Choctawhatchee	Geneva	AL	Current.
Eightmile Creek	Choctawhatchee	Geneva, Walton	AL, FL	Current.
Natural Bridge Creek	Choctawhatchee	Geneva	AL	Current.
Corner Creek	Choctawhatchee	Geneva	AL	Current.
Whitewater Creek	Choctawhatchee	Coffee	AL	Historical.
Pea Creek	Choctawhatchee	Barbour	AL	Historical and Current.
Double Bridges Creek	Choctawhatchee	Coffee	AL	Current.
Little Choctawhatchee River	Choctawhatchee	Dale, Houston	AL	Historical.
West Fork Choctawhatchee River	Choctawhatchee	Barbour, Dale	AL	Historical and Current.
Sikes Creek	Choctawhatchee	Barbour	AL	Current.
Pauls Creek	Choctawhatchee	Barbour	AL	Current.
East Fork Choctawhatchee River	Choctawhatchee	Dale, Henry	AL	Historical and Current.

The southern sandshell persists in its historic range; however, its range is fragmented and numbers appear to be declining (Williams *et al.* 2008, p. 338). In the Escambia River drainage, the species was detected at 1 of 4 historic locations surveyed recently. Also, its numbers are very low in the drainage; a total of 20 individuals from 6 locations have been collected in the Escambia River drainage since 1995. Southern sandshell numbers in the Yellow River drainage are also fairly low, with 65 individuals collected recently at a total of 17 locations. The species was not detected at 2 of the 4 historic locations examined recently in the drainage. In the Choctawhatchee River drainage, the number of historic locations that currently support the species has declined from 16 to 5, and it appears to be extirpated from central portions of the Choctawhatchee River main channel and from some tributaries. Sedimentation could be one factor contributing to its decline. In order to reproduce, the southern sandshell must attract a sight-feeding fish to its superconglutinate lure. Waters clouded by silt and sediment would reduce the chance of this interaction occurring (Haag *et al.* 1995, p. 475).

The southern sandshell is classified as a species of highest conservation concern in Alabama by Blalock-Herod (2004, p. 60), and considered threatened throughout its range by Williams *et al.* (1993, p. 11).

Fuzzy Pigtoe.

The fuzzy pigtoe (*Pleurobema strodeanum,* Wright (1898) is a small to medium-sized mussel known from the Escambia, Yellow, and Choctawhatchee River drainages in Alabama and Florida (Williams *et al.* 2008, p. 574). The fuzzy pigtoe is oval to subtriangular and reaches about 75 mm (3.0 in.) in length. Its shell surface is usually dark brown to black in color. The shell interior is bluish white, with slight iridescence near the margin (Williams and Butler 1994, p. 90; Williams *et al.* 2008, p. 573). The fuzzy pigtoe was described by B.H. Wright (1898) as *Unio strodeanus.* Simpson (1900) reexamined the type specimen and reassigned it to the genus *Pleurobema.* Recent molecular data support that *strodeanum* is distinct as a species and belongs to the genus *Pleurobema* (Campbell and Lydeard 2012, p. 29).

The fuzzy pigtoe is found in medium creeks to medium rivers in stable substrates of sand and silty sand with slow to moderate current. The reproductive biology of the fuzzy pigtoe was studied by White *et al.* (2008, pp. 122–123). It is a short-term brooder, with females gravid from mid-March to May. The blacktail shiner (*Cyprinella venusta*) was found to serve as a host for fuzzy pigtoe glochidia in the preliminary study trial.

The fuzzy pigtoe is endemic to the Escambia, Yellow, and Choctawhatchee River drainages in Alabama and Florida (Williams *et al.* 2008, p. 574). The fuzzy pigtoe's known historical and current occurrences, by water body and county, are shown in Table 9 below.

TABLE 9—WATER BODIES WITH KNOWN HISTORICAL AND CURRENT OCCURRENCES OF THE FUZZY PIGTOE

Water body	Drainage	County	State	Historical or current
Escambia River	Escambia	Escambia, Santa Rosa	FL	Historical and Current.
Conecuh River	Escambia	Escambia, Covington, Crenshaw, Pike.	AL	Historical and Current.
Burnt Corn Creek	Escambia	Conecuh	AL	Historical and Current.
Murder Creek	Escambia	Conecuh	AL	Historical and Current.
Jordan Creek	Escambia	Conecuh	AL	Historical and Current.
Sandy Creek	Escambia	Conecuh	AL	Historical.
Bottle Creek	Escambia	Conecuh	AL	Historical and Current.
Sepulga River	Escambia	Conecuh	AL	Historical.
Persimmon Creek	Escambia	Butler	AL	Current.
Pigeon Creek	Escambia	Covington, Butler	AL	Historical and Current.
Patsaliga Creek	Escambia	Crenshaw	AL	Historical and Current.
Little Patsaliga Creek	Escambia	Crenshaw	AL	Historical and Current.
Mill Creek	Escambia	Pike	AL	Historical.
Yellow River	Yellow	Okaloosa	FL	Historical and Current.
Yellow River	Yellow	Covington	AL	Historical.
Choctawhatchee River	Choctawhatchee	Walton, Washington, Holmes	FL	Historical and Current
Holmes Creek	Choctawhatchee	Washington, Holmes, Jackson	FL	Historical and Current.
Bruce Creek	Choctawhatchee	Walton	FL	Current.
Sandy Creek	Choctawhatchee	Walton	FL	Current.
Blue Creek	Choctawhatchee	Holmes	FL	Current.
Wrights Creek	Choctawhatchee	Holmes	FL	Historical and Current.
Tenmile Creek	Choctawhatchee	Holmes	FL	Current.
West Pittman Creek	Choctawhatchee	Holmes	FL	Current.
East Pittman Creek	Choctawhatchee	Holmes	FL	Current.
Limestone Creek	Choctawhatchee	Walton	FL	Historical.
Eightmile Creek	Choctawhatchee	Walton	FL	Current.
Choctawhatchee River	Choctawhatchee	Geneva, Dale	AL	Historical and Current.
Pea River	Choctawhatchee	Geneva, Coffee, Dale, Pike, Barbour.	AL	Historical and Current.
Flat Creek	Choctawhatchee	Geneva	AL	Current.
Whitewater Creek	Choctawhatchee	Coffee	AL	Current.
Walnut Creek	Choctawhatchee	Pike	AL	Current.
Pea Creek	Choctawhatchee	Barbour	AL	Current.
Big Sandy Creek	Choctawhatchee	Bullock	AL	Current.
Steep Head Creek	Choctawhatchee	Coffee	AL	Current.
Claybank Creek	Choctawhatchee	Dale	AL	Current.
Hurricane Creek	Choctawhatchee	Geneva	AL	Current.
Little Choctawhatchee River	Choctawhatchee	Dale, Houston	AL	Historical.
Panther Creek	Choctawhatchee	Houston	AL	Historical.
West Fork Choctawhatchee River	Choctawhatchee	Dale, Barbour	AL	Historical and Current.

TABLE 9—WATER BODIES WITH KNOWN HISTORICAL AND CURRENT OCCURRENCES OF THE FUZZY PIGTOE—Continued

Water body	Drainage	County	State	Historical or current
Judy Creek	Choctawhatchee	Dale	AL	Current.
Pauls Creek	Choctawhatchee	Barbour	AL	Current.
Unnamed tributary to Lindsey Creek.	Choctawhatchee	Barbour	AL	Current.
East Fork Choctawhatchee River	Choctawhatchee	Dale	AL	Current.
East Fork Choctawhatchee River	Choctawhatchee	Henry	AL	Historical and Current.

Within the Escambia River drainage, the fuzzy pigtoe was detected at 15 of the 21 historic locations surveyed since 1995; however, its status in the drainage is difficult to assess as 9 historical sites have not been surveyed since 1995, and at least 3 other sites have vague localities. The fuzzy pigtoe is exceedingly rare in the Yellow River drainage, where it is currently known from 1 of 4 historic locations. A single individual collected in 2010 in the main channel in Florida is the only recent record of the species in the drainage. Its range in the Yellow River drainage has declined, and the species may no longer occur in the upper portion of the drainage in Alabama. In the Choctawhatchee River drainage, the fuzzy pigtoe stills occurs in nearly all of its historic range and is currently known from a total of 50 locations; however, the species has become extirpated in localized areas. Fifteen of the 18 historic locations in the drainage were surveyed recently, and 8 continue to support fuzzy pigtoe populations. At one site on Limestone Creek, a once abundant population may have disappeared—a total of 42 live fuzzy pigtoes were collected in 1988; the surveyor revisited the site in 1993, and found only 1 live and 4 dead specimens and noted that the creek appeared to have more sand and that mussels were not as abundant (Butler 1988 and 1993 *in litt.*). No fuzzy pigtoes were detected during a 2011 site visit (Gangloff 2012 pers. com.).

The fuzzy pigtoe is considered vulnerable to extinction because of its limited distribution and dwindling habitat by McGregor (2004, p. 101), who classified it as a species of high conservation concern in Alabama. Williams *et al.* (1993, p. 11) considered the fuzzy pigtoe a species of special concern throughout its range.

Summary of Comments and Recommendations

We requested written comments from the public on the proposed listing and designation of critical habitat for the eight mussels during two comment periods. The first comment period associated with the publication of the proposed rule (76 FR 61482) opened on October 4, 2011, and closed on December 5, 2011. We also requested comments on the proposed listing and critical habitat rule and the associated draft economic analysis during a comment period that opened March 27, 2012, and closed on April 26, 2012 (77 FR 18173). We did not receive any requests for a public hearing, so none were held. We also contacted all appropriate State and Federal agencies (including the States of Alabama and Florida, from whom we directly requested comments), county governments, elected officials, scientific organizations, and other interested parties and invited them to comment. Articles concerning the proposed rule and inviting public comment were published by seven local newspapers.

During the first comment periods, we received five comment letters directly addressing the proposed listing and critical habitat designation. During the second comment period, we received four comment letters addressing the proposed listing and critical habitat designation and the draft economic analysis. All substantive information provided during both comment periods has either been incorporated directly into this final determination or is addressed below.

Peer Review

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we requested the expert opinions of four knowledgeable individuals with expertise on freshwater mussel conservation and biology, and with familiarity of the eight species and the three river basins in which they occur. We received written responses from two of the four peer reviewers we contacted.

We reviewed all comments received from the two peer reviewers for substantive and new information regarding the proposal to list and designate critical habitat for the eight mussels. The peer reviewers generally concurred with our conclusions and provided additional information, clarifications, and suggestions to improve the final listing and critical habitat rule. One peer reviewer provided several narrative comments, and we addressed most of those below; however, a few minor comments are directly incorporated into this final rule. Another peer reviewer submitted a marked-up copy of the proposed rule, noting errors and suggestions; we adopted most of the suggested changes and incorporated them directly into this final rule. Peer reviewer comments are addressed in the following summary and incorporated into this final rule as appropriate.

Peer Reviewer Comments

(1) *Comment:* Much of the recent status data utilized were obtained from personal communications, unpublished (i.e., non-peer-reviewed) reports or other generally unavailable reports. Accordingly, it is difficult to assess the rigor of these studies or the Service's interpretation of their data. More information, including sampling effort and methods, mussel catch per unit effort, numbers encountered relative to other species, and specifics of study site locations, is needed to better assess changes in population status or distributions.

Our response: We obtained much of the status data, particularly the recent survey data, from unpublished reports, field notes, or emails. This information is the best scientific data available to us at this time. Although the unpublished reports are not available through journals, they are part of the administrative record and can be obtained through the Panama City Field Office (see **ADDRESSES** section). We agree that information on sampling methods and effort, relative numbers, locations, etc., is important; however, the occurrence data are a compilation of numerous surveys, and it is not practical to report detailed information related to each survey effort. Documenting changes in status and population trends over the period of record is problematic because historic collections often lack basic information such as the specific locality, total number of species or individuals collected, or even collection date. The only accurate comparison that can be made of so many different sources of

historical and recent collection data is whether a particular species was detected (present) or not (absent) during the survey.

(2) *Comment:* The assignment of endangered or threatened species status appears to be somewhat arbitrary. Three species are clearly in serious decline and warrant endangered status: Alabama pearlshell, round ebonyshell, and southern kidneyshell. However, the southern sandshell and Choctaw bean appear to have among the largest extant ranges of any species covered in the proposed rule and remain extant in the Choctawhatchee, Escambia, and Yellow rivers drainages. This distinction needs more quantitative or more detailed biological justification.

Our response: In assessing the status of these mussels, we analyzed each species' current distribution (range), abundance (numbers), and population trend. We also examined the magnitude of the various threats to each of the species. Section 3(6) of the Act defines an endangered species as ''any species which is in danger of extinction throughout all or a significant portion of its range,'' and section 3(20) of the Act defines a threatened species as ''any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' At the time the proposed rule published, we had determined that the current status of the southern sandshell and Choctaw bean, combined with the threats they are facing, made them in danger of extinction throughout their range. However, since the proposed rule was published, additional surveys have taken place, including a Service-funded status survey, and we now have new status and distribution information. In this final rule, we updated the occurrence information to reflect the new data, and we reexamined the status of each species. These new data include locations of populations of the southern sandshell in two new creek systems, Murder and West Sandy creeks, and in two historical creek systems, Burnt Corn and Pond creeks. The new data also showed that southern sandshell abundance is higher than previously known. Because the species is found in numerous streams, we have determined it is no longer in danger of extinction throughout its range. However, the species does still face the wide range of threats explained in the ''Summary of Factors Affecting the Species'' section and is vulnerable to meeting the definition of an endangered species if these threats continue. Therefore, we are revising the status of the southern sandshell and are listing it as a threatened species (see ''Determination'' section). On the other hand, new information confirms that the Choctaw bean's range in the Escambia River drainage has declined, and its abundance rangewide is currently low. It currently faces severe and imminent threats in its aquatic habitats, and these threats are compounded by its low abundance. Based on this new information, we therefore find that the Choctaw bean continues to be in danger of extinction throughout its limited range and are listing it as an endangered species as proposed (see ''Determination'' section).

(3) *Comment:* More clarification about the number of historical sites (as well as what constitutes a 'site') that have been resurveyed for all of these taxa is needed. The reviewer states that this information is critical to assessing declines, and is difficult to extract from the rule as currently written.

Our response: We added Table 1 to the final rule to consolidate information on occurrence and abundance. We also added a statement that we considered sampling areas in close proximity to the same site. Specifically, areas sampled that are within 2 river km (1.2 mi) (approximately) of each other are considered the same site, whereas sampled areas that are more than 2 km apart are considered different sites.

(4) *Comment:* The boundaries of the critical habitat units seem somewhat arbitrary. The reviewer asserted that separation of the basins into these units artificially inflates perceived fragmentation and discontinuities in the system. Many of these units are at the very least hydrologically and physiochemically connected, and also likely remain biologically connected to a degree. Specifically, the peer reviewer suggested that units GCM1, GCM2, GCM3, and GCM4 should be considered a single critical habitat unit, and GCM6 and GCM7 should likewise be merged into a single critical habitat unit. The peer reviewer asserted that this would emphasize connectivity of these systems and the importance of managing aquatic populations at a watershed scale. Another commenter agreed and requested that the Service follow the recommendation of the peer reviewer and consolidate the six units into two distinct units.

Our response: We carefully considered how to delineate the boundaries of the units. Our consideration focused primarily on connectivity and threats, and the spatial distribution of the physical and biological features essential to the conservation of each species. The four divisions in the Escambia drainage are the result of the two mainstem dams on the Conecuh River, creating units GCM1, GCM2, GCM3, and GCM4. In the Choctawhatchee drainage, GCM6 and GCM7 are the result of the Elba dam on the Pea River mainstem. Threats to units downstream of the dams (GCM1 and GCM6) can include altered water quality (temperatures, dissolved oxygen), fluctuations in flow regime, and bed scour. Threats unique to the unit encompassing the two reservoirs (GCM2) are related to the operation of the dams and include drawdowns. Threats to the units upstream of the dams (GCM 3, GCM 4 and GCM 7) include the absence of anadromous fish hosts. These dams are barriers to upstream fish passage, and potentially to mussel gene flow. For these reasons, we believe these mainstem dams are logical boundaries. Finally, the critical habitat units do not infer recovery units. We have not yet completed a recovery plan for these species, but our recovery strategy for the eight mussels will undoubtedly involve managing and protecting these river systems at the watershed level.

(5) *Comment:* A reviewer suggested we consider combining units AP2 and GCM1.

Our response: We believe combining units AP2 and GCM1 would be an inaccurate representation of the Alabama pearlshell's range and habitat. The Alabama pearlshell is a headwater species and, as such, seldom co-occurs with the other six species in the drainage.

(6) *Comment: Cumberlandia* is found throughout the Mississippi basin not just the Tennessee drainage.

Our response: The context of the *Cumberlandia* information was the distribution of the genus in Alabama. We revised the sentence to make this more clear.

(7) *Comment:* Dredging, channelization, and snag removal and resulting streambed destabilization should be listed as the foremost threats to round pearlshell (reviewer meant round ebonyshell). This taxon is relatively drought tolerant as its core populations appear to reside in deep water habitats.

Our response: We agree and have added these activities as threats to the round ebonyshell.

(8) *Comment:* Characterization of narrow pigtoe habitat is somewhat vague and seems to imply that this animal is a small to moderate-sized stream specialist. The reviewer stated that occupied habitats include reaches of the lower Escambia and Yellow rivers, and considers both fairly large rivers.

Our response: We made minor revisions to the description of narrow pigtoe habitat to clarify. However, we disagree that the lower Escambia and Yellow rivers are large rivers, and we follow the description by Williams *et al.* (2008 p. 317) which classifies them as medium-sized rivers. This species is known from medium-sized creeks such as Murder and Patsaliga creeks in Alabama and medium-sized rivers such as the lower Escambia and Yellow rivers in Florida. We would describe nearby river systems like the Mobile and Apalachicola as ''large.'' The species does not occur in these rivers.

(9) *Comment:* What is the status of the proposed Little Choctawhatchee River Reservoir?

Our response: The Little Choctawhatchee project is a proposed water supply reservoir project in Dale and Houston Counties, Alabama. The Choctawhatchee, Pea, and Yellow Rivers Watershed Management Authority has applied for a section 404 permit from the U.S. Army Corps of Engineers. The project is in need of funding, but it is anticipated that it will move forward (Industrial Economics 2012, p. 4–11).

(10) *Comment:* One reviewer stated that there may be some commercial harvest of Alabama pearlshell, and asked if the Service has encountered any evidence for this claim.

Our response: We have no evidence that Alabama pearlshell were or are being harvested commercially.

(11) *Comment:* A peer reviewer suggested we include additional information in the document regarding the Elba Dam and its impact on downstream hydrology. The peer reviewer stated that it is a run-of-river structure and is, to his knowledge, not managed for hydropower production. The peer reviewer would like to see more info about the height and permeability of this and other dam structures.

Our response: At the time the proposed rule was published, we mistakenly believed the Elba Dam was not in operation. However, the dam is currently operating, generating power during peak periods and storing some water. We have revised our discussion of the dam's operation, and added dam height and fish passage information for the structure. We likewise added dam height and fish passage information for the Gantt and Point A dams on the Conecuh River.

(12) *Comment:* A peer reviewer mentioned that they did not find any mussels during a recent survey in the Yellow River upstream from the U.S. 84 crossing or in Hollis Creek. At the time of their survey, Hollis Creek was a small, sandy, intermittent stream at its confluence with the Yellow River and was unlikely to support listed mussels.

Our response: The Yellow River at the U.S. 84 crossing has a recent (1996) collection of Choctaw bean, and this portion of the river will remain as critical habitat. The 5.5-km (3.5-mi) segment of Hollis Creek was included as critical habitat in unit GCM5 in the proposed rule, but we have removed this segment in this final rule based on this new information, and adjusted the final critical habitat lengths for Unit GCM5 and the entire designation accordingly.

(13) *Comment:* A peer reviewer asked why Fort Rucker lands were not included as critical habitat, and stated that this reach seems to be an important section that is likely to be disturbed by Department of Defense activities, which in turn could affect listed mussel populations downstream in the Choctawhatchee River.

Our response: Fort Rucker has completed an integrated natural resources management plan (INRMP) that guides conservation activities on the installation through 2014. Lands within military installations are exempt from critical habitat designation under section 4(a)(3) of the Act, provided they are: ''* * * subject to an integrated natural resources management plan 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 INRMP specifically addresses maintaining and improving water quality through sedimentation and erosion control, land management practices, and improved treatment facilities. Therefore, in the proposed rule we determined that the streams on Ft. Rucker were exempt from the designation. In addition, the INRMP will be updated to incorporate the southern kidneyshell, Choctaw bean, tapered pigtoe, southern sandshell, and fuzzy pigtoe. We will work with Fort Rucker's Environmental and Natural Resources Division to incorporate conservation actions specific to these species into the INRMP.

Comments From the States

Section 4(i) of the Act states, ''the Secretary shall submit to the State agency a written justification for his failure to adopt regulations consistent with the agency's comments or petition.'' Comments received from the State of Florida regarding the proposal to list and designate critical habitat for the eight mussels are addressed below. No comments were received from the State of Alabama.

(14) *Comment:* The Florida Fish and Wildlife Commission generally concurred with our methods and conclusions, and supports the listing and the designation of critical habitat.

Our response: We appreciate the support and look forward to continuing to work with the Florida Fish and Wildlife Commission to recovery these mussels.

(15) *Comment:* One commenter asserted that the listing of the eight mussels and designation of critical habitat in the Florida Panhandle Region will increase costs and time spent on Florida Department of Transportation (FDOT) activities due to the need to conduct mussel surveys, the need to have formal section 7 consultation with the Service, the need to hire specialized consultants to conduct the survey and perform the formal consultation, and the mandated time requirements of a formal section 7 consultation. The comment states that, due to the significant number of bridges needing replacement and the limited funds available, these increased costs and prolonged timelines will have an economic burden and will constitute a safety concern for the public.

Our response: The economic analysis includes data provided by FDOT on the number of road and bridge construction and maintenance projects likely to occur over the next 20 years. The final economic analysis (FEA) estimates a total of 122 consultations over the next 20 years associated with road and bridge construction and maintenance activities within or affecting proposed critical habitat in Florida. The total present value incremental impact of consultations on these projects is $358,000 (an annualized impact of $31,600). As described in section 3.2 of the FEA, once the species are listed, the Service may recommend mussel surveys for proposed projects. However, these surveys would be recommended regardless of critical habitat due to the presence of listed species, and are therefore not quantified as a cost of the designation. In general, designation of critical habitat by itself does not generate the need for formal section 7 consultation. Consultation is triggered by activities that may affect the listed species or its critical habitat. Because each unit is already occupied by one or more of the mussel species, consultation would be required for activities with a Federal nexus that may affect the species regardless of the designation of critical habitat. Transportation planning, including planning for bridge replacement projects, typically has a

timeline, from planning to construction, of approximately 5 years. Informal and formal section 7 consultation can take place concurrent with other aspects of environmental planning without adding to the overall project timeline. There are also alternatives to individual project consultations, such as a programmatic formal consultation for bridge replacement projects, that could expedite the consultation process while reducing costs. The assessment of potential impacts of a project on critical habitat occurs at the same time as the assessment of the potential for the project to adversely affect a listed species. Consequently, critical habitat designation is not anticipated to generate additional delays in project schedules. Bridges that present an imminent public safety hazard may constitute an emergency, requiring emergency consultation. The Service has procedures for addressing emergency consultations that provide guidance to avoid and minimize effects to species and their habitat while allowing the emergency response to proceed. In non-emergency situations, when public safety is at risk, the consultation can often be expedited to address safety concerns.

(16) *Comment:* One comment states that Florida's Environmental Resource Permitting (ERP) Program provides the eight mussels with an additional level of environmental protection that is not offered in Alabama. The comment states that ERP ensures heightened water quality requirements and best management practices. The comment asserts that Florida should be excluded from the requirements of critical habitat designation due to the presence of applicable State statutes, including ERP, which applies to all activities on State, county, city, or Federal properties.

Our response: In response to information provided by the FDOT, section 3.1.2 of the FEA includes a description of the Florida ERP and the baseline protections it provides the eight mussels. The existence of this program does not preclude section 7 consultation requirements for projects with a Federal nexus. As such, the existence of this program does not change the estimated incremental impacts of critical habitat designation in Florida, which are limited to administrative costs of consultation. The heightened water quality protection measures of Florida's ERP provide benefits to freshwater mussels and support primary constituent element (PCE) 4, water quality. However, this measure alone cannot address all the potential threats to these species and their habitat from large-scale construction projects that can be addressed under section 7 of the Act. Threats may include direct injury and loss of individuals, as well as effects to other PCEs such as maintaining geomorphically stable stream and river channels (PCE 1), and stable substrates (PCE 2). Therefore, we are not excluding lands in the State of Florida.

Comments From Federal Agencies

(17) *Comment:* The U.S. Navy expressed its interest and commitment to work proactively with the Service to address potential issues should these species be listed under the Act. The Navy also provided information on properties within the watersheds of the proposed critical habitat units AP2 and GCM1, and these include Naval Air Station (NAS) Whiting Field's Navy Outlying Landing Field (NOLF) Evergreen (Alabama) and NOLF Pace (Florida).

Our response: After receiving these comments, the Service contacted the Navy and requested updated GIS files to better assess the locations of the NOLFs relative to proposed critical habitat. Once we had the detailed NOLF boundaries, we determined that the NOLF Pace does not have critical habitat within the boundary of the property, and that the NOLF Evergreen does have critical habitat within its boundary. NOLF Evergreen is situated within the Murder Creek drainage and includes an approximately 0.40-km (0.25-mi) segment of Hunter Creek, which is critical habitat in unit AP2 for the Alabama pearlshell. We also determined that the NAS Whiting Field Complex INRMP specifically addresses maintaining and improving water quality, and will be updated to incorporate the Alabama pearlshell. Therefore, lands within this installation are exempt from critical habitat designation under section 4(a)(3) of the Act as described in the ''Exemptions'' section, and this final rule has been changed accordingly.

This comment provides new information on the administrative effort required on the part of the NAS for maintenance of its INRMP. Review and updating of this INRMP occurs annually and would therefore occur regardless of critical habitat designation. However, incremental administrative effort may be required to consider the impact of activities covered under the INRMP on critical habitat. As discussed in section 4.1 of the DEA, the Service does not anticipate the critical habitat designation will generate recommendations for conservation efforts beyond those it would recommend due to the listing of the species. As a result, incremental economic impacts of critical habitat associated with consultation on the Navy's INRMP would be limited to additional administrative effort. The FEA is therefore revised to incorporate additional administrative costs to Units AP2 and GCM1 associated with the annual formal consultation on the NAS's INRMP.

Public Comments

(18) *Comment:* Comments received from several groups and individuals support the listing of the eight mussels and designation of critical habitat. These include: The Freshwater Mollusk Conservation Society, the Choctawhatchee River Keeper, the Center for Biological Diversity, American Rivers, and two anonymous commenters.

Our response: We appreciate the support.

(19) *Comment:* Multiple comments assert that the critical habitat designation will generate benefits. One comment suggests that critical habitat could be a stimulus for getting local, State, and Federal resources agencies to cooperate to address threats such as untreated active gully systems and to expand work to reduce pollutant transport from unpaved roads and associated roadside water conveyances. Another comment asserts that the mussels contribute economic value through denitrification of rivers, reducing the need to treat the water. A third comment similarly suggests that the Service should consider the economic benefits of the rule in terms of water quality improvements that will benefit downstream water users and public health.

Our response: Section 2.3.3 of the DEA describes that, ''[U]nder Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions * * * Rather than rely on economic measures, the Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts on the rulemaking.'' As described in section 4.4 of the DEA, the designation of critical habitat is not anticipated to generate additional conservation measures for the eight mussels beyond those that will be generated by their listing. Absent changes in land management or conservation measures for the eight mussels, we do not expect any incremental economic benefits, including improved water quality and associated benefits to human health and

reduced cost of downstream water treatment, to result specifically from designation of critical habitat for the eight mussels.

(20) *Comment:* One commenter provided a recent publication of a molecular study by Campbell and Lydeard (2012) titled *The genera of Pleurobemini (Bivalvia: Unionidae: Ambleminae).* The study confirms the taxonomy of *Fusconaia burkei, F. escambia,* and *Pleurobema strodeanum,* and it reassigns *Fusconaia rotulata* to the new genus *Reginaia.*

Our response: We incorporated these recent findings into this final determination, except the reassignment of *Fusconaia rotulata* to the new genus *Reginaia.* It is the Service's policy to recognize a nomenclature change once it has been vetted and generally accepted by the scientific community. However, because this finding was published in 2012, it has not had time to go through this process. If the change is accepted, we can revise the name in the future.

(21) *Comment:* One commenter agreed with the Service's inclusion of the Alabama pearlshell and southern kidneyshell on the Federal List of Endangered or Threatened Wildlife, but states that the proposed critical habitat should be extended to cover historically known ranges. The currently proposed critical habitat zones for the Alabama pearlshell, AP1 and AP2, do not contain any main stream channel that would prevent population isolation. The commenter recommended the Service include those sections of the Escambia River, Conecuh River, Cedar Creek, and the entirety of Murder Creek in order to connect Burnt Corn Creek, Murder Creek, and the Sepulga River and allow for a continuous stretch of critical habitat for the Alabama pearlshell. The commenter also stated that unit AP2 (commenter meant AP1) should be extended to contain sections of the Alabama River to allow the Alabama pearlshell to increase its range and numbers. Finally, the commenter recommended extending the southern kidneyshell's proposed critical habitat to include unit GCM5 in order to include known historical ranges and improve the species' chance of recovery.

Our response: As described under *Criteria Used to Identify Critical Habitat,* We reviewed available information pertaining to the habitat requirements of these species. In accordance with the Act and its implementing regulation at 50 CFR 424.12(e), we considered whether designating additional areas—outside those currently occupied as well as those occupied at the time of listing—are necessary to ensure the conservation of the species. We are designating critical habitat in areas within the geographical area occupied by the species at the time of listing in 2012. We also are designating specific areas outside the geographical area occupied by the species at the time of listing, that were historically occupied, but are presently unoccupied, because we have determined that such areas are essential for the conservation of these species. We have no data showing the Alabama pearlshell occurred in any of the rivers or creeks suggested for inclusion in the comment. For this reason, and based on the above criteria, we have no scientific information to support the extension of critical habitat in units AP1 and AP2 into the mainstem of these rivers at this time.

The southern kidneyshell's occurrence in the Yellow River is based on a single specimen collected in 1919, from Hollis Creek in Covington County, Alabama. The Hollis Creek segment was re-surveyed in 2012, and the surveyor noted the stream is small and intermittent, and is unlikely to support listed mussels (see comment 12); this may indicate habitat degradation or hydrology alteration or both since the collection. At this time, we do not believe that southern kidneyshell critical habitat should include the Yellow River drainage (including GCM5) because it is not essential to the conservation of the species and does not contain the physical or biological features needed to support the species.

(22) *Comment:* The proposed rule contains considerable speculation as to possible causes for reduced populations of the eight mussel species. The Service should rely instead on rigorous scientific information about relationships between factors potentially affecting these species, including the proposed water quality criteria associated with primary constituent elements, and actual population responses.

Our response: The Service has monitored the status of the eight mussels since they first became candidates for listing in 2004. Since that time, the Service and the States have funded numerous efforts to develop a better understanding of the natural history of these species. We have also analyzed the threats to these species using the best available science on surrogate species. The natural histories of these species are likely very similar to other species in the family Unionidae, and it is reasonable to assume that similar threats will affect these species in a similar manner. Each threat is discussed in detail in the Summary of Factors Affecting the Species and is summarized in the Determination sections. A threats matrix detailing our best understanding of the relative importance of these threats has been developed and is in the administrative record and available upon request (see **ADDRESSES** above).

(23) *Comment:* When properly implemented, forestry best management practices protect water quality and habitat for species associated with riparian, aquatic, and wetland habitats. Implementation and compliance rates for forestry best management practices are high nationally and in the Southeast, including in Alabama and Florida.

Our response: The Service agrees that best management practices (BMPs) are protective of water quality and mussel habitat, and that industrial forestry activities generally do a good job of implementing BMPs. However, BMPs are voluntary and, therefore, are not always implemented. In addition, some harvesting operations fail to use BMPs adequately, and localized impacts can and do occur. We consider sediment from silvicultural activities to be one of many potential sediment sources within a watershed.

(24) *Comment:* Sustainable forestry certification programs require participants to meet or exceed forestry best management practices and help ensure high rates of implementation.

Our response: The Service agrees that the sustainable forestry program is one of the most effective programs to ensure BMPs are properly implemented. Nonetheless, because they are voluntary, BMPs are not always implemented (see our response to Comment (23)) and some forestry activities can contribute sediments into stream systems.

(25) *Comment:* Suspended solids from modern biological wastewater treatment plants are often comprised largely of organic matter, and such solids would generally not be expected to contribute significantly to sedimentation or contaminated sediment.

Our response: The Service concurs with this comment. We have no information that suspended solids discharged by wastewater treatment plants, at permitted levels, are a threat to the eight mussels at this time.

(26) *Comment:* Sediment issues in the southeastern United States are complicated by a legacy of poor agricultural practices during the 1800s and early 1900s, which raises questions about sources of sediment problems and the relative magnitudes of different sediment sources today. Silvicultural activities generally have only a small, short-lived impact on water quality,

especially when compared with other land uses.

Our response: We agree that one of the primary sources of sedimentation in these basins is legacy sediment; however, we not aware of any studies that have looked at the relative contribution of historic and current sediment sources. We agree that silvicutural activities have a small and short-lived impact on water quality compared to other land uses; however, we do not believe the activities have small and short-lived impact to habitat quality. As discussed under Factor A under Summary of Factors Affecting the Species, heavy sediment loads can destroy mussel habitat, resulting in a corresponding shift in mussel fauna (Brim Box and Mossa 1999, p. 100), and can lead to rapid changes in stream channel position, channel shape, and bed elevation (Brim Box and Mossa 1999, p. 102).

(27) *Comment:* Herbicides used in forest management operation pose little risk to fauna, and there is no evidence that they endanger viability of aquatic organisms.

Our response: We do not agree that there is no evidence that herbicides used in forest management endanger viability of aquatic organisms. As described under Factors A and D under Summary of Factors Affecting the Species, numerous studies have documented that certain pesticides are lethal to mussels, particularly to the highly sensitive early life stages. A multitude of bioassay tests conducted on several mussel species show that freshwater mussels are more sensitive than previously known to the pesticides glyphosate and the surfactant MON 0818, ingredients in some pesticides used in forestry management.

(28) *Comment:* Climate change models do not provide information that is appropriate for making management decisions regarding these mussel species.

Our response: We agree that it would not be appropriate to use climate change models, which are broad in scale, to make management decisions regarding the eight mussels. However, we must consider evidence that climate change could lead to increased frequency of severe storms and droughts, which could affect these eight mussels in the future (see Factor E discussion, below).

Summary of Changes From Proposed Rule

After consideration of the comments we received during the public comment periods (see above), we made changes to the final listing rule. Many small, nonsubstantive changes and corrections, not affecting the determination (e.g., updating the Background section in response to comments, minor clarifications) were made throughout the document. Below is a summary list of more substantive changes made to this document.

(1) The total length of critical habitat was revised to 2,404 km (1,494 mi.) due to the removal of Hollis Creek, the exemption of a small section of Hunter Creek, and the accidental omission of one segment (Corner Creek) in a spreadsheet used to sum unit lengths for the proposed rule. Corner Creek was featured in the unit descriptions and maps of the proposed rule, but was inadvertently left out of the spreadsheet.

(2) The status of the southern sandshell was revised to a threatened species based on a peer reviewer's comment and new survey data.

(3) Unit AP2 was revised to remove a 0.4 km (0.25 mi) segment of Hunter Creek in Covington County, Alabama. This segment was determined to be exempt under section 4(a)(3) of the Act because it receives management under an approved INRMP created by the U.S. Navy (see comment 17 and our response).

(4) Table 1 was added to address peer review comment 3.

(5) The *Taxonomy, Life History, and Distribution* section was revised to reflect additional threats to round ebonyshell identified by a reviewer. These additional threats include dredging, channelization, and de-snagging of trees and brush for navigation.

(6) Information related to dam height and fish passage for Point A, Gantt, and Elba dams was added, and information related to the operation of Elba dam on the Pea River was revised.

In addition to these changes and additions, several errors in the proposed rule were corrected. These include:

(1) Renumbering of tables. The proposed rule contained two Tables 1 and 2; the second tables 1 and 2 were renumbered to Tables 10 and 11 in this document.

(2) Adding 1 km (1 mi) to the length of AP2. The length was recalculated and revised to 96 km (155 mi).

(3) Removing a portion of GCM5. Hollis Creek from its confluence with the Yellow River upstream 5.5 km (3.5 mi) to County Road 42, Covington County, Alabama, was erroneously included as critical habitat in the proposed rule, and we have removed it from this final rule; the length of unit GCM 5 was revised to 247 km (153 mi.).

(4) Adding 5 km (3.0 mi) to GCM6. This corrects an accidental omission of the Corner Creek segment length from the total length of critical habitat in the proposed rule. This happened due to its omission from a spreadsheet used to calculate the total length of units. The Corner Creek segment was, however, included in the critical habitat description in the proposed rule. The corrected length of the unit is 897 mi (557 km).

(5) Correcting other small errors in Table 10. Specifically, for southern sandshell,in unit GCM1, we revisedthe total length to 2,222 km (1,379 mi); for southern kidneyshell, we changed unit GCM5 to GCM6 and revised its total length to 1,975 km (1,226 mi); and for fuzzy pigtoe, we changed unit GCM2 to GCM1 and revised its total length to 2,222 km (1,379 mi).

(6) Changing the term ''protected'' to ''managed'' in Table 11 to more accurately define the various types of public lands.

(7) Where appropriate, updating occurrence information to incorporate data from a status survey completed in March of 2012.

Summary of Factors Affecting the Species

Section 4 of the Act and its implementing regulations (50 CFR part 424) set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. A species may be listed as an endangered or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. Listing actions may be warranted based on any of the above threat factors, singly or in combination. Each of these factors is discussed below.

A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

The habitats of freshwater mussels are vulnerable to habitat modification and water quality degradation from a number of activities associated with modern civilization. The primary cause of the decline of these eight 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 from land surface runoff originates from virtually all land use activities and includes sediments, fertilizer, herbicide and pesticide residues; animal wastes; septic tank leakage and gray water discharge; and oils and greases. Current activities and land uses that can negatively affect populations of these eight mussels 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 nutrification, decreased dissolved oxygen concentration, increased acidity and conductivity, and altered flow. Limited range and low numbers make these eight mussels vulnerable to land use changes that would result in increases in nonpoint-source pollution.

Sedimentation is one of the most significant pollution problems for aquatic organisms (Williams and Butler 1994, p. 55), and has been determined to be a major factor in mussel declines (Ellis 1936, pp. 39–40). Impacts resulting from sediments have been noted for many components of aquatic communities. For example, sediments have been shown to abrade or suffocate periphyton (organisms attached to underwater surfaces); affect respiration, growth, reproductive success, and behavior of aquatic insects and mussels; and affect fish growth, survival, and reproduction (Waters 1995, pp. 173–175). Heavy sediment loads can destroy mussel habitat, resulting in a corresponding shift in mussel fauna (Brim Box and Mossa 1999, p. 100). Excessive sedimentation can lead to rapid changes in stream channel position, channel shape, and bed elevation (Brim Box and Mossa 1999, p. 102). 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, p. 30), and high amounts of suspended sediments can dilute their food source (Dennis 1984, p. 212). Increased turbidity from suspended sediment can reduce or eliminate juvenile mussel recruitment (Negus 1966, p. 525; Brim Box and Mossa 1999, pp. 101–102). 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, p. 475; Blalock-Herod *et al.* 2002, p. 1885). If the superconglutinate is not encountered by a host within a short time period, the glochidia will become nonviable (O'Brien and Brim Box 1999, p. 133). Also, evidence suggests that conglutinates of the southern kidneyshell, once released from the female mussel, must adhere to hard surfaces in order to be seen by its fish host. If the surface becomes covered in fine sediments, the conglutinate cannot attach and is swept away (Hartfield and Hartfield 1996, p. 373).

Biologists conducting mussel surveys within the drainages have reported observations of excessive sedimentation in the streams and rivers of the three basins. While searching for the Alabama pearlshell in headwater streams of the Escambia and Alabama drainages, D. N. Shelton (1996, pp. 1–5 unpub. report) reported many streams within the study area had experienced heavy siltation, and that all species of mollusks appeared to be adversely affected. M. M. Gangloff (Gangloff and Hartfield 2009, p. 253) observed large amounts of sand and silt in the mainstem Pea and Choctawhatchee rivers during a 2006–2007 survey, and considered this a possible reason for the decline of mussels in the drainage.

In 2009–2010, The Nature Conservancy completed an inventory and prioritization of impaired sites in the Yellow River watershed in Alabama and Florida (Herrington *et al.,* 2010 unpub. report). The study identified and quantified the impacts of unpaved road crossings and streambank instability and erosion within the river corridor and riparian zone, to assess impairments that could impact the five species occurring in the drainage. A total of 339 unpaved roads and approximately 209 river miles of mainstem and tributaries were assessed using standardized methods. Out of these, 409 sites ranked ''High'' or ''Moderate'' in risk of excessive sedimentation according to the Sediment Risk Index. Many of the impaired sites (149) were located upstream of known mussel locations. In addition, habitat conditions were characterized at 44 known mussel locations; the sites were scored numerically and rated as poor, fair, good, or excellent. The majority of the mussel sites were assessed to be either fair or poor. Most of these locations were within the vicinity of bridge crossings and boat ramps and several, particularly in the Shoal River in Florida, were directly downstream of highly impaired unpaved road and river corridor sites. In summary, the study found the threat of sedimentation and habitat degradation is high throughout the Yellow River watershed with over 75 percent of sites assessed exhibiting high or moderate risk, and the majority of known mussel locations impaired.

Potential sediment sources within a watershed include virtually any activity that disturbs the land surface. Current sources of sand, silt, and other sediment accumulation in south-central Alabama and western Florida stream channels include unpaved road runoff, agricultural lands, timber harvest, livestock grazing, and construction and other development activities (Williams and Butler 1994, p. 55; Bennett 2002, p. 5 and references therein; Hoehn 1998, pp. 46–47 and references therein). The Choctawhatchee, Pea, and Yellow Rivers Watershed Management Plan (CPYRWMP) and the Conecuh–Sepulga–Blackwater Rivers Watershed Protection Plan (CSBRWPP) document water quality impairments to the Alabama portion of the watersheds. Both plans identify elevated levels of sediment as one of the primary causes of impairment (CPYRWMP, p. 156; CSBRWPP, p. 110). In the Choctawhatchee and Yellow river drainages, four out of the nine streams in which sediment loads were calculated by the Geological Survey of Alabama had significant sediment impairment (CPYRWMP, p. 157). In Alabama, runoff from unpaved roads and roadside gullies is considered the main source of sediment transported into the streams of the drainages (Bennett 2002, p. 5 and references therein; CPYRWMP, p. 145). Unpaved roads are constructed primarily of sandy materials and are easily eroded and transported to stream corridors. In addition, certain silvicultural and agricultural activities cause erosion, riparian buffer degradation, and increased sedimentation. Uncontrolled access to streams by cattle can result in destruction of riparian vegetation, bank degradation and erosion, and localized sedimentation of stream habitats.

Land surface runoff also contributes nutrients (for example, nitrogen and phosphorus from fertilizers, sewage, and animal manure) to rivers and streams, causing them to become eutrophic. Excessive nutrient input stimulates excessive plant growth (algae, periphyton attached algae, and nuisance plants). This enhanced plant growth can cause dense mats of filamentous algae that can expose juvenile mussels to entrainment or predation and be detrimental to the survival of juvenile mussels (Hartfield and Hartfield 1996,

p. 373). Excessive plant growth can also reduce dissolved oxygen in the water when dead plant material decomposes. In a review of the effects of eutrophication on mussels, Patzner and Muller (2001, p. 329) noted that stenoecious (narrowly tolerant) species disappear as waters become more eutrophic. They also refer to studies that associate increased levels of nitrate with the decline and absence of juvenile mussels (Patzner and Muller 2001, pp. 330–333). Filamentous algae may also displace certain species of fish, or otherwise affect fish–mussel interactions essential to recruitment (for example, Hartfield and Hartfield 1996, p. 373). Nutrient sources include fertilizers applied to agricultural fields and lawns, septic tanks, and municipal wastewater treatment facilities.

Because of their sedentary characteristics, mussels are extremely vulnerable to toxic effluents (Sheehan *et al.* 1989, pp. 139–140; Goudreau *et al.* 1993, pp. 216–227; Newton 2003, p. 2543). Descriptions of localized mortality have been provided for chemical spills and other discrete point-source discharges; however, rangewide decreases in mussel density and diversity may result from the more insidious effects of chronic, low-level contamination (Newton 2003, p. 2543, Newton *et al.* 2003, p. 2554). Freshwater mussel experts often report chemical contaminants as factors limiting to unionids (Richter *et al.* 1997, pp. 1081–1093). They note high sensitivity of early life stages to contaminants such as chlorine (Wang *et al.* 2007 pp. 2039–2046), metals (Keller and Zam 1991, p. 542; Jacobson *et al.* 1993, pp. 879–883), ammonia (Augspurger *et al.* 2003, pp. 2571–2574; Wang *et al.* 2007 pp. 2039–2046), and pesticides (Bringolf *et al.* 2007a,b pp. 2089–2092, pp. 2096–2099). Pesticide residues from agricultural, residential, or silvicultural activities enter streams mainly by surface runoff. Agricultural crops locally grown within the range of these mussels associated with high pesticide use include cotton, peanuts, corn, and soybeans. Chlorine, metals, and ammonia are common constituents in treated effluent from municipal and industrial wastewater treatment facilities. A total of 62 municipal and 39 industrial wastewater treatment facilities are permitted in Alabama and Florida to discharge treated effluent into surface waters of the three river drainages (FDEP 2010a; ADEM 2010a).

States maintain water-use classifications through issuance of National Pollutant Discharge Elimination System (NPDES) permits to industries, municipalities, and others that set maximum limits on certain pollutants or pollutant parameters. The Alabama Department of Environmental Management (ADEM) has designated the water use classification for most portions of the Escambia, Yellow, and Choctawhatchee Rivers as ''Fish and Wildlife'' (F&W), and a few portions (mostly lakes) as ''Swimming'' (S). The F&W designation establishes minimum water quality standards that are believed to protect existing species and water uses like fishing and recreation within the designated area, while the S classification establishes higher water quality standards that are protective of human contact with the water. The Florida Department of Environmental Protection (FDEP) classifies all three river drainages as Class III waters. The Class III designation establishes minimum water quality standards that are believed to protect species and uses such as recreation. The Choctawhatchee and Shoal Rivers are also designated as Outstanding Florida Waters (OFW) by the State of Florida. The designation prevents the discharge of pollutants, which would lower existing water quality or significantly degrade the OFW.

Section 303(d) of the Clean Water Act (33 U.S.C. 1251 et seq.) requires States to identify waters that do not fully support their designated use classification. These impaired water bodies are placed on the State's 303(d) list, and a total maximum daily load (TMDL) must be developed for the pollutant of concern. A TMDL is an estimate of the total load of pollutants that a segment of water can receive without exceeding applicable water quality criteria. Alabama's 303(d) list identifies a total of 25 impaired stream segments within the Escambia, Yellow, and Choctawhatchee River basins that either support populations of the eight species or that flow into streams that support them. The list identifies metals (mercury and lead), organic enrichment, pathogens, siltation, excess nutrients, or unknown toxicity as reasons for impairment (ADEM 2010b, pp. 4–8). Various potential point and non-point pollution sources are identified, such as atmospheric deposition, pasture grazing, feedlots, municipal, industrial, urban runoff, agriculture, and land development. Florida's 303(d) list identifies a total of 22 impaired stream segments within the basins that either support populations of seven of the species (the Alabama pearlshell does not occur in Florida) or that flow into streams that support them. The list identifies coliform bacteria, low dissolved oxygen (nutrients), and mercury (in fish tissue) as reasons for inclusion (FDEP 2010b, pp. 4–6).

While the negative effects of point-source discharges on aquatic communities in Alabama and Florida have been reduced over time by compliance with State and Federal regulations pertaining to water quality, there has been less success in dealing with nonpoint-source pollution impacts. Because these contaminant sources stem from urban surface runoff, private landowner activities (construction, grazing, agriculture, silviculture), and public construction works (bridge and highway construction and maintenance), they are often more difficult to regulate.

These mussels require stable stream and river habitats and activities that cause channel instability can negatively impact their populations. Activities such sand and gravel mining, the removal of large woody material, off-road vehicles use, and land use changes are known to cause channel destabilization. Activities that destabilize stream beds and channels can result in drastic alterations to stream geomorphology and consequently to the stream's ecosystem.

Instream gravel mining has been implicated in the destruction of mussel populations (Stansbery 1970, p. 10; Hartfield 1993, pp. 138–139). Instream sand and gravel mining can cause severe bank erosion, channel widening, destruction of riparian habitats, and other geomorphic changes (Kanehl and Lyons 1992, pp. 26–27; Brown *et al.* 1998, pp. 987–992), including head cuts that can extend considerable distances upstream from the mines (Hartfield 1993, pp. 138–139) and substrate disturbance and siltation impacts that can be realized for considerable distances downstream (Stansbery 1970, p. 10). Poorly located or inadequately designed mines in the flood plain can have similar effects and result in alterations to streams channels (Mossa and Coley, 2004, p. 2). For example, a mined area along Big Escambia Creek near Century, Florida resulted in the formation of a new channel through the mines, causing excessive sedimentation in downstream areas. A large restoration project was required to put the stream back into its natural channel. Numerous mining operations occur along a gravel vein in the upper Escambia and Choctawhatchee river drainages in Florida and Alabama (Metcalf 2012 pers. com).

Operations that remove large woody material from channels, either for navigation and maintenance (desnagging) or for the recovery of pre-cut submerged timber (deadhead

logging), have the potential to affect mussel communities by creating unstable substrates (Watters 1999, p. 269). These types of permitted activities are common in areas where these mussels occur. The removal of large logs may result in changes to sedimentation patterns and stream morphology, the erosion of banks and bars, and the consequent loss of habitat structure and species diversity (Watters 1999, p. 268; Cathey *et al.* unpub. report, p. 1).

Low flow conditions provide access to stream margins and channels for off-road vehicles. The practice of driving off-road vehicles within stream channels has been observed in the upper Conecuh and Choctawhatchee river drainages (Metcalf 2012 pers. com). These vehicles may destabilize stream banks, increase sedimentation rates, and may also directly crush mussels (Stringfellow and Gagnon 2001, p. 3).

Land use activities such as land clearing and development can cause channel instability by accelerating stormwater runoff into streams. Increased runoff rates can result in bank erosion and bed scour (Brim Box and Mossa 1999, p. 103), and can lead to channel incision (Booth 1990, p. 407; Doyle *et al.* 2000, p. 157, 175). These flow regime changes can significantly and rapidly alter the morphology of the stream channel, and can eventually lead to degradation throughout the watershed as sediments eroded in the upper portions are deposited in the lower reaches (Doyle *et al.* 2000, pp. 156, 175).

The damming of rivers has been a major factor contributing to the demise of freshwater mussels (Bogan 1993, p. 604). Dams eliminate or reduce river flow within impounded areas, trap silts and cause sediment deposition, alter water temperature and dissolved oxygen levels, change downstream water flow and quality, affect normal flood patterns, and block upstream and downstream movement of mussels and their host fishes (Bogan 1993, p. 604; Vaughn and Taylor 1999, pp. 915–917; Watters 1999, pp. 261–264; McAllister *et al.* 2000, p. iii; Marcinek *et al.* 2005, pp. 20–21). Downstream of dams, mollusk declines are associated with changes and fluctuation in flow regime, scouring and erosion, reduced dissolved oxygen levels, water temperatures, and changes in resident fish assemblages (Williams *et al.* 1993, p. 7; Neves *et al.* 1997, pp. 63–64; Watters 1999, pp. 261–264; Marcinek *et al.* 2005, pp. 20–21). Because rivers are linear systems, these alterations can cause mussel declines for many miles downstream of the dam (Vaughn and Taylor 1999, p. 916).

Three significant mainstem impoundments are situated within the three drainages, all in Alabama. Constructed in 1923 for hydroelectric power generation, Point A Lake and Gantt Lake dams are located on the mainstem of the Conecuh River in Covington County, Alabama. The downstream dam, Point A, is 41 ft. high, and Gantt dam is 35 ft. high. Combined, these two dams impound approximately 3,400 acres at normal pool. Both impoundments have limited storage capacity and are operated as modified run-of-river projects with daily peaking. For example, when inflows to Gantt are greater than 1,500 cubic feet per second (cfs), the outflow matches the inflow at Point A. However, during the summer months, when inflows can fall below 1,500 cfs, a portion of the inflow may be stored and released when power generation is in high demand. Regardless of the inflow, Point A dam has a minimum continuous discharge requirement of 500 cfs and a requirement to meet a dissolved oxygen level of no less than 4.0 milligram per liter (mg/l).

The Elba dam on the Pea River mainstem near Elba, Alabama, was constructed in 1903 for power generation. The dam generates power during peak periods and stores some water, but does not have a reservoir, only a widened channel which is roughly one and a half to two times wider upstream of the dam than downstream. The 29 ft. high structure is a barrier to to upstream fish migration (Williams *et al.* 2008, p. 34). Channel scour (deepening of the streambed as a result of erosion) is occurring downstream of the Elba Dam (Williams 2010 pers. comm.).

All three dams are barriers to upstream fish migration and to the movement of potential mussel host species. The Service (2003 pp. 13392–3) noted that Point A Dam and Elba Dam prevent threatened Gulf sturgeon (*Acipenser oxyrinchus desotoi*) movement farther upstream at all flow conditions. By blocking fish movement, the dams may prevent gene exchange between upstream and downstream mussel populations. Gulf sturgeon have been shown to serve as a primary host for mussel larvae (Fritts *et al.,* in review), although we do not know if they serve as a host for any of these eight species. The three dams currently separate populations of southern kidneyshell, Choctaw bean, tapered pigtoe, southern sandshell, and fuzzy pigtoe. In addition, two smaller impoundments are located on tributary streams. Lake Frank Jackson is situated on Lightwood Knot Creek, a tributary to the Yellow River in Covington County, Alabama; Lake Tholocco, on Claybank Creek, is a tributary to the Choctawhatchee River in Dale County, Alabama. Waters released from these two shallow impoundments can have extremely elevated temperatures in summer, which alters the normal temperature cycle downstream (Williams *et al.* 2000 unpub. data).

The potential exists for more dams to be constructed within the three drainages, and at least four additional impoundments are proposed. These include proposed impoundments on Murder Creek and Big Escambia Creek in the Escambia River drainage in Alabama, the Yellow River mainstem in Florida, and the Little Choctawhatchee River in Alabama. These proposed projects have implications for populations of all eight species. Given projected population increases and the need for municipal water supply, other proposals for impoundment construction are expected in the future.

In summary, the loss and degradation of habitat from various forms of pollution, stream bed destabilization, and impoundments are a threat to the continued existence of these eight species. Degradation from sedimentation and contaminants is a threat to the habitat and water quality necessary to support these species throughout their entire ranges. Sedimentation can cause mortality by suffocation; impair the ability to feed, respire, and reproduce; and destabilize substrate. Contaminants associated with municipal and industrial effluents (metals, ammonia, chlorine) and with agriculture and silviculture (pesticides) are lethal to mussels, particularly to the highly sensitive early life stages. These mussels require stabile stream and river channels, and quickly disappear from areas destabilized by gravel mining, the removal of large woody material, off-road vehicle use, and increased surface runoff. The effects of impoundments are more subtle, but can cause severe alternations to mussel habitat both upstream and downstream of the dam, and can impair dispersal and breeding ability. While recent surveys for these species have documented several new populations, they have also documented a decline in (and the loss of) many of the known populations due to human impact. Therefore, we have determined that the present or threatened destruction, modification, or curtailment of habitat and range is a threat with severe impact to the Alabama pearlshell, round ebonyshell, southern kidneyshell, and Choctaw bean, and is a threat with moderate impact to the tapered pigtoe, narrow

pigtoe, southern sandshell, and fuzzy pigtoe. This threat is current and is projected to continue and increase into the future with additional anthropogenic pressures.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

None of the eight mussels are commercially valuable species, and the streams and rivers that they inhabit are not subject to harvesting activities for commercial mussel species. Although the eight species have been taken for scientific and private collections in the past, collecting is not considered a factor in the decline of these species. Such activity may increase as their rarity becomes known; however, we have no specific information indicating that overcollection is currently a threat. Therefore, we find that overutilization for commercial, recreational, scientific, or educational purposes is not a threat to the eight mussels at this time.

C. Disease or Predation

Diseases of freshwater mussels are poorly known, and we have no specific information indicating that disease poses a threat to populations of these eight species. Juvenile and adult mussels are prey items for some invertebrate predators and parasites (for example, nematodes and mites), and provide prey for a few vertebrate species (for example, raccoons, muskrats, otters, and turtles) (Hart and Fuller 1974, pp. 225–240). However, we have no evidence of any specific declines in these species due to predation. Therefore, diseases and predation of freshwater mussels remain largely unstudied and are not considered a threat to the eight mussels at this time.

D. The Inadequacy of Existing Regulatory Mechanisms

There is no information on the sensitivity of the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, or fuzzy pigtoe to aquatic pollutants. Current State and Federal regulations regarding pollutants are designed to be protective of aquatic organisms; however, freshwater mussels may be more susceptible to some pollutants than test organisms commonly used in bioassay tests. A multitude of bioassay tests conducted on 16 mussel species (summarized by Augspurger *et al.* 2007, pp. 2025–2028) show that freshwater mussels are more sensitive than previously known to some chemical contaminants including chlorine, ammonia, copper, the pesticides chlorothalonil and glyphosate, and the surfactant MON 0818. For example, several recent studies have demonstrated that U.S. Environmental Protection Agency (EPA) criteria for ammonia may not be protective of freshwater mussels (Augspurger *et al.* 2003, p. 2571; Newton *et al.* 2003, pp. 2559–2560; Mummert *et al.* 2003, pp. 2548–2552).

Ammonia is an important aquatic pollutant because of its relatively high toxicity and common occurrence in riverine systems. This has application to the expected sources of these chemicals in the environment. Significant sources of nutrient enrichment leading to elevated ammonia include industrial wastewater, municipal wastewater treatment plant effluents, and urban and agricultural runoff (chemical fertilizers and animal wastes) (Augspurger *et al.* 2007, p. 2026). Elevated copper in surface waters can result from natural runoff sources, but is more often associated with a private or municipal wastewater effluent. Pesticide residues enter streams from agricultural, residential, or silvicultural runoff. Environmental chlorine concentrations will most often be associated with a point source discharge such as a municipal wastewater treatment facility.

As indicated in the Factor A discussion above, sedimentation is considered the most significant threat to these eight species. Best management practices (BMPs) for sediment and erosion control are often recommended or required for construction projects; however, compliance, monitoring, and enforcement of these recommendations are often poorly implemented. Although unpaved roads likely contribute the majority of sediment to the streams and rivers in the basins, other sources including forestry, row crops, and construction contribute to the total sediment load.

States are required under the Clean Water Act to establish a TMDL for the pollutants of concern that the water body can receive without exceeding the applicable standard (see discussion under Factor A). However, the Federal Clean Water Act is not fully utilized in the protection of these river systems. For example, of the 51 impaired water bodies identified within the drainages, less than one-fourth currently have approved TMDLs (ADEM 2010c, pp. 3–6; FDEP 2010b, pp. 4–6).

In summary, some regulatory mechanisms exist that protect aquatic species; however, these regulations are not effective at protecting mussels and their habitats from sedimentation and contaminants. Pollution from non-point sources is the greatest threat to these eight mussels (see Factor A discussion); however, this type of pollution is difficult to regulate and not effectively controlled by State and Federal water quality regulations. Therefore, we find current existing regulatory mechanisms are inadequate to protect the eight mussels throughout their ranges. This threat is current and is projected to continue into the future.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Random Catastrophic Events

The Gulf coastal region is prone to extreme hydrologic events. Extended droughts result from persistent high-pressure systems, which inhibit moisture from the Gulf of Mexico from reaching the region (Jeffcoat *et al.* 1991, p. 163–170). Warm, humid air from the Gulf of Mexico can produce strong frontal systems and tropical storms resulting in heavy rainfall and extensive flooding (Jeffcoat *et al.* 1991, p. 163–170). Although floods and droughts are a natural part of the hydrologic processes that occur in these river systems, these events may contribute to the further decline of mussel populations suffering the effects of other threats.

During high flows, flood scour can dislodge mussels where they may be injured, buried, or swept into unsuitable habitats, or mussels may be stranded and perish when flood waters recede (Vannote and Minshall 1982, p. 4105; Tucker 1996, p. 435; Hastie *et al.* 2001, pp. 107–115; Peterson *et al.* 2011, unpaginated). Heavy spring rains in 2009 resulted in severe flooding in the basins that destroyed numerous stream crossings.

During drought, stream channels may become disconnected pools where mussels are exposed to higher water temperatures, lower dissolved oxygen levels, and predators, or channels may become dewatered entirely. Johnson *et al.* (2001, p. 6) monitored mussel responses during a severe drought in 2000 in tributaries of the Lower Flint River in Georgia, and found that most mortality occurred when dissolved oxygen levels dropped below 5 mg/L. Furthermore, increased human demand and competition for surface and ground water resources for irrigation and consumption during drought can cause drastic reductions in stream flows and alterations to hydrology (Golladay *et al.* 2004, p. 504; Golladay *et al.* 2007 unpaginated). Extended droughts occurred in the Southeast during 1998 to 2002, and again in 2006 to 2008. The effects of these recent droughts on these eight mussels are unknown; however,

substantial declines in mussel diversity and abundance as a direct result of drought have been documented in southeastern streams (for example, Golladay *et al.* 2004, pp. 494–503; Haag and Warren 2008, p. 1165). The Alabama pearlshell is particularly at risk during drought as its headwater stream habitats are vulnerable to dewatering. Shelton (1995, p. 4 unpub. report) reported one of the most common causes of mortality in the species is due to stranding by extreme low water.

There is a growing concern that climate change may lead to increased frequency of severe storms and droughts (McLaughlin *et al.* 2002, p. 6074; Golladay *et al.* 2004, p. 504; Cook *et al.* 2004, p. 1015). Specific effects of climate change to mussels, their habitat, and their fish hosts could include changes in stream temperature regimes, the timing and levels of precipitation causing more frequent and severe floods and droughts, and alien species introductions. Increases in temperature and reductions in flow may also lower dissolved oxygen levels in interstitial habitats, which can be lethal to juveniles (Sparks and Strayer 1998, pp. 131–133). Effects to mussel populations from these environmental changes could include reduced abundance and biomass, altered species composition, and host fish considerations (Galbraith *et al.* 2010, pp. 1180–1182). The present conservation status, complex life histories, and specific habitat requirements of freshwater mussels suggest that they may be quite sensitive to climate change (Hastie *et al.* 2003, p. 45).

The linear nature of their habitat, reduced range, and small population sizes make these eight mussels vulnerable to contaminant spills. Spills as a result of transportation accidents are a constant, potential threat as numerous highways and railroads cross the stream channels of the basins. Also, more than 400 oil wells are located within Conecuh and Escambia Counties, Alabama. In Conecuh County, most of these wells are concentrated in the Cedar Creek drainage, which supports at least two populations of the Alabama pearlshell. These wells are subject to periodic spills either directly at the well site or associated with the transport of the oil. For example, on February 5, 2010, an oil spill occurred in the headwaters of Feagin Creek. Feagin Creek is located between two known pearlshell locations, Little Cedar and Amos Mill creeks. The resulting spill discharged more than 150 gallons of oil into Feagin Creek. Although there were no known populations of the pearlshell in Feagin Creek, this type of spill could have easily occurred in one of the adjacent watersheds that supports the pearlshell. Since 2000, there have been 13 spills reported in Conecuh, 36 in Escambia, and 33 in Covington Counties, Alabama.

Reduced Genetic Diversity

Population fragmentation and isolation prohibits the natural interchange of genetic material among populations. Low numbers of individuals within the isolated populations have greater susceptibility to deleterious genetic effects, including inbreeding depression and loss of genetic variation (Lynch 1996, pp. 493–494). Small, isolated populations, therefore, are more susceptible to environmental pressures, including habitat degradation and stochastic events, and thus are the most susceptible to extinction (Primack 2008, pp. 151–153). It is unknown if any of the eight mussel species are currently experiencing a loss of genetic diversity. However, surviving populations of the Alabama pearlshell, round ebonyshell, and southern kidneyshell do have highly restricted or reduced ranges, fragmented habitats, and extremely small population sizes.

Host Fish Considerations

As mentioned in the *General Biology* section above, all of these eight species require a fish host in order to complete their life cycle. Therefore, these mussels would be adversely affected by the loss or reduction of fish species essential to their parasitic glochidial stage. The blacktail shiner (*Cyprinella venusta*), a common and abundant fish species, was found to serve as a glochidial host for the tapered pigtoe and fuzzy pigtoe (White *et al.* 2008, p. 123). The specific hosts for the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, narrow pigtoe, and southern sandshell and have not been identified; however, other species of the same genera are known to parasitize cyprinids (minnows), centrarchids (sunfish), and percids (darters) (Haag and Warren 1997, pp. 580–581, 583; Keller and Ruessler 1997, p. 405; O'Brien and Brim Box 1999, p. 134; Haag *et al.* 1999, p. 150; Haag and Warren 2003, pp. 81–82; Luo 1993, p. 16).

Nonindigenous Species

The Asian clam (*Corbicula fluminea*) has been introduced to the drainages and may be adversely affecting these eight mussels through direct competition for space and resources. The Asian clam was first detected in eastern Gulf drainages in the early 1960s, and is presently widespread throughout the Escambia, Yellow, and Choctawhatchee River drainages (Heard 1975, p. 2). The invasion of the Asian clam in these and in other eastern Gulf drainages has been accompanied by drastic declines in populations of native mussels (see observations by Heard 1975, p. 2; and Shelton 1995, p. 4 unpub. report). However, it is difficult to say whether the Asian clam competitively excluded the native mussels, or if it was simply tolerant of whatever caused the mussels to disappear. The Asian clam may pose a direct threat to native mussels, particularly as juveniles, as a competitor for resources such as food, nutrients, and space (Neves and Widlak 1987, p. 6). Dense populations of Asian clams may ingest large numbers of unionid sperm, glochidia, and newly metamorphosed juveniles, and may actively disturb sediments, reducing habitable space for juvenile native mussels, or displacing them downstream (Strayer 1999, p. 82; Yeager *et al.* 2000, pp. 255–256).

The flathead catfish (*Pylodictis olivaris*) has been introduced to the drainages and may be adversely impacting native fish populations. The flathead catfish is a large predator native to the central United States, and since its introduction outside its native range, it has altered the composition of native fish populations through predation (Boschung and Mayden 2004, p. 350). Diet and selectivity studies of introduced flathead catfish in coastal North Carolina river systems show it feeds primarily on other fish species (Guier *et al.* 1984, pp. 617–620; Pine *et al.* 2005, p. 909). The flathead catfish is now well-established in the Escambia, Yellow, and Choctawhatchee River drainages, and its numbers appear to be growing (Strickland 2010 pers. comm.). Biologists working in the Florida portions of these drainages have observed a correlation between the increase in flathead catfish numbers and a decrease in numbers of other native fish species, particularly of bullhead catfish (*Ameiurus* sp.) and redbreast sunfish (*Lepomis auritus*) (Strickland 2010 pers. comm.). Although we do not know the specific fish hosts for six of the mussel species, the loss or reduction of native fishes in general could affect their ability to recruit.

In summary, a variety of natural or manmade factors currently are a threat to these eight mussels. Stochastic events such as droughts and floods have occurred in these three river drainages in the past, and climate change may increase the frequency and intensity of

similar events in the future. The withdrawal of surface and ground waters during drought can cause further drastic flow reductions and alterations that may cause declines in mussel abundance and distribution. Contaminant spills have also occurred in these drainages and currently are a threat, particularly in the Alabama portion of the Escambia River drainage, where there are numerous oil wells. It is not known if these species are currently experiencing a loss of genetic viability; however, their restricted or reduced ranges, fragmented habitats, and small population sizes increases the risks and consequences of inbreeding depression and loss of genetic variation. Introduced species, such as the Asian clam, may adversely impact these mussels through direct competition for space and resources. Another introduced species, the flathead catfish, may consume host fishes, thereby affecting mussel recruitment. Therefore, we have determined that other natural or manmade factors, specifically threats from flooding, drought, and contaminant spills, are severe threats to the Alabama pearlshell, round ebonyshell, southern kidneyshell, and Choctaw bean, and they are moderate threats to the tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe. These threats are currently impacting these species and are projected to continue or increase in the future. We have determined that threats from the Asian clam have moderate impacts to the Alabama pearlshell, round ebonyshell, southern kidneyshell, southern sandshell, and Choctaw bean, and these threats have low impacts to the tapered pigtoe, narrow pigtoe, and fuzzy pigtoe. We have determined that reduced genetic diversity, the absence or reduction of fish hosts, and the presence of flathead catfish have the potential to adversely impact the eight mussels. However, we do not know the intensity of these threats at this time.

Determination

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe. Section 3(6) of the Act defines an endangered species as ''any species which is in danger of extinction throughout all or a significant portion of its range,'' and section 3(20) of the Act defines a threatened species as ''any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' As described in detail above, these eight species are currently at risk throughout all of their respective ranges due to ongoing threats of habitat destruction and modification (Factor A), inadequacy of existing regulatory mechanisms (Factor D), and other natural or manmade factors affecting their continued existence (Factor E). Specifically, these factors include excessive sedimentation, municipal and industrial effluents, pesticides, excessive nutrients, impoundment of stream channels, recurring drought and flooding, contaminant spills, and the introduced Asian clam. In addition, existing regulatory mechanisms are inadequate to ameliorate some of the threats affecting these mussels and their habitats. Based on the best available science, these threats are currently impacting these species and are projected to continue and potentially worsen in the future. These eight mussels are also at increased threat due to the loss of genetic viability and the reduction or absence of fish hosts (described under Factor E); however, these threats are not currently known to be imminent.

Species with small ranges, few populations, and small or declining population sizes, are the most vulnerable to extinction (Primack 2008, p. 137). The effects of certain factors, particularly habitat degradation and loss, catastrophic events, and introduced species, increase in magnitude when population size is small (Soulé 1980, pp. 33, 71; Primack 2008, pp. 133–135, 152). The impact of habitat degradation, catastrophic events, and introduced species are more severe to the Alabama pearlshell, round ebonyshell, southern kidneyshell, and Choctaw bean than the other four species, which have few or isolated populations coupled with low numbers of individuals and limited or reduced ranges. Nonetheless, the tapered pigtoe, narrow pigtoe, southern sandshell and fuzzy pigtoe, which still occur in much of their historical ranges have been eliminated from historic streams and main channel locations and have declining numbers of individuals. When combining the effects of historical, current, and future habitat loss and degradation; historical and ongoing drought; and the exacerbating effects of small and declining population sizes and curtailed ranges, the Alabama pearlshell, round ebonyshell, southern kidneyshell, and Choctaw bean are in danger of extinction throughout all of their ranges, and the tapered pigtoe, narrow pigtoe, southern sandshell and fuzzy pigtoe are likely to become endangered within the foreseeable future throughout all of their ranges. In addition, any factor (i.e., habitat loss or natural and manmade factors) that results in a further decline in habitat or individuals may be problematic for the long-term recovery of these species.

Therefore, based on the best available scientific and commercial information, we are listing the Alabama pearlshell, round ebonyshell, southern kidneyshell, and Choctaw bean as endangered species throughout all of their ranges, and the tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe as threatened species throughout all of their ranges. In the proposed rule we examined all available information on the eight species to determine if any significant portions of their ranges may warrant a different status. However, because of their limited and curtailed ranges, and uniformity of the threats throughout them, we find there are no significant portions of any of the species' ranges that warrant a different determination of status.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness and conservation by Federal, State, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and requires that recovery actions be carried out for all listed species. The protection measures required of Federal agencies and the prohibitions against certain activities involving listed wildlife are discussed in Effects of Critical Habitat Designation and are further discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Subsection 4(f) of the Act requires the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a

point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning includes the development of a recovery outline shortly after a species is listed and preparation of a draft and final recovery plan. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery plan identifies site-specific management actions that set a trigger for review of the five factors that control whether a species remains endangered or may be downlisted or delisted, and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (comprised of species experts, Federal and State agencies, nongovernment organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our Web site (*http://www.fws.gov/endangered*), or from our Panama City Field Office (see **ADDRESSES**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribal, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

Once these species are listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, under to section 6 of the Act, the States of Alabama and Florida will be eligible for Federal funds to implement management actions that promote the protection or recovery of these eight mussel species. Information on our grant programs that are available to aid species recovery can be found at: *http://www.fws.gov/grants.*

Please let us know if you are interested in participating in recovery efforts for this species. Additionally, we invite you to submit any new information on this species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

Federal agency actions within the species' habitat that may require conference or consultation or both as described in the preceding paragraph include: The management of and any other landscape-altering activities on Federal lands administered by the Department of Defense and U.S. Forest Service; issuance of section 404 Clean Water Act permits by the U.S. Army Corps of Engineers; licensing of hydroelectric dams, and construction and management of gas pipeline and power line rights-of-way approved by the Federal Energy Regulatory Commission; construction and maintenance of roads or highways funded by the Federal Highway Administration; and land management practices administered by the Department of Agriculture.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. The prohibitions of section 9(a)(2) of the Act, codified at 50 CFR 17.21 for endangered wildlife, in part, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these), import, export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. Under the Lacey Act (18 U.S.C. 42–43; 16 U.S.C. 3371–3378), it is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered and threatened wildlife species under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22 for endangered wildlife, and at 17.32 for threatened wildlife. With regard to endangered wildlife, a permit must be issued for the following purposes: for scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities.

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify, to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on planned and ongoing activities within the range of species proposed for listing. The following activities could potentially result in a violation of section 9 of the Act; this list is not comprehensive:

(1) Unauthorized collecting, handling, possessing, selling, delivering, carrying, or transporting of the species, including import or export across State lines and international boundaries, except for properly documented antique specimens of these taxa at least 100 years old, as defined by section 10(h)(1) of the Act.

(2) Introduction of nonnative species that compete with or prey upon these eight mussel species, such as the zebra mussel (*Dreissena polymorpha*) and the black carp (*Mylopharyngodon piceus*).

(3) The unauthorized release of biological control agents that attack any life stage of these species.

(4) Unauthorized modification of the channel or water flow of any stream or water body in which these species are known to occur.

Questions regarding whether specific activities would constitute a violation of section 9 of the Act should be directed to the Panama City Ecological Services Field Office (see **ADDRESSES**).

Critical Habitat

Background

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that Federal agencies ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the consultation requirements of section 7(a)(2) of the Act would apply, but even in the event of a destruction or adverse modification finding, the obligation of the Federal action agency and the landowner is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in critical habitat if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat). In identifying those physical and biological features within an area, we focus on the principal biological or physical constituent elements (primary constituent elements such as roost sites, nesting grounds, seasonal wetlands, water quality, tide, soil type) that are essential to the conservation of the species. Primary constituent elements are the specific elements of physical or biological features that provide for a species' life-history processes, are essential to the conservation of the species.

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. For example, an area currently occupied by the species but that was not occupied at the time of listing may be essential to the conservation of the species and may be included in the critical habitat designation. We designate critical habitat in areas outside the geographical area occupied by a species only when a designation limited to its range would be inadequate to ensure the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific and commercial data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658)), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary sources of information include the articles in peer-reviewed journals, scientific status surveys and studies, biological assessments, other unpublished materials, or experts' opinions or personal knowledge.

Habitat is dynamic, and species may move from one area to another over time. Climate change will be a particular challenge for biodiversity because the interaction of additional stressors associated with climate change and current stressors may push species beyond their ability to survive (Lovejoy 2005, pp. 325–326). The synergistic implications of climate change and habitat fragmentation are the most threatening facet of climate change for biodiversity (Hannah and Lovejoy 2005, p.4). Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field *et al.* 1999, pp. 1–3; Hayhoe *et al.* 2004, p. 12422; Cayan *et al.* 2005, p. 6; Intergovernmental Panel on Climate Change (IPCC) 2007, p. 1181). Climate change may lead to increased frequency and duration of severe storms and droughts (Golladay *et al.* 2004, p. 504; McLaughlin *et al.* 2002, p. 6074; Cook *et al.* 2004, p. 1015).

We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) Conservation actions implemented under section 7(a)(1) of the Act, (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to insure their actions are not likely to jeopardize the continued existence of any endangered or threatened species, and (3) the prohibitions of section 9 of the Act if actions occurring in these areas may affect the species. Federally funded or permitted projects affecting listed

species outside their designated critical habitat areas may still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of this species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of these planning efforts calls for a different outcome.

Physical or Biological Features

In accordance with section 3(5)(A)(i) and 4(b)(1)(A) of the Act and the regulations at 50 CFR 424.12, in determining which areas within the geographical area occupied at the time of listing to designate as critical habitat, we consider the physical and biological features (PBFs) essential to the conservation of the species, and which may require special management considerations or protection. These include, but are not limited to:

(1) Space for individual and population growth and for normal behavior;

(2) Food, water, air, light, minerals, or other nutritional or physiological requirements;

(3) Cover or shelter;

(4) Sites for breeding, reproduction, or rearing (or development) of offspring; and

(5) Habitats that are protected from disturbance or are representative of the historic, geographical, and ecological distributions of a species.

We derive the specific physical or biological features essential for Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe from studies of these species' habitat, ecology, and life history as described in the Critical Habitat section of the proposed rule to designate critical habitat published in the **Federal Register** on October 4, 2011 (76 FR 61482), and in the information presented below.

We have determined that Alabama pearlshell, round ebonyshell, southern sandshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, and fuzzy pigtoe require the following physical or biological features:

Space for Individual and Population Growth and for Normal Behavior

The Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe are all historically associated with the Escambia, Yellow, and Choctawhatchee river drainages in Alabama and Florida. The Alabama pearlshell is also known from three locations in the Mobile River Basin; however, only one of those is considered to be currently occupied. The eight mussels are found embedded in stable substrates composed mainly of fine to coarse sand, with occasional patches of clay or gravel (Williams *et al.* 2008, pp. 32–34), and within areas of sufficient current velocities to remove finer sediments. These habitats are formed and maintained by water quantity, channel slope, and normal sediment input to the system. Changes in one or more of these parameters can result in channel degradation or channel aggradation, with serious effects to mussels. The decline of the mussel fauna of these eastern Gulf Coastal Plain drainages is not well understood, but is primarily associated with the loss of habitats and channel instability due to excessive sedimentation (Williams and Butler 1994, p. 55). Sedimentation has been determined to be a major factor in habitat destruction, resulting in corresponding shift in mussel fauna (Brim Box and Mossa 1999, p. 102). Stable stream bottom substrates not only provide space for populations of these eight mussel species, but also provide cover and shelter and sites for breeding, reproduction, and growth of offspring. Therefore, based on the information above, we identify stream channel stability to be a physical or biological feature for the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe.

Food

Freshwater mussels, such as these eight species, filter algae, detritus, and bacteria from the water column (Williams *et al.* 2008, p. 67). For the first several months, juvenile mussels employ pedal (foot) feeding, extracting bacteria, algae, and detritus from the sediment (Yeager *et al.* 1994, pp. 217–221). Food availability and quality are affected by habitat stability, floodplain connectivity, water flow, and water quality. Therefore, based on the information above, we identify adequate food availability and quality to be a physical or biological feature for these species.

Water

The Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe are riverine species that depend upon adequate water flow. Continuously flowing water is a habitat feature associated with all of the eight species. Flowing water maintains the stream bottom habitats where these species are found, transports food items to the sedentary juvenile and adult life stages, transports sperm to the adult females, provides oxygen for respiration, and removes wastes. Populations of the narrow pigtoe were recently discovered in Gantt and Point A Lakes (Williams *et al.* 2008, p. 317), manmade reservoirs on the Conecuh River mainstem in Alabama. We attribute the occurrence of the species in these impoundments to the relatively small size of the reservoirs, and to the operational regime of the dams. As mentioned under Factor A, both impoundments have limited storage capacity and are operated as modified run-of-river projects with daily peaking. Therefore, most of the time, the outflow matches the inflow. Also, some areas in the reservoirs are narrow and riverine, for instance the area around Dunns Bridge on Gantt Lake. Here, narrow pigtoe were found in relatively high numbers in firm, stable sand substrates with little or no silt accumulation (Williams 2009, pers. comm.; Pursifull 2006, pers. obs.). Although the natural state of the river's hydrological flow regime is modified, it does retain the features necessary to maintain the benthic habitats where the species are found. Therefore, based on the information above, we identify flowing water to be a physical or biological feature for these eight mussel species.

The ranges of standard physical and chemical water quality parameters (such as temperature, dissolved oxygen, pH, and conductivity) that define suitable habitat conditions for the eight species have not been investigated. However, as relatively sedentary animals, mussels must tolerate the full range of such parameters that occur naturally within the streams where they persist. Both the amount (flow) and the physical and chemical conditions (water quality) where each of the eight species currently exists vary widely according to season, precipitation events, and seasonal human activities within the watershed. Conditions across their historical ranges vary even more due to watershed size, geology, geography, and differences in human population densities and land uses. In general, each of the species survives in areas where the magnitude, frequency, duration, and seasonality of water flow are adequate to

maintain stable habitats (for example, sufficient flow to remove fine particles and sediments without causing degradation), and where water quality is adequate for year-round survival (for example, moderate to high levels of dissolved oxygen, low to moderate input of nutrients, and relatively unpolluted water and sediments). Therefore, based on the information above, we identify adequate water flow and water quality (as defined below) to be a physical or biological feature for the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe.

We currently believe that most numeric standards for pollutants and water quality parameters (for example, dissolved oxygen, pH, heavy metals) that have been adopted by the States under the Clean Water Act represent levels that are essential to the conservation of each of these eight mussels. However, some States' standards may not adequately protect mollusks, or are not being appropriately measured, monitored, or achieved in some reaches (see Factors A and D above). The Service is currently in consultation with the EPA to evaluate the protectiveness of criteria approved in EPA's water quality standards for threatened and endangered species and their critical habitats as described in the memorandum of agreement that our agencies signed in 2001 (66 FR 11201, February 22, 2001). Other factors that can potentially alter water quality are droughts and periods of low flow, non-point-source runoff from adjacent land surfaces (for example, excessive amounts of sediments, nutrients, and pesticides), point-source discharges from municipal and industrial wastewater treatment facilities (for example, excessive amounts of ammonia, chlorine, and metals), and random spills or unregulated discharge events. This could be particularly harmful during drought conditions when flows are depressed and pollutants are more concentrated. Therefore, adequate water quality is essential for normal behavior, growth, and viability during all life stages of the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe.

Sites for Breeding, Reproduction, or Rearing

Freshwater mussels require a host fish for transformation of larval mussels (glochidia) to juvenile mussels (Williams *et al.* 2008, p. 68). Thus, the presence of the appropriate host fishes to complete the reproductive life cycle is essential to the conservation of these eight mussels. The blacktail shiner was found to serve as a host for the fuzzy pigtoe and tapered pigtoe in a preliminary study trial (White *et al.* 2008, p. 123). This minnow species occurs in a variety of habitats in drainages throughout the coastal plain (Mettee *et al.* 1996, pp. 174–175). The specific host fish(es) for the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, narrow pigtoe, and southern sandshell are not currently known; however, other species of the same genera are known to parasitize cyprinids (minnows), centrarchids (sunfish), and percids (darters) (Haag and Warren 2003, pp. 81–82; Haag and Warren 1997, pp. 580–581, 583; Keller and Ruessler 1997, p. 405; O'Brien and Brim Box 1999, p. 134; Haag *et al.* 1999, p. 150). Therefore, based on the information above, we identify the presence of the appropriate host fishes to complete the reproductive life cycle to be a physical or biological feature for these eight mussel species.

Juvenile mussels require stable bottom habitats for growth and survival. Excessive sediments or dense growth of filamentous algae can expose juvenile mussels to entrainment or predation and be detrimental to the survival of juvenile mussels (Hartfield and Hartfield 1996, p. 373). Geomorphic instability can result in the loss of habitats and juvenile mussels due to scouring or deposition (Hartfield 1993, p. 138). Therefore, based on the information above, we identify stable bottom substrate with low to moderate amounts of filamentous algae growth to be a physical or biological feature for the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe.

Primary Constituent Elements for the Eight Mussels

Under the Act and its implementing regulations, we are required to identify the physical or biological features essential to the conservation of these eight mussel species in areas occupied at the time of listing, focusing on the features' primary constituent elements (PCEs). Primary constituent elements are those specific elements of the physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species.

Based on our current knowledge of the physical or biological features and habitat characteristics required to sustain the species' life-history processes, we have determined that the primary constituent elements specific to the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe are:

(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 fuzzy pigtoe and tapered pigtoe, the presence of blacktail shiner (*Cyprinella venusta*) will serve as a potential indication of fish host presence.

Special Management Considerations or Protection

When designating critical habitat, we assess whether the specific areas within the geographical area occupied by these species at the time of listing contain features that are essential to their conservation and that may require special management considerations or protections. None of the portions of the critical habitat units for these species below has been designated as critical habitat for other mussel species that are already listed under the Act. None of the areas is presently under special management or protection provided by a legally operative management plan or agreement for the conservation of these species.

Many of the threats to the eight mussels and their habitat are pervasive and common in all of the nine units that we are designating as critical habitat

(see below). These include the potential of significant changes in stream bed material composition and quality by activities such as construction projects, livestock grazing, timber harvesting, and other watershed and floodplain disturbances that release sediments or nutrients into the water; the potential of significant alteration of water chemistry or water quality; the potential of anthropogenic activities such as channelization, impoundment, and channel excavation that could cause aggradation or degradation of the channel bed elevation or significant bank erosion; and the potential of significant changes in the existing flow regime due to such activities as impoundment, water diversion, or water withdrawal. Because the areas we are designating as critical habitat below are facing these threats, they require special management consideration and protection.

Criteria Used To Identify Critical Habitat

As required by section 4(b)(1)(A) of the Act, we used the best scientific and commercial data available to designate critical habitat. We reviewed available information pertaining to the habitat requirements of these species. In accordance with the Act and its implementing regulation at 50 CFR 424.12(e), we considered whether designating additional areas—outside those currently occupied (that is those occupied at the time of listing)—are necessary to ensure the conservation of the species. We are designating critical habitat in areas within the geographical area occupied by the species at the time of listing (2012). We also are designating specific areas outside the geographical area occupied by the species at the time of listing, that were historically occupied but are presently unoccupied, because we have determined that such areas are essential for the conservation of these species.

We began our analysis by considering historical and current ranges of each of the eight species. Sources of this information include research published in peer-reviewed articles and books, agency reports, museum collections, and surveys by biologists (see Background section). We then identified the specific areas that are occupied by each of the eight mussels and that contain one or more of the physical or biological features. We defined occupied habitat as those stream reaches known to be currently occupied by any of the eight species. To identify the currently occupied stream reaches, we used survey data collected from 1995 to 2012. Several surveys were conducted in the basins between the years of 1995 to 2012 (Shelton 1995 unpub. report; Shelton 1999 in litt.; Blalock-Herod *et al.* 2005; Pilarczyk *et al.* 2006; Shelton *et al.* 2007 unpub. report; Gangloff and Hartfield 2009; Gangloff 2010–12, unpub. data). These surveys were used to assess the current conservation status of the species, and extended their known ranges. For this reason, we considered the year 1995 to be the demarcation between historical and current records. To identify historically occupied stream reaches, we used survey data between the late 1800s and 1994. Therefore, if a species was known to occur in an area prior to 1995, but was not collected in the same area since then, the stream reach is considered historically occupied.

We then evaluated occupied stream reaches to delineate the probable upstream and downstream extent of each species' distribution. Known occurrences for some mussel species are extremely localized, and rare mussels can be difficult to locate. In addition, creek and river habitats are highly dependent upon upstream and downstream channel habitat conditions for their maintenance. Therefore, where more than one occurrence record of a particular species was found within a stream reach, we considered the entire reach between the uppermost and lowermost locations as occupied habitat.

We then considered whether this essential area was adequate for the conservation of each of the eight species. Small, isolated, aquatic populations are subject to chance catastrophic events and to changes in human activities and land use practices that may result in their elimination. Larger, more contiguous populations can reduce the threat of extinction due to habitat fragmentation and isolation. For these reasons, we believe that conservation of the Alabama pearlshell and southern kidneyshell requires expanding their ranges into currently unoccupied portions of their historical habitat. Given that threats to these two species are compounded by their limited distribution and isolation, it is unlikely that currently occupied habitat is adequate for their conservation. The range of each has been severely curtailed, their occupied habitats are limited and isolated, and population sizes are small. For example, the Alabama pearlshell is no longer believed to occur in the Limestone Creek system (Monroe County), several tributaries in the Murder Creek system, or in the Patsaliga Creek drainage. The southern kidneyshell once occurred in all three river basins, but is currently known only from the Choctawhatchee basin. While occupied units provide habitat for current populations, these species are at high risk of extirpation and extinction from stochastic events, whether periodic natural events or potential human-induced events (see Summary of Factors Affecting the Species). The inclusion of essential unoccupied areas will provide habitat for population reintroduction and will decrease the risk of extinction. Based on the best scientific data available, areas not currently occupied by the Alabama pearlshell and southern kidneyshell are essential for their conservation, with one exception. We eliminated from consideration the Yellow River drainage as critical habitat for the southern kidneyshell. Its occurrence in the Yellow River is based on a 1919 collection of one specimen from Hollis Creek in Covington County, Alabama. However, we believe this single, historical collection is not sufficient to support the conclusion that any portions of the Yellow River drainage are essential to the conservation of the southern kidneyshell at this time. Otherwise, all of the stream habitat areas designated as critical habitat that are currently not known to be occupied contain sufficient physical or biological features (e.g., geomorphically stable channels, perennial water flows, adequate water quality, and appropriate benthic substrates) to support life-history functions of the mussels. The stream reaches also lack major anthropogenic disturbance, and have potential for reoccupation by the species through future reintroduction efforts. Based on the above factors, all unoccupied stream reaches included in the designations for the Alabama pearlshell and southern kidneyshell are essential to their conservation.

Following the identification of occupied and unoccupied stream reaches, the next step was to delineate the probable upstream and downstream extent of each species' distribution. We used USGS 1:100,000 digital stream maps to delineate the boundaries of critical habitat units according to the criteria explained below. The upstream boundary of a unit in a stream is the first perennial, named tributary confluence; a road-crossing bridge; or a permanent barrier to fish passage (such as a dam) above the upstream-most current occurrence record. Many of the Alabama pearlshell survey sites are located near watershed headwaters. In these areas, the upstream boundary of a unit is the point where the stream and its tributaries are no longer perennially flowing streams. The confluence of a

tributary typically marks a significant change in the size of the stream and is a logical and recognizable upstream terminus. When a named tributary was not available, a road-crossing bridge was used to mark the boundary. Likewise, a dam or other barrier to fish passage marks the upstream extent to which mussels may disperse via their fish hosts. The downstream boundary of a unit in a stream is the confluence of a named tributary, the upstream extent of tidal influence, or the upstream extent of an impoundment, below the downstream-most occurrence record. In the unit descriptions, distances between landmarks marking the upstream or downstream extent of a stream segment are given in kilometers (km) and equivalent miles (mi), as measured tracing the course of the stream, not straight-line distance. Distances less than 10 km (6.2 mi) are rounded to the nearest half number, and distances of 10 km (6.2 mi) and greater are rounded to the nearest whole number.

Because mussels are naturally restricted by certain physical conditions within a stream or river reach (i.e., flow, substrate), they may be unevenly distributed within these habitat units. Uncertainty on upstream and downstream distributional limits of some populations may have resulted in small areas of occupied habitat excluded from, or areas of unoccupied habitat included in, the designation. We recognize that both historical and recent collection records upon which we relied are incomplete, and that there may be river segments or small tributaries not included in this designation that harbor small, limited populations of one or more of the eight species considered in this designation, or that others may become suitable in the future. The exclusion of such areas does not diminish their potential individual or cumulative importance to the conservation of these species. However, with proper management, each of the nine critical habitat units are capable of supporting one or more of these mussel species, and will serve as source populations for artificial reintroduction into designated stream units, as well as assisted or natural migration into adjacent undesignated streams within each basin. The habitat areas contained within the units described below constitute our best evaluation of areas needed for the conservation of these species at this time. Critical habitat may be revised for any or all of these species should new information become available.

Using the criteria above, we delineated a total of nine critical habitat units—two units (AP1, AP2) for the Alabama pearlshell, and seven Gulf Coast mussels units (GCM1 through GCM7) for one or more of the other seven mussel species. We depicted the Alabama pearlshell units separately as this species tends to inhabit headwater stream environments and seldom co-occurs with the other seven species, although some critical habitat in the downstream portions of Unit AP2 overlaps with the upstream portions of Unit GCM1 in the Escambia River drainage. The round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe often co-occur within the same stream segments, so most of the GCM critical habitat units are designated for more than one species. Unit GCM2: Point A Lake and Gantt Lake Reservoirs is the only exception, which is designated for the narrow pigtoe only.

When determining critical habitat boundaries within this final rule, we made every effort to avoid including developed areas because such lands lack physical or biological features for these eight mussel species. The areas designated as critical habitat listed below include only stream channels within the ordinary high-water line and do not do not include manmade structures (such as buildings, aqueducts, runways, dams, roads, and other paved areas) and the land on which they are located, with the exception of the impoundments created by Point A and Gantt Lake dams (impounded water, not the actual dam structures). The scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed lands. Any such lands inadvertently left inside critical habitat boundaries shown on the maps of this final rule have been excluded by text in the rule and are not designated as critical habitat. Therefore, a Federal action involving these lands will not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification unless the specific action would affect the physical or biological featues in the adjacent critical habitat.

Units are designated based on sufficient elements of physical or biological features being present to support life-history processes of these eight mussel species. Some units contain all of the identified elements of physical or biological features and support multiple life-history processes. Some segments contain only some elements of the physical or biological features necessary to support each species' particular use of that habitat.

The critical habitat designation is defined by the map or maps, as modified by any accompanying regulatory text, presented at the end of this document in the rule portion. We include more detailed information on the boundaries of the critical habitat designation in the preamble of this document. We will make the coordinates or plot points or both on which each map is based available to the public on *http://www.regulations.gov* at Docket No. FWS–R4–ES–2011–0050, on our Internet sites *http://www.fws.gov/PanamaCity,* and at the field office responsible for the designation (see **ADDRESSES** above).

Final Critical Habitat Designation

We are designating nine units as critical habitat for the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe. The critical habitat areas described below constitute our best assessment at this time of areas that meet the definition of critical habitat. The occupancy and stream length of designated critical habitat units by species is shown in Table 10.

TABLE 10—OCCUPANCY AND STREAM LENGTH OF DESIGNATED CRITICAL HABITAT UNITS BY SPECIES

Unit	Currently occupied?	Total stream length kilometers (miles)
Alabama pearlshell *(Margaritifera marrianae)*		
AP1: Big Flat Creek	Yes	92 (57)
AP2: Burnt Corn Creek, Murder Creek, and Sepulga River	Partially [1]	155 (96)

TABLE 10—OCCUPANCY AND STREAM LENGTH OF DESIGNATED CRITICAL HABITAT UNITS BY SPECIES—Continued

Unit	Currently occupied?	Total stream length kilometers (miles)
Total		247 (153)
Round ebonyshell *(Fusconaia rotulata)*		
GCM1: Lower Escambia River	Yes	558 (347)
Southern sandshell *(Hamiota australis)*		
GCM1: Lower Escambia River	Yes	558 (347)
GCM3: Patsaliga Creek	Yes	149 (92)
GCM4: Upper Escambia River	Yes	137 (85)
GCM5: Yellow River	Yes	247 (153)
GCM6: Choctawhatchee River and Lower Pea River	Yes	897 (557)
GCM7: Upper Pea River	Yes	234 (145)
Total		2,222 (1,379)
Southern kidneyshell *(Ptychobranchus jonesi)*		
GCM1: Lower Escambia River	No	558 (347)
GCM3: Patsaliga Creek	No	149 (92)
GCM4: Upper Escambia River	No	137 (85)
GCM6: Choctawhatchee River and Lower Pea River	Yes	897 (557)
GCM7: Upper Pea River	Yes	234 (145)
Total		1,975 (1,226)
Choctaw bean *(Villosa choctawensis)*		
GCM1: Lower Escambia River	Yes	558 (347)
GCM3: Patsaliga Creek	Yes	149 (92)
GCM4: Upper Escambia River	Yes	137 (85)
GCM5: Yellow River	Yes	247 (153)
GCM6: Choctawhatchee River and Lower Pea River	Yes	897 (557)
GCM7: Upper Pea River	Yes	234 (145)
Total		2,222 (1,397)
Tapered pigtoe *(Fusconaia burkei)*		
GCM6: Choctawhatchee River and Lower Pea River	Yes	897 (557)
GCM7: Upper Pea River	Yes	234 (145)
Total		1,131 (702)
Narrow pigtoe *(Fusconaia escambia)*		
GCM1: Lower Escambia River	Yes	558 (347)
GCM2: Point A Lake and Gantt Lake Reservoirs	Yes	21 (13)
GCM3: Patsaliga Creek	Yes	149 (92)
GCM4: Upper Escambia River	Yes	137 (85)
GCM5: Yellow River	Yes	247 (153)
Total		1,112 (690)
Fuzzy pigtoe *(Pleurobema strodeanum)*		
GCM1: Lower Escambia River	Yes	558 (347)
GCM3: Patsaliga Creek	Yes	149 (92)
GCM4: Upper Escambia River	Yes	137 (85)
GCM5: Yellow River	Yes	247 (153)
GCM6: Choctawhatchee River and Lower Pea River	Yes	897 (557)
GCM7: Upper Pea River	Yes	234 (145)
Total		2,222 (1,379)

Note: Totals may not sum due to rounding.
[1] 17 km (11 mi) of Murder Creek mainstem are unoccupied.

The designated critical habitat includes the creek and river channels within the ordinary high-water line only. For this purpose, we have applied the definition found at 33 CFR 329.11, and consider the ordinary high-water line on nontidal rivers to be the 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.

States were granted ownership of lands beneath navigable waters up to the ordinary high-water line upon achieving Statehood (*Pollard* v. *Hagan,* 44 U.S. (3 How.) 212 (1845)). Prior sovereigns or the States may have made grants to private parties that included lands below the ordinary high-water mark of some navigable waters that are included in this rule. Most, if not all, lands beneath the navigable waters included in this final rule are owned by the States of Alabama and Florida. The lands beneath most nonnavigable waters included in this final rule are in private ownership. Riparian lands along the waters are either in private ownership, or are owned by county, State, or Federal entities. Lands under county, State, and Federal ownership consist of managed conservation areas and Department of Defense lands, and are considered to have some level of protection. The approximate length of each habitat unit and land ownership is shown in Table 11.

TABLE 11—CRITICAL HABITAT UNITS, LOCATION, APPROXIMATE STREAM LENGTH, AND OWNERSHIP OF RIPARIAN LANDS

Unit	Location	Total Length km (mi)	Private km (mi)*	Private/ Managed km (mi)*	Managed km (mi)*
AP1	Big Flat Creek, AL	92 (57)	92 (57)	0	0
AP2	Burnt Corn Creek, Murder Creek, and Sepulga River, AL.	155 (96)	155 (96)	0	0
GCM1	Lower Escambia River, AL, FL	558 (347)	482 (299)	18 (11)	59 (36)
GCM2	Point A Lake and Gantt Lake Reservoirs, AL.	21 (13)	21 (13)	0	0
GCM3	Patsaliga Creek, AL	149 (92)	149 (92)	0	0
GCM4	Upper Escambia River, AL	137 (85)	130 (81)	7 (4)	0
GCM5	Yellow River, AL, FL	247 (153)	98 (61)	68 (42)	81 (50)
GCM6	Choctawhatchee River and Lower Pea River, AL, FL.	897 (557)	718 (446)	61 (38)	119 (74)
GCM7	Upper Pea River, AL	234 (145)	228 (142)	0	5 (3)
Overlap between units AP2 and GCM1		−85 (53)	−85 (53)	0	0
Total	.....	2,404 (1,494)	1,987 (1,235)	153 (95)	263 (164)

Note: Totals may not sum due to rounding.

* Ownership is categorized by private ownership on both banks of the river (Private); private on one bank and county, state or federal on the other (Private/Managed); and county, state, or federal ownership on both banks (Managed).

We present brief descriptions of all units, and reasons why they meet the definition of critical habitat for each species, below.

Unit AP1: Big Flat Creek Drainage, Alabama

Unit AP1 encompasses 92 km (57 mi) of the Big Flat Creek drainage, in Monroe and Wilcox Counties, AL. The unit is within the Mobile River basin. It includes the mainstem of Big Flat Creek from State Route 41 upstream 56 km (35 mi), Monroe County, AL; Flat Creek from its confluence with Big Flat Creek upstream 20 km (12 mi), Monroe County, AL; and Dailey Creek from its confluence with Flat Creek upstream 17 km (11 mi), Wilcox County, AL.

Unit AP1 is within the geographical area occupied at the time of listing (2012) for the Alabama pearlshell. Based on collection records, the species was last collected in the Big Flat Creek system in 1995, when Shelton (1995, p. 3 unpub. report) documented a fresh dead individual. Although it is likely that the Alabama pearlshell has always been rare in Big Flat Creek, the unit currently supports healthy populations of several other native mussel species, indicating the presence of essential physical or biological features, and contains PCEs 1, 2, 3, and 4. A diverse fish fauna, including potential fish host(s) for the Alabama pearlshell, are known from the Big Flat Creek drainage, indicating the potential presence of PCE 5.

Threats to the Alabama pearlshell and its habitat may require special management of the physical or biological features including maintaining natural stream flows and protecting water quality from excessive point- and non-point-source pollution. For example, runoff from agricultural and industrial sites can alter water quality through added nutrients and sediment. Runoff from unpaved roads can also add sediments, and poorly designed road culverts can degrade habitats and limit distribution of the species. Some culverts can isolate pearlshell populations by acting as a barrier for dispersion and movement of host fish(es).

Unit AP2: Burnt Corn Creek, Murder Creek, and Sepulga River Drainages, Alabama

Unit AP2 encompasses 155 km (96 mi) of the Burnt Corn Creek, Murder Creek, and Sepulga River drainages within the Escambia River drainage in Escambia and Conecuh Counties, AL. It includes the mainstem of Burnt Corn Creek from its confluence with Murder Creek upstream 66 km (41 mi), Conecuh County, AL; the mainstem of Murder Creek from its confluence with Jordan Creek upstream 17 km (11 mi) to the confluence of Otter Creek, Conecuh County, AL; Jordan Creek from its confluence with Murder Creek upstream 12 km (7 mi), Conecuh County, AL; Otter Creek from its confluence with Murder Creek upstream 9 km (5.5 mi), Conecuh County, AL; Hunter Creek from its confluence with Murder Creek upstream 4.4 km (2.7 mi) to the NOLF Evergreen northern boundary, Conecuh County, AL; Hunter Creek from the NOLF Evergreen southern boundary upstream 3.0 km (1.9 mi), Conecuh County, AL; Sandy Creek from County

Road 29 upstream 5 km (3.5 mi) to Hagood Road; two unnamed tributaries to Sandy Creek—one from its confluence with Sandy Creek upstream 8.5 km (5.0 mi) to Hagood Road, and the other from its confluence with the previous unnamed tributary 2.5 km (1.5 mi) upstream to Hagood Road, Conecuh County, AL; Little Cedar Creek from County Road 6 upstream 8 km (5 mi), Conecuh County, AL; Amos Mill Creek from its confluence with the Sepulga River upstream 12 km (8 mi), Escambia and Conecuh Counties, AL; Polly Creek from its confluence with Amos Mill Creek upstream 3 km (2 mi), Conecuh County, AL; and Bottle Creek from its confluence with the Sepulga River upstream 5.5 km (3.5 mi) to County Road 42, Conecuh County, AL.

Unit AP2 is mostly within the geographical area occupied at the time of listing (2012) for the Alabama pearlshell. The Alabama pearlshell currently occurs in Jordan, Hunter, Otter, Sandy, Little Cedar, Bottle, and Amos Mill creek drainages. Although it historically occurred in the mainstem of Murder Creek, it has not been collected there since 1991. Therefore, this short reach of Murder Creek is considered unoccupied by the Alabama pearlshell, but essential to the conservation of the species. This unoccupied reach retains the physical or biological features of a natural stream channel and supports other native mussel species. It has potential for reoccupation by the pearlshell, particularly if threats can be identified and mitigated.

The unit currently supports healthy populations of several other native mussel species, indicating the elements of essential physical or biological features, and contains PCEs 1, 2, 3, and 4. In addition, other mussel species, requiring similar PCEs, co-occur with the pearlshell. A diverse fish fauna, including potential fish host(s) for the Alabama pearlshell, are known from these drainages, indicating the potential presence of PCE 5.

Threats to the Alabama pearlshell and its habitat that may require special management of the physical or biological featues include alteration and maintenance of natural stream flows (including the construction of impoundments), and protecting water quality from excessive point- and non-point-source pollution.

Unit GCM1: Lower Escambia River Drainage, Florida and Alabama

Unit GCM1 encompasses 558 km (347 mi) of the lower Escambia River mainstem and 12 tributary streams in Escambia and Santa Rosa Counties, FL, and Escambia, Covington, Conecuh, and Butler Counties, AL. The unit consists of the main channel of the Escambia-Conecuh River from the confluence of Spanish Mill Creek, Escambia and Santa Rosa counties, FL, upstream 204 km (127 mi) to the Point A Lake dam, Covington County, AL; Murder Creek from its confluence with the Conecuh River, Escambia County, AL, upstream 62 km (38 mi) to the confluence of Cane Creek, Conecuh County, AL; Burnt Corn Creek from its confluence with Murder Creek, Escambia County, AL, upstream 59 km (37 mi) to County Road 20, Conecuh County, AL; Jordan Creek from its confluence with Murder Creek, upstream 5.5 km (3.5 mi) to Interstate 65, Conecuh County, AL; Mill Creek from its confluence with Murder Creek upstream 2.5 km (1.5 mi) to the confluence of Sandy Creek, Conecuh County, AL; Sandy Creek from its confluence with Mill Creek upstream 5.5 km (3.5 mi) to County Road 29, Conecuh County, AL; Sepulga River from its confluence with the Conecuh River upstream 69 km (43 mi) to the confluence of Persimmon Creek, Conecuh County, AL; Bottle Creek from its confluence with the Sepulga River upstream 5.5 km (3.5 mi) to County Road 42, Conecuh County, AL; Persimmon Creek from its confluence with the Sepulga River, Conecuh County, upstream 36 km (22 mi) to the confluence of Mashy Creek, Butler County, AL; Panther Creek from its confluence with Persimmon Creek upstream 11 km (7 mi) to State Route 106, Butler County, AL; Pigeon Creek from its confluence with the Sepulga River, Conecuh and Covington Counties, upstream 89 km (55 mi) to the confluence of Three Run Creek, Butler County, AL; and Three Run Creek from its confluence with Pigeon Creek upstream 9 km (5.5 mi) to the confluence of Spring Creek, Butler County, AL.

Unit GCM1 is within the geographical area occupied at the time of listing (2012) for the round ebonyshell, southern kidneyshell, Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe. The southern kidneyshell is not currently known to occur in the unit; however, this portion of the Escambia River system is within the species' historical range, and we consider it essential to the southern kidneyshell's conservation due to the need to re-establish the species within other portions of its historical range in order to reduce threats from stochastic events. The unit currently supports populations of round ebonyshell, Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe, indicating the presence of essential physical or biological features, and contains PCEs 1, 2, 3, and 4. In addition, other mussel species, requiring similar PCEs, co-occur with these five species. A diverse fish fauna, including potential fish host(s) for the fuzzy pigtoe, are known from the Escambia River drainage, indicating the potential presence of PCE 5.

Threats to the five species and their habitat that may require special management of the physical or biological features include the potential of significant changes in the existing flow regime and water quality due to two upstream impoundments. As discussed in Summary of Factors Affecting the Species, mollusk declines downstream of dams are associated with changes and fluctuation in flow regime, scouring and erosion, reduced dissolved oxygen levels and altered water temperatures, and changes in resident fish assemblages. These alterations can cause mussel declines for many miles downstream of the dam.

Unit GCM2: Point A Lake and Gantt Lake Reservoirs, Alabama

Unit GCM2 encompasses 21 km (13 mi) of the Point A Lake and Gantt Lake reservoir system in Covington County, AL. Both lakes are impoundments on the Conecuh River main channel in the Escambia River drainage. The unit extends from Point A Lake dam, Covington County upstream 21 km (13 mi) to the Covington-Crenshaw County line in Alabama.

Unit GCM2 is within the geographical area occupied at the time of listing (2012) for the narrow pigtoe. As mentioned in discussion of essential physical or biological features for the narrow pigtoe, we attribute its occurrence in these two impoundments to the small size of the reservoirs and to the operational regime of the dams. This allows for water movement through the system, and prevents silt accumulation in some areas. The largest narrow pigtoe population occurs in the middle reach of Gantt Lake, where the reservoir narrows and becomes somewhat riverine. Although the natural state of the river's hydrological flow regime is modified, it does retain the presence of the physical or biological features necessary to maintain the benthic habitats where the species are found. The persistence of the narrow pigtoe within these reservoirs indicates the presence of an appropriate fish host. Although its fish host(s) is unknown, other mussels of the genus *Fusconaia* are known to use cyprinid minnows, fish that occupy a variety of habitats including large, flowing rivers, and

lakes and reservoirs (Mettee *et al.* 1996, p. 128). The unit currently supports narrow pigtoe populations, indicating the elements of essential physical or biological features, and contains PCEs 1, 3, 4, and 5. We consider the habitat in this unit essential to the conservation of the narrow pigtoe as it possesses the largest known population. The fuzzy pigtoe is known historically from this stretch of the Conecuh River (one specimen was collected in 1915). However, the collection was made prior to construction of the reservoirs in 1923, and it is not presently known to occur in this now-impounded section of the river.

Threats to the narrow pigtoe and its habitat that may require special management of the physical or biological features include the potential of significant changes in water levels due to periodic drawdowns of the reservoirs for maintenance to the dams. Within the two reservoirs, mussels occur in shallow areas near the shore, where they are susceptible to exposure when water levels are lowered. A drawdown of Point A Lake in 2005, and Gantt Lake in 2006, exposed and killed a substantial number of mussels (Johnson 2006 in litt.). During the Gantt drawdown, 142 individuals of narrow pigtoe were relocated after being stranded in dewatered areas near the shoreline (Garner 2009 pers. comm.; Pursifull 2006, pers. obs.).

Unit GCM3: Patsaliga Creek Drainage, Alabama

Unit GCM3 encompasses 149 km (92 mi) of Patsaliga Creek and two tributary streams in Covington, Crenshaw, and Pike Counties, AL, within the Escambia River basin. The unit consists of the Patsaliga Creek mainstem from its confluence with Point A Lake at County Road 59, Covington County, AL, upstream 108 km (67 mi) to Crenshaw County Road 66-Pike County Road 1 (the creek is the county boundary), AL; Little Patsaliga Creek from its confluence with Patsaliga Creek upstream 28 km (17 mi) to Mary Daniel Road, Crenshaw County, AL; and Olustee Creek from its confluence with Patsaliga Creek upstream 12 km (8 mi) to County Road 5, Pike County, AL.

Unit GCM3 is within the geographical area occupied at the time of listing (2012) for the Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe. The southern kidneyshell is not currently known to occur in the unit; however, this portion of the Patsaliga Creek system is within the species' historic range. We consider it essential to the conservation of the southern kidneyshell due to the need to re-establish the species within other portions of its historic range in order to reduce threats from stochastic events. The unit does currently support populations of Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe, indicating the presence of essential physical or biological features, and contains PCEs 1, 2, 3, and 4. In addition, other mussel species, requiring similar PCEs, co-occur with these four species. A diverse fish fauna, including a potential fish host for the fuzzy pigtoe, are known from the Patsaliga Creek drainage, indicating the potential presence of PCE 5.

Prior to construction of the Point A Lake and Gantt Lake dams in 1923, Patsaliga Creek drained directly to the Conecuh River main channel. It now empties into Point A Lake and is effectively isolated from the main channel by the dams. The dams are barriers to upstream fish movement, particularly to anadromous fishes. Therefore, a potential threat that may require special management of the physical or biological features includes the absence of fish hosts.

Unit GCM4: Upper Escambia River Drainage, Alabama

Unit GCM4 encompasses 137 km (85 mi) of the Conecuh River mainstem and two tributary streams in Covington, Crenshaw, Pike, and Bullock Counties, AL, within the Escambia River drainage. The unit consists of the Conecuh River from its confluence with Gantt Lake reservoir at the Covington-Crenshaw County line upstream 126 km (78 mi) to County Road 8, Bullock County, AL; Beeman Creek from its confluence with the Conecuh River upstream 6.5 km (4 mi) to the confluence of Mill Creek, Pike County, AL; and Mill Creek from its confluence with Beeman Creek, upstream 4.5 km (3 mi) to County Road 13, Pike County, AL.

Unit GCM4 is is within the geographical area occupied at the time of listing (2012) Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe. The southern kidneyshell is not currently known to occur in the unit; however, this portion of the Conecuh River is within the species' historic range, and we consider it to be essential to the conservation of the southern kidneyshell due to the need to re-establish the species within other portions of its historic range in order to reduce threats from stochastic events. The unit does currently support populations of Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe, indicating the presence of essential physical or biological features, and contains PCEs 1, 2, 3, and 4. In addition, other mussel species requiring similar PCEs co-occur with these four species. A diverse fish fauna, including a potential fish host for the fuzzy pigtoe, are known from the upper Escambia River drainage, indicating the potential presence of PCE 5.

The Point A Lake and Gantt Lake dams on the Conecuh River mainstem are barriers to upstream fish movement, particularly to anadromous fishes. Therefore, a potential threat that may require special management of the physical or biological features includes the absence of fish hosts.

Unit GCM5: Yellow River Drainage, Florida and Alabama

Unit GCM5 encompasses 247 km (153 mi) of the Yellow River mainstem, the Shoal River mainstem, and three tributary streams in Santa Rosa, Okaloosa, and Walton Counties, FL, and Covington County, AL. The unit consists of the Yellow River from the confluence of Weaver River (a tributary located 0.9 km (0.6 mi), downstream of State Route 87), Santa Rosa County, FL, upstream 157 km (97 mi) to County Road 42, Covington County, AL; the Shoal River from its confluence with the Yellow River, Okaloosa County, FL, upstream 51 km (32 mi) to the confluence of Mossy Head Branch, Walton County, FL; Pond Creek from its confluence with Shoal River, Okaloosa County, FL, upstream 24 km (15 mi) to the confluence of Fleming Creek, Walton County, FL; and Five Runs Creek from its confluence with the Yellow River upstream 15 km (9.5 mi) to County Road 31, Covington County, AL.

Unit GCM5 is within the geographical area occupied at the time of listing (2012) for the Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe. The southern kidneyshell was known from the Yellow River drainage; however, its occurrence in the basin is based on the collection of one specimen in 1919 from Hollis Creek in Alabama. We believe this single, historical record is not sufficient to consider this unit as essential to the conservation of the southern kidneyshell. Therefore, we are not designating Unit GCM5 as critical habitat for the southern kidneyshell at this time. The unit does currently support populations of Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe, indicating the presence of essential physical or biological features, and contains PCEs 1, 2, 3, and 4. In addition, other mussel species, requiring similar PCEs, co-occur with these four species. A diverse fish fauna are known from the Yellow River

drainage, indicating the potential presence of PCE 5.

Unit GCM6: Choctawhatchee River and Lower Pea River Drainages, Florida and Alabama

Unit GCM6 encompasses 897 km (557 mi) of the Choctawhatchee River mainstem, the lower Pea River mainstem, and 29 tributary streams in Walton, Washington, Bay, Holmes, and Jackson Counties, FL, and Geneva, Coffee, Dale, Houston, Henry, Pike, and Barbour Counties, AL. The unit consists of the Choctawhatchee River from the confluence of Pine Log Creek, Walton County, FL, upstream 200 km (125 mi) to the point the river splits into the West Fork Choctawhatchee and East Fork Choctawhatchee rivers, Barbour County, AL; Pine Log Creek from its confluence with the Choctawhatchee River, Walton County, upstream 19 km (12 mi) to the confluence of Ditch Branch, Washington and Bay Counties, FL; an unnamed channel forming Cowford Island from its downstream confluence with the Choctawhatchee River upstream 3 km (2 mi) to its upstream confluence with the river, Washington County, FL; Crews Lake from its western terminus 1.5 km (1 mi) to its eastern terminus, Washington County, FL (Crews Lake is a relic channel southwest of Cowford Island, and is disconnected from the Cowford Island channel, except during high flows); Holmes Creek from its confluence with the Choctawhatchee River, Washington County, FL, upstream 98 km (61 mi) to County Road 4, Geneva County, AL; Alligator Creek from its confluence with Holmes Creek upstream 6.5 km (4 mi) to County Road 166, Washington County, FL; Bruce Creek from its confluence with the Choctawhatchee River upstream 25 km (16 mi) to the confluence of an unnamed tributary, Walton County, FL; Sandy Creek from its confluence with the Choctawhatchee River, Walton County, FL, upstream 30 km (18 mi) to the confluence of West Sandy Creek, Holmes and Walton County, FL; Blue Creek from its confluence with Sandy Creek, upstream 7 km (4.5 mi) to the confluence of Goose Branch, Holmes County, FL; West Sandy Creek from its confluence with Sandy Creek, upstream 5.5 km (3.5 mi) to the confluence of an unnamed tributary, Walton County, FL; Wrights Creek from its confluence with the Choctawhatchee River, Holmes County, FL, upstream 43 km (27 mi) to County Road 4, Geneva County, AL; Tenmile Creek from its confluence with Wrights Creek upstream 6 km (3.5 mi) to the confluence of Rice Machine Branch, Holmes County, FL; West Pittman Creek from its confluence with the Choctawhatchee River upstream 6.5 km (4 mi) to Fowler Branch, Holmes County, FL; East Pittman Creek from its confluence with the Choctawhatchee River upstream 4.5 km (3 mi) to County Road 179, Holmes County, FL; Parrot Creek from its confluence with the Choctawhatchee River upstream 6 km (4 mi) to Tommy Lane, Holmes County, FL; the Pea River from its confluence with the Choctawhatchee River, Geneva County, AL, upstream 91 km (57 mi) to the Elba Dam, Coffee County, AL; Limestone Creek from its confluence with the Pea River upstream 8.5 km (5 mi) to Woods Road, Walton County, FL; Flat Creek from the Pea River upstream 17 km (10 mi) to the confluence of Panther Creek, Geneva County, AL; Eightmile Creek from its confluence with Flat Creek, Geneva County, AL, upstream 15 km (9 mi) to the confluence of Dry Branch (first tributary upstream of County Road 181), Walton County, FL; Corner Creek from its confluence with Eightmile Creek upstream 5 km (3 mi) to State Route 54, Geneva County, AL; Natural Bridge Creek from its confluence with Eightmile Creek Geneva County, AL, upstream, 4 km (2.5 mi) to the Covington-Geneva County line, AL; Double Bridges Creek from its confluence with the Choctawhatchee River, Geneva County, AL, upstream 46 km (29 mi) to the confluence of Blanket Creek, Coffee County, AL; Claybank Creek from its confluence with the Choctawhatchee River, Geneva County, AL, upstream 22 km (14 mi) to the Fort Rucker military reservation southern boundary, Dale County, AL; Claybank Creek from the Fort Rucker military reservation northern boundary, upstream 6 km (4 mi) to County Road 36, Dale County, AL; Steep Head Creek from the Fort Rucker military reservation western boundary, upstream 4 km (2.5 mi) to County Road 156, Coffee County, AL; Hurricane Creek from its confluence with the Choctawhatchee River upstream 14 km (8.5 mi) to State Route 52, Geneva County, AL; Little Choctawhatchee River from its confluence with the Choctawhatchee River, Dale and Houston Counties upstream 20 km (13 mi) to the confluence of Newton Creek, Houston County, AL; Panther Creek from its confluence with the Little Choctawhatchee River, upstream 4.5 km (2.5 mi) to the confluence of Gilley Mill Branch, Houston County, AL; Bear Creek from its confluence with the Little Choctawhatchee River, upstream 5.5 km (3.5 mi) to County Road 40 (Fortner Street), Houston County, AL; West Fork Choctawhatchee River from its confluence with the Choctawhatchee River, Dale County, AL, upstream 54 km (33 mi) to the fork of Paul's Creek and Lindsey Creek, Barbour County, AL; Judy Creek from its confluence with West Fork Choctawhatchee River upstream 17 km (11 mi) to County Road 13, Dale County, AL; Sikes Creek from its confluence with West Fork Choctawhatchee River, Dale County, AL, upstream 8.5 km (5.5 mi) to State Route 10, Barbour County, AL; Paul's Creek from its confluence with West Fork Choctawhatchee River upstream 7 km (4.5 mi) to one mile upstream of County Road 20, Barbour County, AL; Lindsey Creek from its confluence with West Fork Choctawhatchee River upstream 14 km (8.5 mi) to the confluence of an unnamed tributary, Barbour County, AL; an unnamed tributary to Lindsey Creek from its confluence with Lindsey Creek upstream 2.5 km (1.5 mi) to 1.0 mile upstream of County Road 53, Barbour County, AL; and East Fork Choctawhatchee River from its confluence with the Choctawhatchee River, Dale County, AL, upstream 71 km (44 mi) to County Road 71, Barbour County, AL.

Unit GCM6 is within the geographical area occupied at the time of listing (2012) for the southern kidneyshell, Choctaw bean, tapered pigtoe, southern sandshell, and fuzzy pigtoe. The unit currently supports populations of the five species, indicating the elements of essential physical or biological features, and contains PCEs 1, 2, 3, and 4. In addition, other mussel species, requiring similar PCEs, co-occur with these five species. A diverse fish fauna is known from the Choctawhatchee River, including a potential fish host for the fuzzy pigtoe and tapered pigtoe, indicating the potential presence of PCE 5.

Not included in this unit are two oxbow lakes now disconnected from the Choctawhatchee River main channel in Washington County, Florida. Horseshoe Lake has a record of southern kidneyshell from 1932, and Crawford Lake has records of Choctaw bean and tapered pigtoe from 1934. It is possible these oxbow lakes had some connection to the main channel when the collections were made over 75 years ago. The three species are not currently known to occur in Horseshoe or Crawford lakes, and we do not consider them essential to the conservation of the southern kidneyshell, Choctaw bean, or tapered pigtoe.

Threats to the five species and their habitat that may require special management of the physical or biological features include the potential of significant changes in the existing

flow regime and water quality due to the Elba Dam on the Pea River mainstem. As discussed in Summary of Factors Affecting the Species, mollusk declines downstream of dams are associated with changes and fluctuation in flow regime, scouring and erosion, reduced dissolved oxygen levels and altered water temperatures, and changes in resident fish assemblages. These alterations can cause mussel declines for many miles downstream of the dam.

Unit GCM7: Upper Pea River Drainage, Alabama

Unit GCM7 encompasses 234 km (145 mi) of the upper Pea River mainstem and six tributary streams in Coffee, Dale, Pike, Barbour, and Bullock Counties, AL. This unit is within the Choctawhatchee River basin and includes the stream segments upstream of the Elba Dam. The unit consists of the Pea River from the Elba Dam, Coffee County, upstream 123 km (76 mi) to State Route 239, Bullock and Barbour Counties, AL; Whitewater Creek from its confluence with the Pea River, Coffee County upstream 45 km (28 mi) to the confluence of Walnut Creek, Pike County, AL; Walnut Creek from its confluence with Whitewater Creek upstream 14 km (9 mi) to County Road 26, Pike County, AL; Big Creek (Coffee County) from its confluence with Whitewater Creek, Coffee County, upstream 30 km (18 mi) to the confluence of Smart Branch, Pike County, AL; Big Creek (Barbour County) from its confluence with the Pea River upstream 10 km (6 mi) to the confluence of Sand Creek, Barbour County, AL; Pea Creek from its confluence with the Pea River upstream 6 km (4 mi) to the confluence of Hurricane Creek, Barbour County, AL; and Big Sandy Creek from its confluence with the Pea River upstream 6.5 km (4 mi) to County Road 14, Bullock County, AL.

Unit GCM7 is within the geographical area occupied at the time of listing (2012) for the southern kidneyshell, Choctaw bean, tapered pigtoe, southern sandshell, and fuzzy pigtoe. The unit currently supports populations of the five species, indicating the elements of essential physical or biological features, and contains PCEs 1, 2, 3, and 4. In addition, other mussel species, requiring similar PCEs, co-occur with these five species. A diverse fish fauna is known from the upper Pea River, including potential fish host(s) for the fuzzy pigtoe and tapered pigtoe, indicating the potential presence of PCE 5.

The Elba Dam on the Pea River mainstem is a barrier to upstream fish movement, particularly to anadromous fishes. Therefore, a potential threat that may require special management of the physical or biological feature includes the absence of potential host fishes.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. In addition, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of designated critical habitat.

Decisions by the 5th and 9th Circuit Courts of Appeal have invalidated our regulatory definition of ''destruction or adverse modification'' (50 CFR 402.02) (see *Gifford Pinchot Task Force* v. *U.S. Fish and Wildlife Service,* 378 F. 3d 1059 (9th Cir. 2004) and *Sierra Club* v. *U.S. Fish and Wildlife Service,* 245 F.3d 434, 442 (5th Cir. 2001)), and we do not rely on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat. Under the statutory provisions of the Act, we determine destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would continue to serve its intended conservation role for the species.

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Examples of actions that are subject to the section 7 consultation process are actions on State, tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat, and actions on State, tribal, local, or private lands that are not federally funded or authorized, do not require section 7 consultation.

As a result of section 7 consultation, we document compliance with the requirements of section 7(a)(2) through our issuance of:

(1) A concurrence letter for Federal actions that may affect, but are not likely to adversely affect, listed species or critical habitat; or

(2) A biological opinion for Federal actions that may affect, or are likely to adversely affect, listed species or critical habitat.

When we issue a biological opinion concluding that a project is likely to jeopardize the continued existence of a listed species and/or destroy or adversely modify critical habitat, we provide reasonable and prudent alternatives to the project, if any are identifiable, that would avoid the likelihood of jeopardy and/or destruction or adverse modification of critical habitat. We define ''reasonable and prudent alternatives'' (at 50 CFR 402.02) as alternative actions identified during consultation that:

(1) Can be implemented in a manner consistent with the intended purpose of the action;

(2) Can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction;

(3) Are economically and technologically feasible; and

(4) Would, in the Director's opinion, avoid the likelihood of jeopardizing the continued existence of the listed species and/or avoid the likelihood of destroying or adversely modifying critical habitat.

Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where we have listed a new species or subsequently designated critical habitat that may be affected and the Federal agency has retained discretionary involvement or control over the action (or the agency's discretionary involvement or control is authorized by law). Consequently, Federal agencies sometimes may need to request reinitiation of consultation with us on actions for which formal consultation has been completed, if those actions with discretionary involvement or control may affect subsequently listed species or designated critical habitat.

Application of the ''Adverse Modification'' Standard

The key factor related to the adverse modification determination is whether, with implementation of the proposed Federal action, the affected critical habitat would continue to serve its intended conservation role for the species. Activities that may destroy or adversely modify critical habitat are those that alter the physical or biological features to an extent that appreciably reduces the conservation value of critical habitat for Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, or fuzzy pigtoe. As discussed above, the role of critical habitat is to support life-history needs and provide for the conservation of these species.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe, in any proposed or final regulation that designates critical habitat, activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation.

Activities that, when carried out, funded, or authorized by a Federal agency, may affect critical habitat and therefore should result in consultation for these eight mussel species include, but are not limited to:

(1) Actions that would significantly alter channel geomorphology. Such activities could include, but are not limited to, channelization, impoundment, road and bridge construction, mining, dredging, desnagging, and destruction of riparian vegetation. These activities may lead to changes in water flows and levels that would degrade or eliminate the mussels or their fish host and/or their habitats. These actions can also lead to increased sedimentation and degradation in water quality to levels that are beyond the tolerances of the mussels or their fish host.

(2) Actions that would significantly alter the existing flow regime. Such activities could include, but are not limited to impoundment, water diversion, water withdrawal, water draw-down, and hydropower generation. These activities could eliminate or reduce the habitat necessary for growth and reproduction of these mussels.

(3) Actions that would significantly alter water chemistry, quality, or temperature. Such activities could include, but are not limited to, release of chemicals, biological pollutants, or heated effluents into the surface water or connected groundwater at a point source or by dispersed release (non-point source). These activities could alter water conditions to levels that are beyond the tolerances of the mussels or their fish host and result in direct or cumulative adverse affects to these individuals and their life cycles.

(4) Actions that would significantly alter stream bed material composition and quality by increasing sediment deposition or filamentous algal growth. Such activities could include, but are not limited to, construction projects, livestock grazing, timber harvest, and other watershed and floodplain disturbances that release sediments or nutrients into the water. These activities could eliminate or reduce habitats necessary for the growth and reproduction of these mussels by causing excessive sedimentation and burial of the species or their habitats, or nutrification leading to excessive filamentous algal growth. Excessive filamentous algal growth can cause reduced nighttime dissolved oxygen levels through respiration, and prevent juvenile mussels from settling into stream sediments.

Exemptions

Application of Section 4(a)(3) of the Act

The Sikes Act Improvement Act of 1997 (Sikes Act) (16 U.S.C. 670a) required each military installation that includes land and water suitable for the conservation and management of natural resources to complete an integrated natural resources management plan (INRMP) by November 17, 2001. An INRMP integrates implementation of the military mission of the installation with stewardship of the natural resources found on the base. Each INRMP includes:

- An assessment of the ecological needs on the installation, including the need to provide for the conservation of listed species;
- A statement of goals and priorities;
- A detailed description of management actions to be implemented to provide for these ecological needs; and
- A monitoring and adaptive management plan.

Among other things, each INRMP must, to the extent appropriate and applicable, provide for fish and wildlife management; fish and wildlife habitat enhancement or modification; wetland protection, enhancement, and restoration where necessary to support fish and wildlife; and enforcement of applicable natural resource laws.

The National Defense Authorization Act for Fiscal Year 2004 (Pub. L. 108–136) amended the Act to limit areas eligible for designation as critical habitat. Specifically, section 4(a)(3)(B)(i) of the Act (16 U.S.C. 1533(a)(3)(B)(i)) now provides: ''The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan 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.''

We consult with the military on the development and implementation of INRMPs for installations with listed species. We analyzed INRMPs developed by military installations located within the range of the proposed critical habitat designation for southern kidneyshell, Choctaw bean, tapered pigtoe, southern sandshell, and fuzzy pigtoe to determine if they meet the criteria for exemption from critical habitat under section 4(a)(3) of the Act. The following areas are Department of Defense lands with completed, Service-approved INRMPs within the proposed critical habitat designation.

Fort Rucker

The U.S. Army-operated Fort Rucker Aviation Center, located in Daleville, Alabama, owns lands that include portions of the proposed critical habitat designation (specifically unit GCM6, Choctawhatchee River and Lower Pea River Drainage). Portions of Claybank and Steep Head creeks are on lands within the Fort Rucker military reservation. Fort Rucker has completed an INRMP (US Army 2009) that guides conservation activities on the installation through 2014. The INRMP specifically addresses maintaining and improving water quality through reduction in sedimentation and erosion control, land management practices, and improved treatment facilities. (US Army 2009, pp. 82–83, 90, 128–129). In addition, the INRMP will be updated to incorporate the southern kidneyshell, Choctaw bean, tapered pigtoe, southern sandshell, and fuzzy pigtoe.

Based on the above considerations, and in accordance with section 4(a)(3)(B)(i) of the Act, we have determined that the identified lands are subject to the Fort Rucker INRMP and that conservation efforts identified in the INRMP will provide a benefit to the species occurring in habitats within or downstream of the Fort Rucker military reservation. Therefore, lands within this installation are exempt from critical habitat designation under section 4(a)(3)

of the Act. We are not including approximately 25 km (16 mi) of stream habitat in this critical habitat designation because of this exemption.

NAS Whiting Field Complex

The U.S. Navy owns lands that include portions of the proposed critical habitat designation in unit AP2. A segment of Hunter Creek is on lands within the boundaries of Naval Air Station (NAS) Whiting Field's Navy Outlying Field (NOLF) Evergreen located in Conecuh County, Alabama. The NAS Whiting Field Complex has completed an INRMP (Department of the Navy 2006) that guides conservation activities on the installation through 2016. The INRMP specifically addresses improving water quality through vegetative buffers, stormwater and pesticide management, erosion control, and land management practices (Department of the Navy 2006, pp. 5.4–5.6, 5.15–5.26). In addition, the INRMP will be updated to incorporate the Alabama pearlshell.

Based on the above considerations, and in accordance with section 4(a)(3)(B)(i) of the Act, we have determined that the identified lands are subject to the NAS Whiting Field INRMP and that conservation efforts identified in the INRMP will provide a benefit to the Alabama pearlshell occurring in habitats within or adjacent to NOLF Evergreen. Therefore, lands within this installation are exempt from critical habitat designation under section 4(a)(3) of the Act. We are not including approximately 0.4 km (0.25 mi) of stream habitat in this final critical habitat designation because of this exemption.

Other Department of Defense Lands

Eglin Air Force Base (AFB), located in Niceville, Florida, owns the lands adjacent to the critical habitat designation (specifically unit GCM5, Yellow River Drainage). The lower portions of the Shoal and Yellow rivers form the northwestern boundary of the military reservation. However, no portions of stream or river channels designated as critical habitat occur within the boundary of the military reservation, and therefore Eglin AFB lands are not exempted. These reaches are also currently designated critical habitat for the threatened Gulf sturgeon (*Acipenser oxyrinchus desotoi*) (68 FR 13370, March 19, 2033).

Exclusions

Application of Section 4(b)(2) of the Act

Section 4(b)(2) of the Act states that the Secretary shall designate and make revisions to critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species. In making that determination, the statute on its face, as well as the legislative history, is clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor.

Under section 4(b)(2) of the Act, the Secretary may exclude an area from designated critical habitat based on economic impacts, impacts on national security, or any other relevant impacts. In considering whether to exclude a particular area from the designation, we identify the benefits of including the area in the designation, identify the benefits of excluding the area from the designation, and evaluate whether the benefits of exclusion outweigh the benefits of inclusion. If the analysis indicates that the benefits of exclusion outweigh the benefits of inclusion, the Secretary may exercise his discretion to exclude the area only if such exclusion would not result in the extinction of the species.

Exclusions Based on Economic Impacts

Under section 4(b)(2) of the Act, we consider the economic impacts of specifying any particular area as critical habitat. In order to consider economic impacts, we prepared a draft economic analysis (DEA) of the proposed critical habitat designation and related factors (77 FR 18173). The draft analysis, dated March 5, 2012, was made available for public review March 27, 2012, through April 26, 2012 (77 FR 18173). Following the close of the comment period, a final analysis (FEA) (dated May 24, 2012) of the potential economic effects of the designation was developed taking into consideration the public comments and any new information (Industrial Economics 2012).

The intent of the economic analysis is to quantify the economic impacts of all potential conservation efforts for the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe; some of these costs will likely be incurred regardless of whether we designate critical habitat (baseline). The economic impact of the critical habitat designation is analyzed by comparing scenarios both ''with critical habitat'' and ''without critical habitat.'' The ''without critical habitat'' scenario represents the baseline for the analysis, considering protections already in place for the species (e.g., under the Federal listing and other Federal, State, and local regulations). The baseline, therefore, represents the costs incurred regardless of whether critical habitat is designated. The ''with critical habitat'' scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the species. In other words, the incremental costs are those attributable solely to the designation of critical habitat above and beyond the baseline costs; these are the costs we consider in the final designation of critical habitat. The analysis looks at baseline impacts incurred from the listing of the species, and forecasts both baseline and incremental impacts likely to occur with the designation of critical habitat. For a further description of analysis methods, see the ''Framework for the Analysis'' section of the FEA.

The FEA also addresses how potential economic impacts are likely to be distributed, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation activities on government agencies, private businesses, and individuals. The FEA measures lost economic efficiency associated with residential and commercial development and public projects and activities, such as economic impacts on water management and transportation projects, Federal lands, small entities, and the energy industry. Decision-makers can use this information to assess whether the effects of the designation might unduly burden a particular group or economic sector. Finally, the FEA looks at costs that will be incurred once listed, and considers those costs that may occur in the 20 years following the designation of critical habitat, which was determined to be the appropriate period for analysis because limited planning information was available for most activities to forecast activity levels for projects beyond a 20-year timeframe. The final economic analysis quantifies economic impacts of conservation efforts for these eight species associated with the following categories of activity: (1)

Impoundments, dams, and diversions; (2) dredging, channelization, and instream mining; (3) transportation and utilities; (4) residential and commercial development; (5) timber management, agriculture, and grazing; and (6) oil wells/drilling.

The FEA states that the present value of total incremental cost of critical habitat designation is estimated to be $1.70 million over the analysis timeframe (2012 to 2031), applying a 7 percent discount rate or $147,000 annually. All of these impacts stem from the administrative cost of addressing adverse modification of critical habitat during section 7 consultations. Because the region is primarily rural, with little planned economic activity, the Service and contacted stakeholders do not anticipate that designation of critical habitat for these mussels will have substantial impact on economic activity. The majority of the incremental impacts (67 percent) are related to road and bridge construction and maintenance projects. Specifically, over the 30-year timeframe of the FEA, the Alabama Department of Transportation (ADOT) and the Florida Department of Transportation (FDOT) expect 208 road and bridge maintenance and resurfacing projects will occur in the region, and ADOT and FDOT will, therefore, conduct section 7 consultations with the Service when roadways cross streams designated as critical habitat. In Alabama, data were not available to determine the number of road crossings in critical habitat, and this likely results in an overestimate of impacts to transportation projects in Alabama.

Our economic analysis did not identify any disproportionate costs that are likely to result from the designation. Consequently, the Secretary is not exerting his discretion to exclude any areas from this designation of critical habitat for these eight species based on economic impacts.

A copy of the final economic analysis with supporting documents may be obtained by contacting the Panama City Field Office (see **ADDRESSES**) or by downloading from the Internet at *http://www.regulations.gov*.

Exclusions Based on National Security Impacts

Under section 4(b)(2) of the Act, we consider whether there are lands owned or managed by the Department of Defense where a national security impact might exist. In preparing this final rule, we have exempted from the designation of critical habitat those Department of Defense lands with completed INRMPs determined to provide a benefit to the Alabama pearlshell, southern kidneyshell, Choctaw bean, tapered pigtoe, southern sandshell, and fuzzy pigtoe. We have also determined that the remaining lands within the designation of critical habitat for the species are not owned or managed by the Department of Defense, and, therefore, we anticipate no impact on national security. Consequently, the Secretary is not exercising his discretion to exclude any areas from this final designation based on impacts on national security.

Exclusions Based on Other Relevant Impacts

Under section 4(b)(2) of the Act, we consider any other relevant impacts, in addition to economic impacts and impacts on national security. We consider a number of factors, including whether the landowners have developed any Habitat Conservation Plans (HCPs) or other management plans for the area, or whether there are conservation partnerships that would be encouraged by designation of, or exclusion from, critical habitat. In addition, we look at any tribal issues, and consider the government-to-government relationship of the United States with tribal entities. We also consider any social impacts that might occur because of the designation.

In preparing this final rule, we have determined that there are currently no HCPs or other management plans for the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, or fuzzy pigtoe, and the final designation does not include any tribal lands or trust resources. We anticipate no impact on tribal lands, partnerships, or HCPs from this critical habitat designation. Accordingly, the Secretary is not exercising his discretion to exclude any areas from this final designation based on other relevant impacts.

Required Determinations

Regulatory Planning and Review—Executive Order 12866 and 13563

Executive Order 12866 provides that the Office of Information and Regulatory Affairs (OIRA) will review all significant rules. The Office of Information and Regulatory Affairs has determined that this rule is not significant.

Executive Order 13563 reaffirms the principles of E.O. 12866 while calling for improvements in the nation's regulatory system to promote predictability, to reduce uncertainty, and to use the best, most innovative, and least burdensome tools for achieving regulatory ends. The executive order directs agencies to consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public where these approaches are relevant, feasible, and consistent with regulatory objectives. E.O. 13563 emphasizes further that regulations must be based on the best available science and that the rulemaking process must allow for public participation and an open exchange of ideas. We have developed this rule in a manner consistent with these requirements.

Regulatory Flexibility Act

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq.,* as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency must publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended RFA to require Federal agencies to provide a certification statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities.

According to the Small Business Administration (SBA), small entities include small organizations, such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; as well as small businesses (13 CFR 121.201). Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential economic impacts to these small entities are significant, we consider the types of activities that might trigger regulatory impacts under this rule, as well as the types of project modifications that may result. In general, the term ''significant economic impact'' is meant to apply to a typical small business firm's business operations.

To determine if the designation of critical habitat for the eight mussel species will affect a substantial number of small entities, we consider the number of small entities affected within particular types of economic activities (e.g., governments (counties), development, and dredging). We apply the ''substantial number'' test individually to each industry to determine if certification is appropriate. However, the SBREFA does not explicitly define ''substantial number'' or ''significant economic impact.'' Consequently, to assess whether a ''substantial number'' of small entities is affected by this designation, this analysis considers the relative number of small entities likely to be impacted in an area. In some circumstances, especially with critical habitat designations of limited extent, we may aggregate across all industries and consider whether the total number of small entities affected is substantial. In estimating the number of small entities potentially affected, we also consider whether their activities have any Federal involvement.

Designation of critical habitat only affects activities authorized, funded, or carried out by Federal agencies. Some kinds of activities are unlikely to have any Federal involvement and so will not be affected by critical habitat designation. In areas where the species is present, Federal agencies already are required to consult with us under section 7 of the Act on activities they authorize, fund, or carry out that may affect the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, or fuzzy pigtoe. Federal agencies also must consult with us if their activities may affect critical habitat. Designation of critical habitat, therefore, could result in an additional economic impact on small entities due to the requirement to reinitiate consultation for ongoing Federal activities (see *Application of the ''Adverse Modification'' Standard* section).

In our final economic analysis of the critical habitat designation, we evaluated the potential economic effects on small entities resulting from conservation actions related to the listing of the eight mussels and the designation of critical habitat. The analysis is based on the estimated impacts associated with the rulemaking as described in Chapters 2 through 4 and Appendix A of the analysis and evaluates the potential for economic impacts related to: (1) Impoundments, dams, and diversions; (2) dredging, channelization, and in-stream mining; (3) transportation and utilities; (4) residential and commercial development; (5) timber management, agriculture, and grazing; and (6) oil wells/drilling.

According to the final economic analysis, impacts on small entities due to this rule are expected to be modest because the incremental costs of the rule are estimated to be administrative in nature. The final economic analysis evaluated the incremental impacts of designating critical habitat for these eight mussels over the next 20 years (2012–2031), which was determined to be the appropriate period for analysis because limited planning information is available for most activities to forecast activity levels for projects beyond a 20-year timeframe. This analysis estimates that 7 small governments, 20 small development-related entitities, and 4 small dredging-related entities are likely to incur administrative costs as third parties associated with section 7 consultation. Applying a 7 percent discount rate, incremental impacts associated with the designation are estimated to represent less than 1 percent of the annual revenues each small entity.

In summary, we considered whether this designation would result in a significant economic effect on a substantial number of small entities. Based on the above reasoning and currently available information, we concluded that this rule will not result in a significant economic impact on a substantial number of small entities. Therefore, we are certifying that the designation of critical habitat for the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe will not have a significant economic impact on a substantial number of small entities, and a regulatory flexibility analysis is not required.

Energy Supply, Distribution, or Use—Executive Order 13211

On May 18, 2001, the President issued Executive Order 13211 (E.O. 13211; ''Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use'') on regulations that significantly affect energy supply, distribution, and use. E.O. 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. OMB has provided guidance for implementing this Executive Order that outlines nine outcomes that may constitute ''a significant adverse effect'' when compared to not taking the regulatory action under consideration. The economic analysis finds that none of these criteria are relevant to this analysis. Thus, based on information in the economic analysis, energy-related impacts associated with the 8 mussels conservation activities within critical habitat are not expected. As such, the designation of critical habitat is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

Unfunded Mandates Reform Act

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 *et seq.*), we make the following findings:

(1) This rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or tribal governments, or the private sector, and includes both ''Federal intergovernmental mandates'' and ''Federal private sector mandates.'' These terms are defined in 2 U.S.C. 658(5)–(7). ''Federal intergovernmental mandate'' includes a regulation that ''would impose an enforceable duty upon State, local, or tribal governments'' with two exceptions. It excludes ''a condition of Federal assistance.'' It also excludes ''a duty arising from participation in a voluntary Federal program,'' unless the regulation ''relates to a then-existing Federal program under which $500,000,000 or more is provided annually to State, local, and tribal governments under entitlement authority,'' if the provision would ''increase the stringency of conditions of assistance'' or ''place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding,'' and the State, local, or tribal governments ''lack authority'' to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; Aid to Families with Dependent Children work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. ''Federal private sector mandate'' includes a regulation that ''would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance or (ii) a duty arising from participation in a voluntary Federal program.''

The designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only

regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply, nor would critical habitat shift the costs of the large entitlement programs listed above onto State governments.

(2) We do not believe that this rule will significantly or uniquely affect small governments because it would not produce a Federal mandate of $100 million or greater in any year; that is, it is not a ''significant regulatory action'' under the Unfunded Mandates Reform Act. Small governments will be affected only to the extent that any programs having Federal funds, permits, or other authorized activities must ensure that their actions will not adversely affect the critical habitat. The final economic analysis concludes incremental impacts may occur due to administrative costs of section 7 consultations for activities related to impoundments and dams, development, and dredging projects; however, these are not expected to significantly affect small government entities. Consequently, a Small Government Agency Plan is not required.

Takings—Executive Order 12630

In accordance with Executive Order 12630 (Government Actions and Interference with Constitutionally Protected Private Property Rights), we have analyzed the potential takings implications of designating critical habitat for the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe in a takings implications assessment. As discussed above, the designation of critical habitat affects only Federal actions. Although private parties that receive Federal funding, assistance, or require approval or authorization from a Federal agency for an action may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.

The majority of the designation occurs in navigable waterways whose stream bottoms are owned by the States of Alabama and Florida. Impacts of this designation could occur on non-Federal riparian lands adjacent to the designated streams where there is Federal involvement (e.g., Federal funding or permitting) subject to section 7 of the Act, or where a decision on a proposed action on federally owned land could affect economic activity on adjoining non-Federal land. However, in general, we believe that the takings implications associated with this critical habitat designation will be insignificant. The takings implications assessment concludes that this designation of critical habitat for these eight mussels does not pose significant takings implications for lands within or affected by the designation.

Federalism—Executive Order 13132

In accordance with Executive Order 13132 (Federalism), this rule does not have significant Federalism effects. A federalism impact summary statement is not required. In keeping with Department of the Interior and Department of Commerce policy, we requested information from, and coordinated development of, this critical habitat designation with appropriate State resource agencies in Alabama and Florida. We received comments from Florida Fish and Wildlife Conservation Commission and have addressed them in the Summary of Comments and Recommendations section of this rule. The designation of critical habitat in areas currently occupied by the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe imposes no additional restrictions to those currently in place and, therefore, has little incremental impact on State and local governments and their activities. The designation may have some benefit to these governments in that the areas that contain the physical or biological features essential to the conservation of the species are more clearly defined, and the elements of the features of the habitat necessary to the conservation of the species are specifically identified. This information does not alter where and what federally sponsored activities may occur. However, it may assist local governments in long-range planning (rather than having them wait for case-by-case section 7 consultations to occur).

Where State and local governments require approval or authorization from a Federal agency for actions that may affect critical habitat, consultation under section 7(a)(2) will be required. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.

Civil Justice Reform

In accordance with Executive Order 12988 (Civil Justice Reform), the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and that it meets the applicable standards set forth in sections 3(a) and 3(b)(2) of the Order. We are designating critical habitat in accordance with the provisions of the Act. This final rule uses standard property descriptions and identifies the elements of physical or biological features essential to the conservation of the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe within the designated areas to assist the public in understanding the habitat needs of these species.

Paperwork Reduction Act of 1995

This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*). This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act (NEPA)

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*), need not be prepared in connection with listing a species as an endangered or threatened species under the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

It is our position that, outside the jurisdiction of the U.S. Court of Appeals

for the Tenth Circuit, we do not need to prepare environmental analyses pursuant to the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) in connection with designating critical habitat under the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination With Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to tribes.

We determined that there are no Tribal lands occupied at the time of listing (2012) that contain the features essential for the conservation, and no unoccupied Tribal lands that are essential for the conservation, of the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe. Therefore, none of the designated critical habitat for these species is on Tribal lands.

References Cited

A complete list of references cited is available on the Internet at *http://www.regulations.gov* and upon request from the Panama City Field Office (see **ADDRESSES**).

Authors

The primary authors of this package are the staff members of the Panama City Field Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

PART 17—[AMENDED]

■ 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

■ 2. Amend § 17.11(h) by adding entries for ''Bean, Choctaw,'' ''Ebonyshell, round,'' ''Kidneyshell, southern,'' ''Pearlshell, Alabama'', ''Pigtoe, fuzzy'', ''Pigtoe, narrow'', ''Pigtoe, tapered'', and ''Sandshell, southern'' in alphabetical order under ''CLAMS'' to the List of Endangered and Threatened Wildlife to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
*	*	*	*	*	*	*	
CLAMS							
*	*	*	*	*	*	*	
Bean, Choctaw	*Villosa choctawensis*	U.S.A. (AL, FL)	NA	E	808	17.95(f)	NA
*	*	*	*	*	*	*	
Ebonyshell, round	*Fusconaia rotulata*	U.S.A. (AL, FL)	NA	E	808	17.95(f)	NA
*	*	*	*	*	*	*	
Kidneyshell, southern.	*Ptychobranchus jonesi.*	U.S.A. (AL, FL)	NA	E	808	17.95(f)	NA
*	*	*	*	*	*	*	
Pearlshell, Alabama	*Margaritifera marrianae.*	U.S.A. (AL)	NA	E	808	17.95(f)	NA
*	*	*	*	*	*	*	
Pigtoe, fuzzy	*Pleurobema strodeanum.*	U.S.A. (AL, FL)	NA	T	808	17.95(f)	NA
*	*	*	*	*	*	*	
Pigtoe, narrow	*Fusconaia escambia*	U.S.A. (AL, FL)	NA	T	808	17.95(f)	NA
*	*	*	*	*	*	*	
Pigtoe, tapered	*Fusconaia burkei*	U.S.A. (AL, FL)	NA	T	808	17.95(f)	NA
*	*	*	*	*	*	*	
Sandshell, southern	*Hamiota australis*	U.S.A. (AL, FL)	NA	T	808	17.95(f)	NA
*	*	*	*	*	*	*	

■ 3. In § 17.95, amend paragraph (f) by adding an entry for eight mussel species in four northeastern Gulf of Mexico drainages, immediately before the entry for ''Georgia Pigtoe (*Pleurobema hanleyianum*)'' to read as follows:

§ 17.95 Critical habitat—fish and wildlife.

* * * * *

(f) *Clams and Snails.*

* * * * *

Eight mussel species in four northeast Gulf of Mexico drainages: the Choctaw bean (*Villosa choctawensis*), round ebonyshell (*Fusconaia rotulata*), southern kidneyshell (*Ptychobranchus jonesi*), Alabama pearlshell (*Margaritifera marrianae*), fuzzy pigtoe (*Pleurobema strodeanum*), narrow pigtoe (*Fusconaia escambia*), tapered pigtoe (*Fusconaia burkei*), and southern sandshell (*Hamiota australis*).

(1) Critical habitat units are depicted for the following counties:

(i) Alabama. Barbour, Bullock, Butler, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Monroe, and Pike Counties.

(ii) Florida. Bay, Escambia, Holmes, Jackson, Okaloosa, Santa Rosa, Walton, and Washington Counties.

(2) Within these areas, the primary constituent elements of the physical or biological features essential to the conservation of the Alabama pearlshell, round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe consist of five components:

(i) 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).

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

(iii) 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.

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

(v) 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 fuzzy pigtoe and tapered pigtoe, the presence of blacktail shiner (*Cyprinella venusta*) will serve as a potential indication of fish host presence.

(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, dams, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on November 9, 2012, with the exception of the impoundments created by Point A and Gantt Lake dams (impounded water, not the actual dam structures).

(4) *Critical habitat map units.* Data layers defining map units were created with USGS National Hydrography Dataset (NHD) GIS data. The 1:100,000 river reach (route) files were used to calculate river kilometers and miles. ESRIs ArcGIS 9.3.1 software was used to determine longitude and latitude coordinates using decimal degrees. The projection used in mapping all units was Universal Transverse Mercator (UTM), NAD 83, Zone 16 North. The following data sources were referenced to identify features (like roads and streams) used to delineate the upstream and downstream extents of critical habitat units: NHD data, Washington County USFWS National Wetlands Inventory, 1999 Florida Department of Transportation Roads Characteristics Inventory (RCI) dataset, U.S. Census Bureau 2000 TIGER line waterbody data, ESRIs World Street Map Service, Florida Department of Transportation General Highway Maps, DeLorme Atlas and Gazetteers, and USGS 7.5 minute topographic maps. The maps in this entry, as modified by any accompanying regulatory text, establish the boundaries of the critical habitat designation. The coordinates or plot points or both on which each map is based are available to the public at the Service's internet site, *http://www.fws.gov/PanamaCity, http://www.regulations.gov* at Docket No. FWS–R4–ES–2011–0050, and at the field office responsible for this designation. You may obtain field office location information by contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) Index maps follow (Map 1 for the Alabama pearlshell, and Map 2 for the round ebonyshell, southern kidneyshell, Choctaw bean, tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe):

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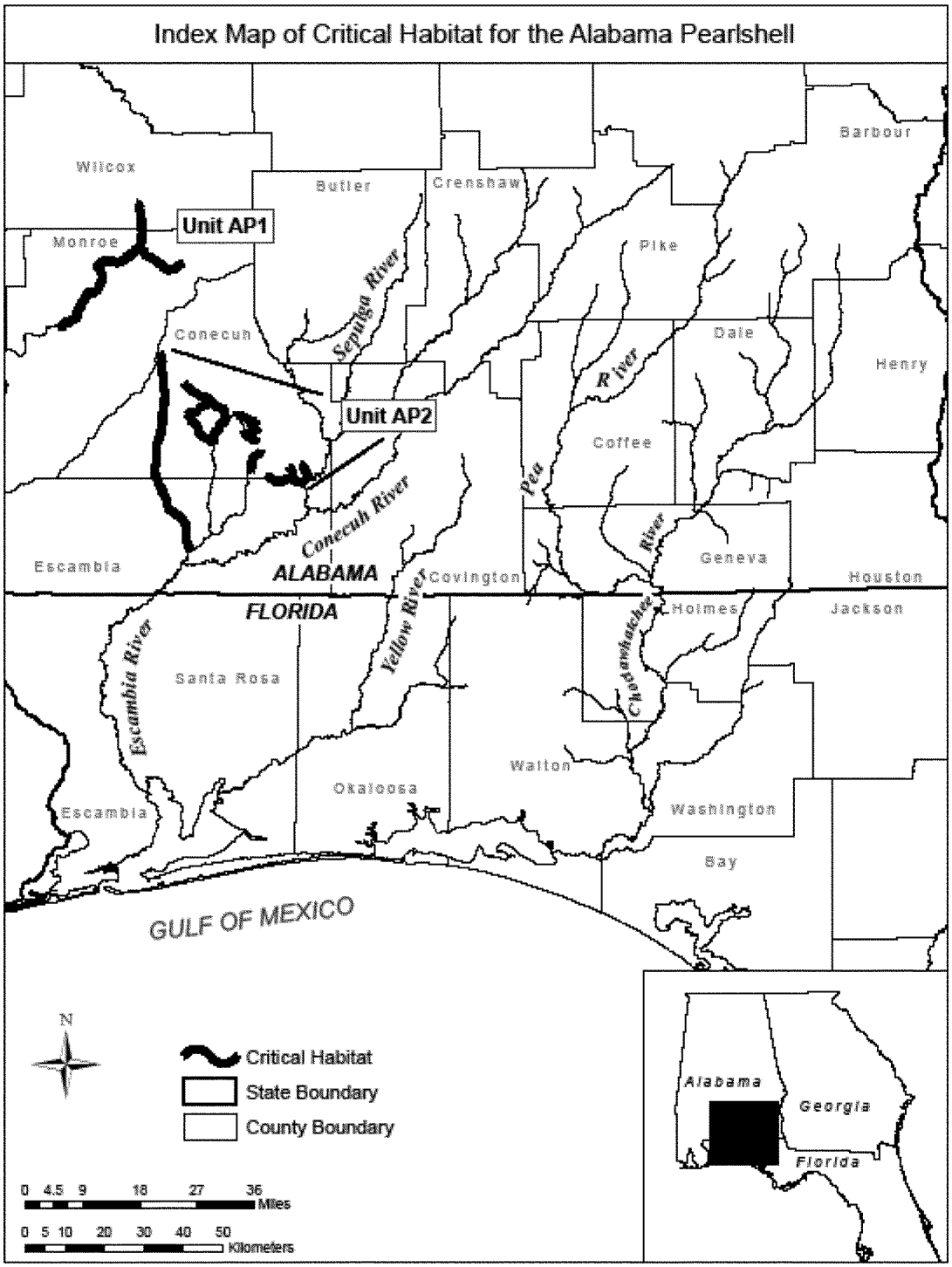
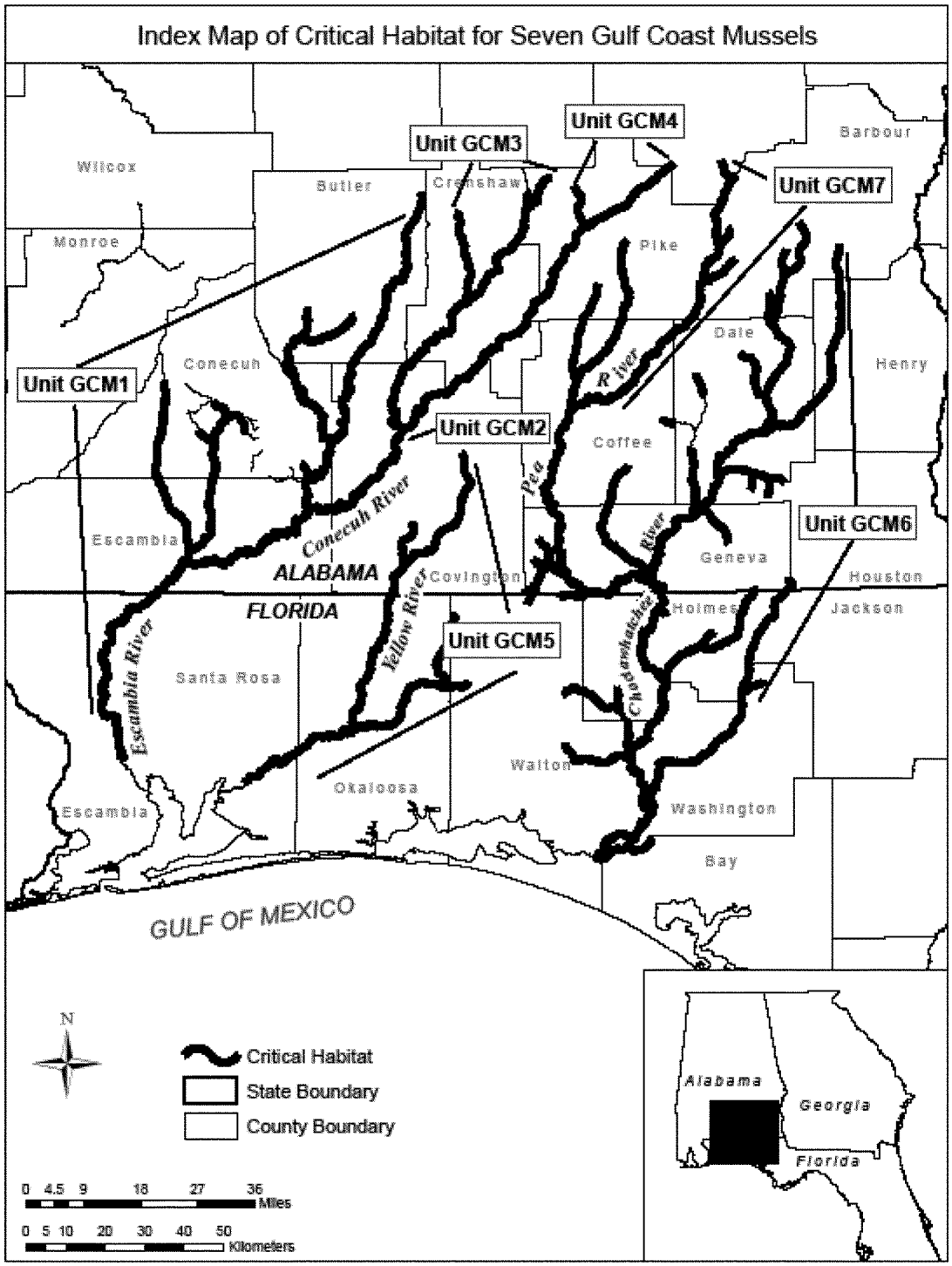
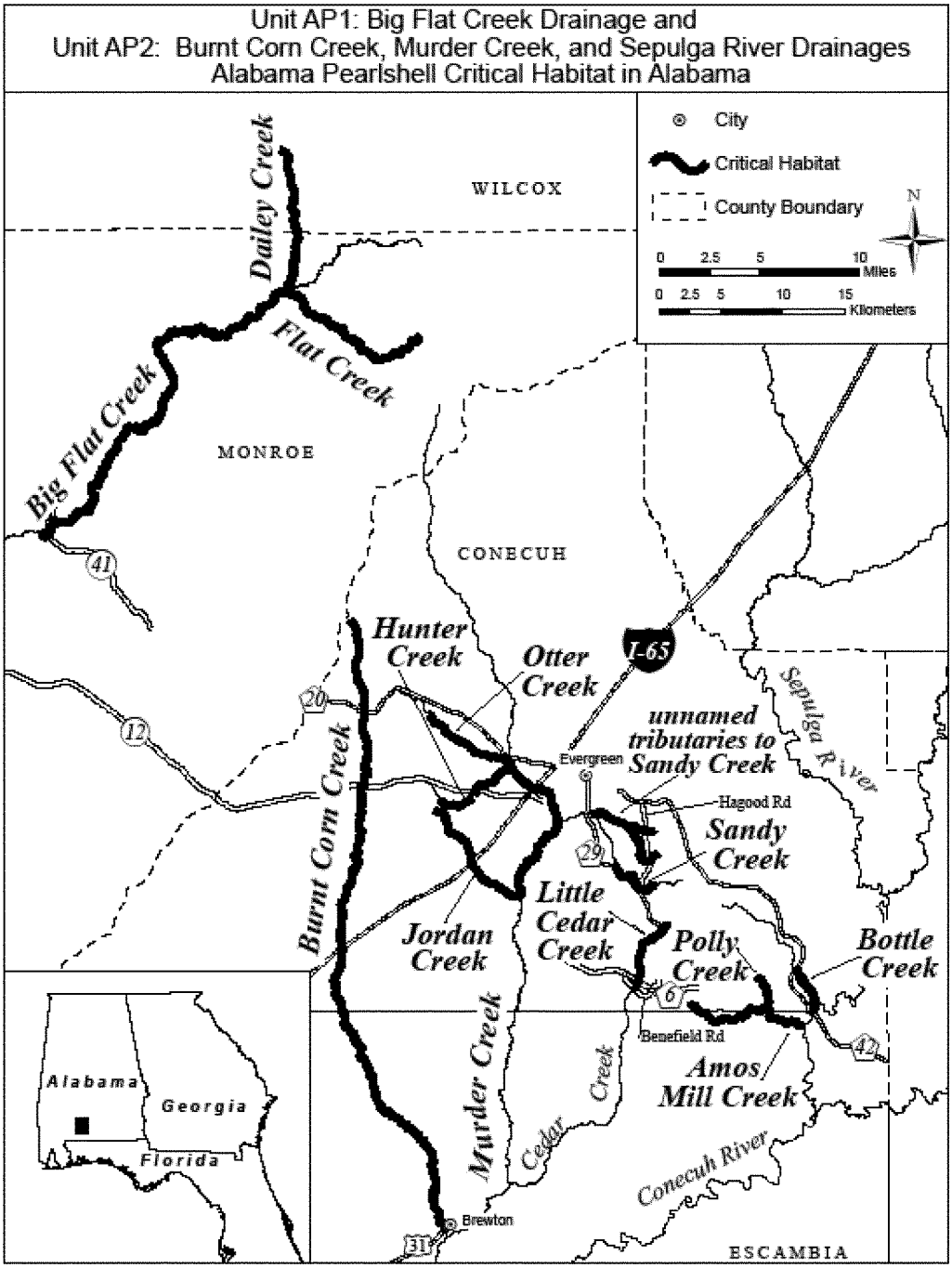

Index Map of Critical Habitat for the Alabama Pearlshell
Wilcox
Butler
Crenshaw
Barbour
Monroe
Unit AP1
Pike
Sepulga River
Conecuh
Dale
Henry
Unit AP2
Coffee
Pea River
Conecuh River
Escambia
ALABAMA
Covington
Geneva
Houston
FLORIDA
Holmes
Jackson
Escambia River
Yellow River
Chattahoochee River
Santa Rosa
Walton
Okaloosa
Escambia
Washington
Bay
GULF OF MEXICO
N
Critical Habitat
State Boundary
County Boundary
0 4.5 9 18 27 36
Miles
0 5 10 20 30 40 50
Kilometers
Alabama
Georgia
Florida



(6) Unit AP1: Big Flat Creek Drainage, Monroe and Wilcox Counties, AL. This unit is critical habitat for the Alabama pearlshell.

(i) The unit includes the mainstem of Big Flat Creek from State Route 41 upstream 56 kilometers (km) (35 miles (mi)), Monroe County, AL; Flat Creek from its confluence with Big Flat Creek upstream 20 km (12 mi), Monroe County, AL; and Dailey Creek from its confluence Flat Creek upstream 17 km (11 mi), Monroe and Wilcox Counties, AL.

(ii) Map of Unit AP1, Big Flat Creek Drainage, and Unit AP2, Burnt Corn Creek, Murder Creek, and Sepulga River drainages, follows:



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(7) Unit AP2: Burnt Corn Creek, Murder Creek, and Sepulga River. Drainages, Escambia and Conecuh Counties, AL. This unit is critical habitat for the Alabama pearlshell.

(i) The unit includes the mainstem of Burnt Corn Creek from its confluence with Murder Creek upstream 66 km (41 mi), Conecuh County, AL; the mainstem of Murder Creek from its confluence with Jordan Creek upstream 17 km (11 mi) to the confluence of Otter Creek, Conecuh County, AL; Jordan Creek from its confluence with Murder Creek upstream 12 km (7 mi), Conecuh County, AL; Otter Creek from its confluence with Murder Creek, upstream 9 km (5.5 mi), Conecuh County, AL; Hunter Creek from its confluence with Murder Creek upstream 4.4 km (2.7 mi) to the Navy Outlying Field (NOLF) Evergreen northern boundary, Conecuh County, AL; Hunter Creek from the NOLF Evergreen southern boundary upstream 3.0 km (1.9 mi), Conecuh County, AL; Sandy Creek from County Road 29 upstream 5 km (3.5 mi), Conecuh County, AL; two unnamed tributaries to Sandy Creek—one from its confluence with Sandy Creek upstream 8.5 km (5.0 mi) to just above Hagood Road, and the other from it confluence with the previous unnamed tributary upstream 2.5 km (1.5 mi) to just above Hagood Road; Little Cedar Creek from County Road 6 upstream 8 km (5 mi), Conecuh County, AL; Amos Mill Creek from its confluence with the Sepulga River upstream 12 km (8 mi), Escambia and Conecuh Counties, AL; Polly Creek from its confluence with Amos Mill Creek upstream 3 km (2 mi), Conecuh County, AL; and Bottle Creek from its

confluence with the Sepulga River upstream 5.5 km (3.5 mi) to County Road 42, Conecuh County, AL.

(ii) Map of Unit AP1, Big Flat Creek Drainage, and Unit AP2, Burnt Corn Creek, Murder Creek, and Sepulga River Drainages is provided at paragraph (6)(ii) of this entry.

(8) Unit GCM1: Lower Escambia River Drainage in Escambia and Santa Rosa counties, FL, and Escambia, Covington, Conecuh, and Butler Counties, AL. This unit is critical habitat for the round ebonyshell, southern kidneyshell, Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe.

(i) The unit includes the Escambia-Conecuh River mainstem from the confluence of Spanish Mill Creek Escambia and Santa Rosa Counties, FL, upstream 204 km (127 mi) to the Point A Lake dam, Covington County, AL; Murder Creek from its confluence with the Conecuh River, Escambia County, AL, upstream 62 km (38 mi) to the confluence of Cane Creek, Conecuh County, AL; Burnt Corn Creek from its confluence with Murder Creek, Escambia County, AL, upstream 59 km (37 mi) to County Road 20, Conecuh County, AL; Jordan Creek from its confluence with Murder Creek, upstream 5.5 km (3.5 mi) to Interstate 65, Conecuh County, AL; Mill Creek from its confluence with Murder Creek upstream 2.5 km (1.5 mi) to the confluence of Sandy Creek, Conecuh County, AL; Sandy Creek from its confluence with Mill Creek upstream 5.5 km (3.5 mi) to County Road 29, Conecuh County, AL; Sepulga River from its confluence with the Conecuh River upstream 69 km (43 mi) to the confluence of Persimmon Creek, Conecuh County, AL; Bottle Creek from its confluence with the Sepulga River upstream 5.5 km (3.5 mi) to County Road 42, Conecuh County, AL; Persimmon Creek from its confluence with the Sepulga River, Conecuh County, upstream 36 km (22 mi) to the confluence of Mashy Creek, Butler County, AL; Panther Creek from its confluence with Persimmon Creek upstream 11 km (7 mi) to State Route 106, Butler County, AL; Pigeon Creek from its confluence with the Sepulga River, Conecuh and Covington Counties, upstream 89 km (55 mi) to the confluence of Three Run Creek, Butler County, AL; and Three Run Creek from its confluence with Pigeon Creek upstream 9 km (5.5 mi) to the confluence of Spring Creek, Butler County, AL.

(ii) Map of Unit GCM1, Lower Escambia River, follows (to preserve detail, the map is divided into south and north sections):

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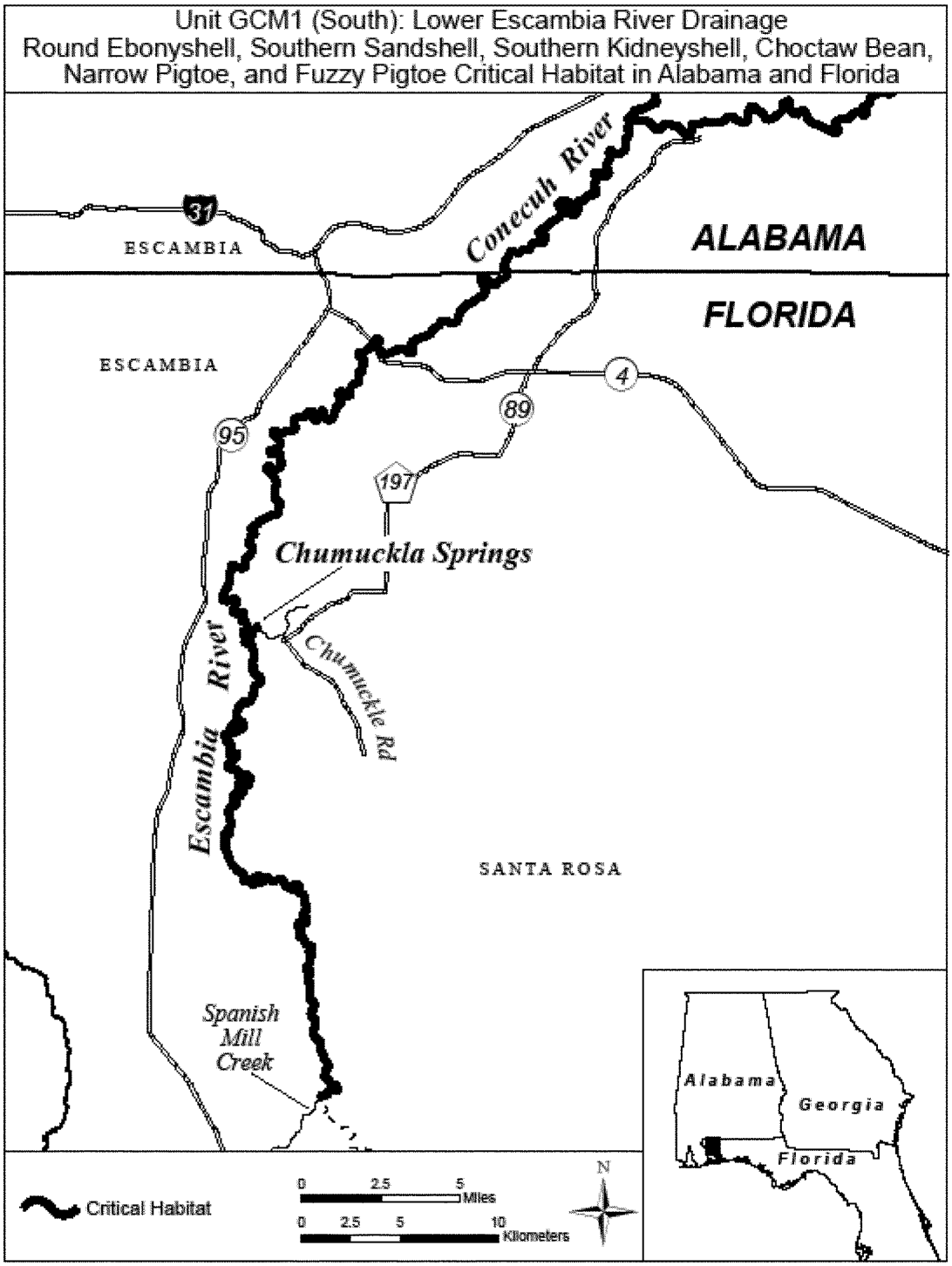
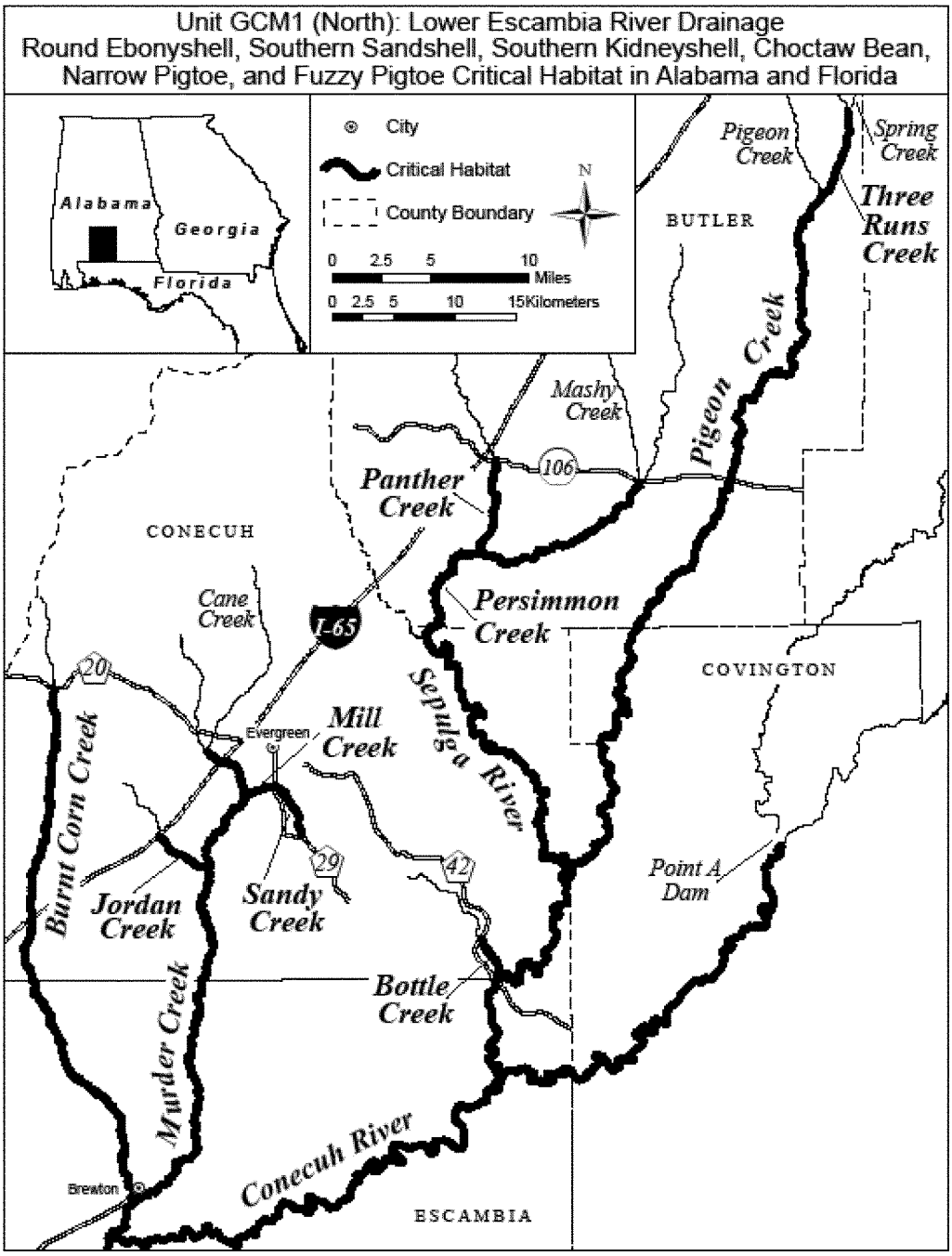
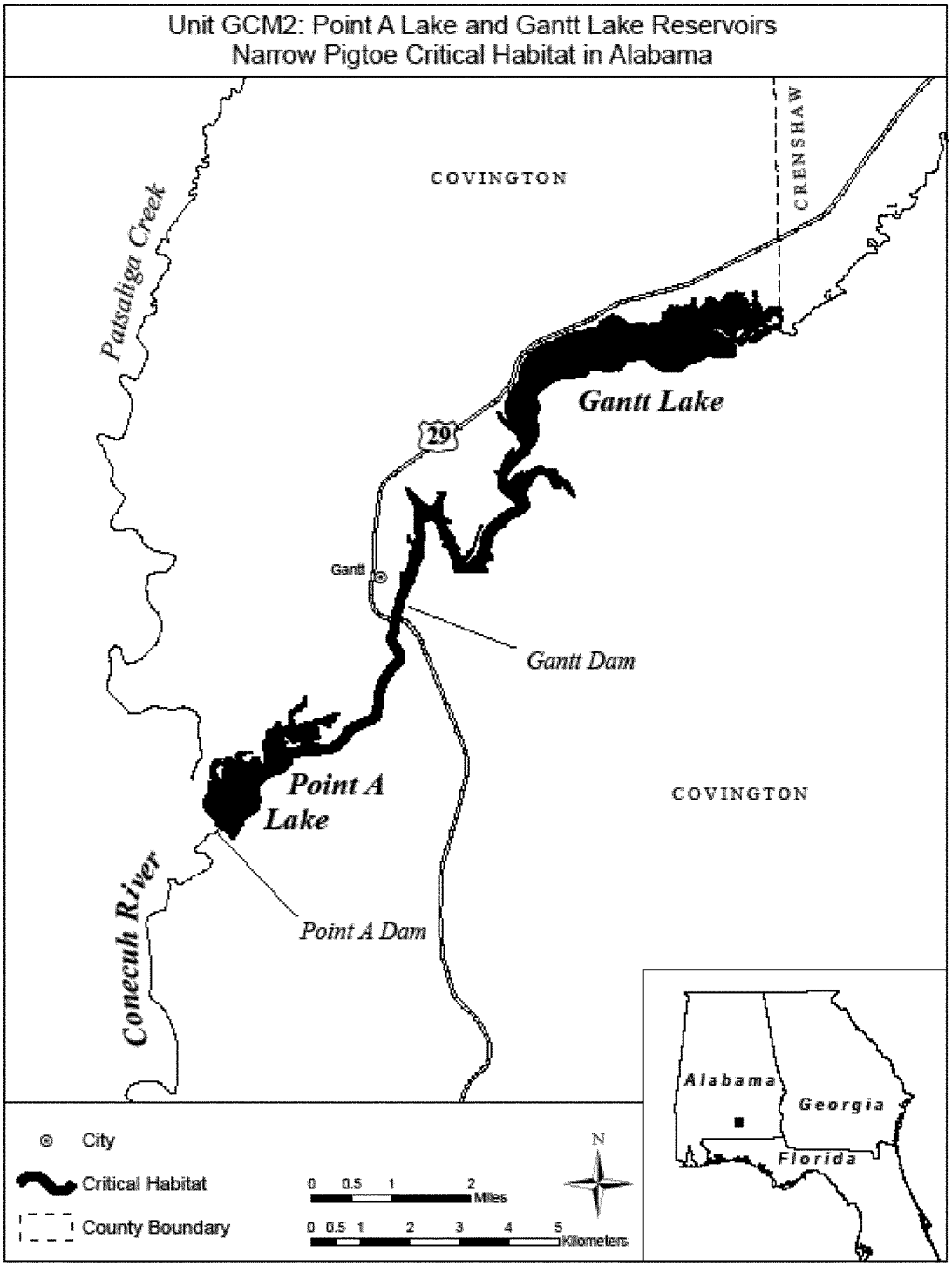

Unit GCM1 (South): Lower Escambia River Drainage
Round Ebonyshell, Southern Sandshell, Southern Kidneyshell, Choctaw Bean, Narrow Pigtoe, and Fuzzy Pigtoe Critical Habitat in Alabama and Florida
Conecuh River
31
ESCAMBIA
ALABAMA
FLORIDA
ESCAMBIA
4
89
95
197
Chumuckla Springs
Chumuckla Rd
Escambia River
SANTA ROSA
Spanish Mill Creek
Alabama
Georgia
Florida
Critical Habitat
0 2.5 5 Miles
0 2.5 5 10 Kilometers
N



(9) Unit GCM2: Point A Lake and Gantt Lake Reservoirs in Covington County, AL. This unit is critical habitat for the narrow pigtoe.

(i) The unit extends from Point A Dam, Covington County, upstream 21 km (13 mi) to the Covington-Crenshaw County line, AL.

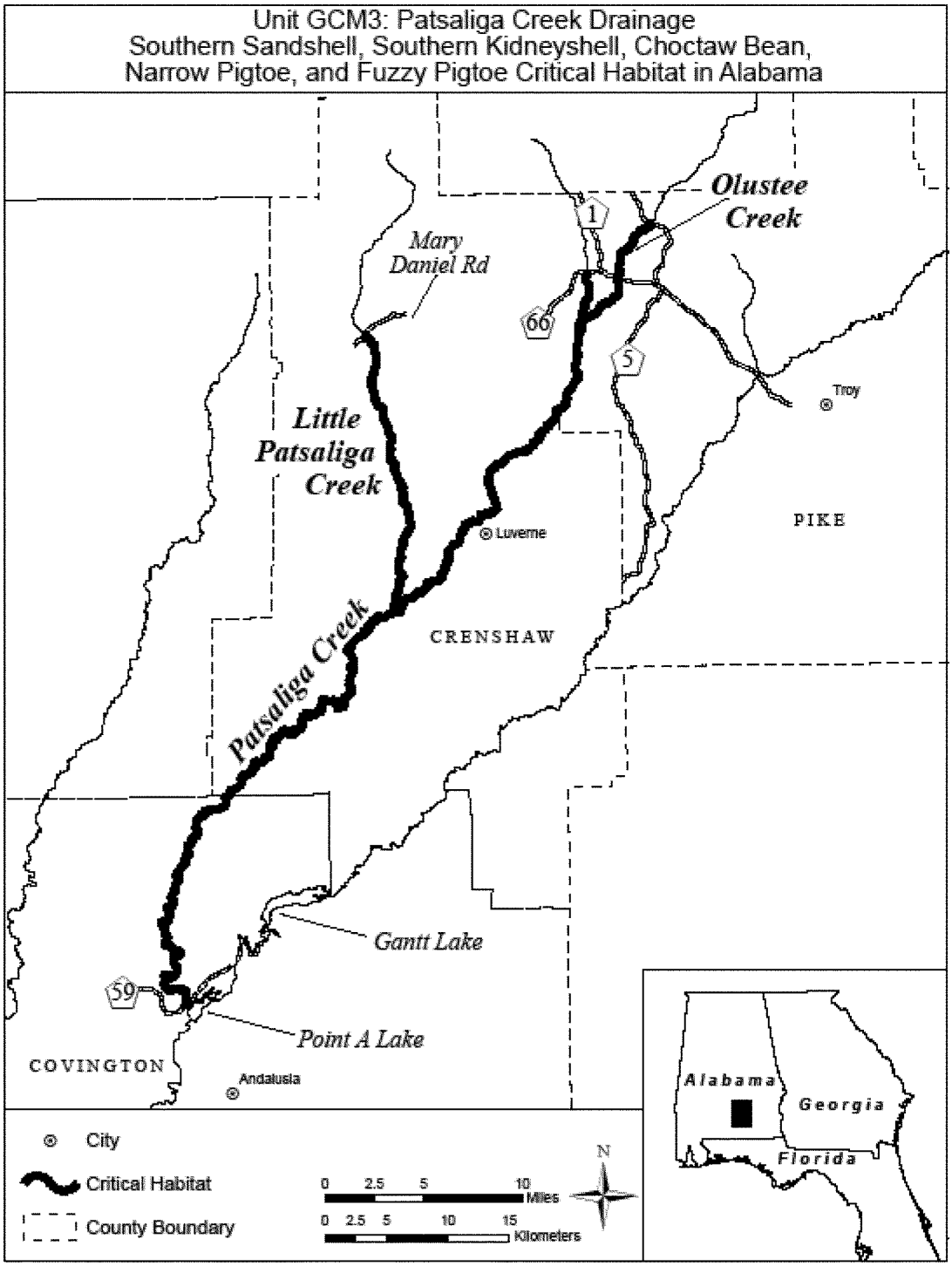
(ii) Map of Unit GCM2, Point A Lake and Gantt Lake Reservoirs, follows:



(10) Unit GCM3: Patsaliga Creek Drainage in Covington, Crenshaw, and Pike Counties, AL. The Patsaliga Creek drainage is within the Escambia River basin. This unit is critical habitat for the southern kidneyshell, Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe.

(i) The unit includes Patsaliga Creek from its confluence with Point A Lake at County Road 59, Covington County, AL, upstream 108 km (67 mi) to Crenshaw County Road 66-Pike County Road 1, AL; Little Patsaliga Creek from its confluence with Patsaliga Creek upstream 28 km (17 mi) to Mary Daniel Road, Crenshaw County, AL; and Olustee Creek from its confluence with Patsaliga Creek upstream 12 km (8 mi) to County Road 5, Pike County, AL.

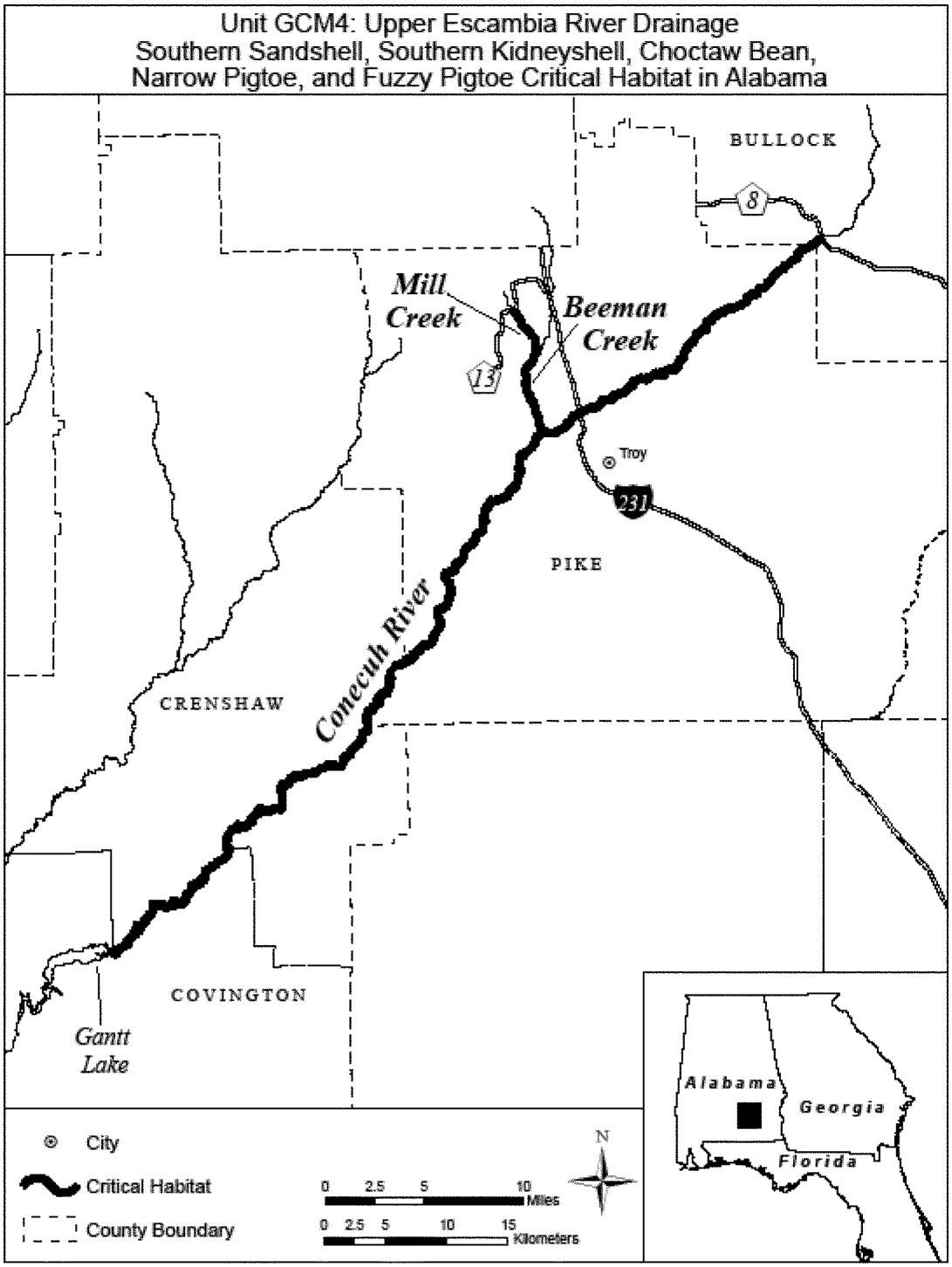
(ii) Map of Unit GCM3, Patsaliga Creek Drainage follows:



(11) Unit GCM4: Upper Escambia River Drainage in Covington, Crenshaw, Pike, and Bullock Counties, AL. This unit is critical habitat for the southern kidneyshell, Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe.

(i) The unit includes the Conecuh River from its confluence with Gantt Lake reservoir at the Covington-Crenshaw County line upstream 126 km (78 mi) to County Road 8, Bullock County, AL; Beeman Creek from its confluence with the Conecuh River upstream 6.5 km (4 mi) to the confluence of Mill Creek, Pike County, AL; and Mill Creek from its confluence with Beeman Creek, upstream 4.5 km (3 mi) to County Road 13, Pike County, AL.

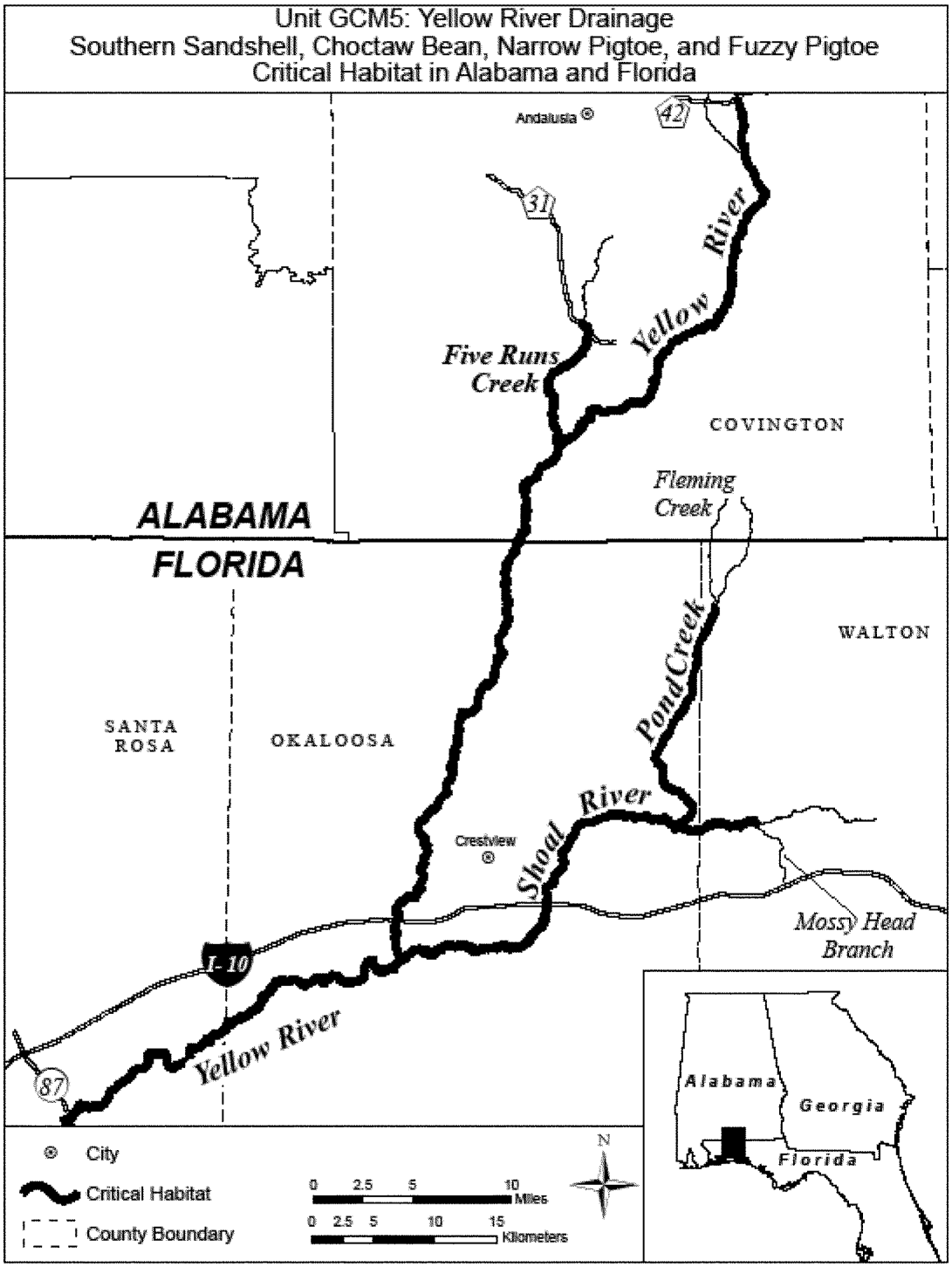
(ii) Map of Unit GCM 4, Upper Escambia River Drainage, follows:



(12) Unit GCM5: Yellow River Drainage in Santa Rosa, Okaloosa, and Walton Counties, FL, and Covington County, AL. This unit is critical habitat for the Choctaw bean, narrow pigtoe, southern sandshell, and fuzzy pigtoe.

(i) The unit includes the Yellow River mainstem from the confluence of Weaver River (a distributary located 0.9 km (0.6 mi), downstream of State Route 87), Santa Rosa County, FL, upstream 157 km (97 mi) to County Road 42, Covington County, AL; the Shoal River mainstem from its confluence with the Yellow River upstream 51 km (32 mi) to the confluence of Mossy Head Branch, Walton County, FL; Pond Creek from its confluence with the Shoal River upstream 24 km (15 mi) to the confluence of Fleming Creek, Walton County, FL; and Five Runs Creek from its confluence with the Yellow River upstream 15 km (9.5 mi) to County Road 31, Covington County, AL.

(ii) Map of Unit GCM5, Yellow River Drainage, follows:



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(13) Unit GCM6: Choctawhatchee River and Lower Pea River Drainages in Walton, Washington, Bay, Holmes, and Jackson Counties, FL, and Geneva, Coffee, Dale, Houston, Henry, Pike, and Barbour Counties, AL. This unit is critical habitat for the southern kidneyshell, Choctaw bean, tapered pigtoe, southern sandshell, and fuzzy pigtoe.

(i) The unit includes the Choctawhatchee River mainstem from the confluence of Pine Log Creek, Walton County, FL, upstream 200 km (125 mi) to the point the river splits into the West Fork Choctawhatchee and East Fork Choctawhatchee rivers, Barbour County, AL; Pine Log Creek from its confluence with the Choctawhatchee River, Walton County, upstream 19 km (12 mi) to Ditch Branch, Washington and Bay Counties, FL; an unnamed channel forming Cowford Island from its downstream confluence with the Choctawhatchee River upstream 3 km (2 mi) to its upstream confluence with the river, Washington County, FL; Crews Lake from its western terminus 1.5 km (1 mi) to its eastern terminus, Washington County, FL (Crews Lake is a relic channel southwest of Cowford Island, and is disconnected from the Cowford Island channel, except during high flows); Holmes Creek from its

confluence with the Choctawhatchee River, Washington County, FL, upstream 98 km (61 mi) to County Road 4, Geneva County, AL; Alligator Creek from its confluence with Holmes Creek upstream 6.5 km (4 mi) to County Road 166, Washington County, FL; Bruce Creek from its confluence with the Choctawhatchee River upstream 25 km (16 mi) to the confluence of an unnamed tributary, Walton County, FL; Sandy Creek from its confluence with the Choctawhatchee River, upstream 30 km (18 mi) to the confluence of West Sandy Creek, Holmes and Walton Counties, FL; Blue Creek from its confluence with Sandy Creek, upstream 7 km (4.5 mi) to the confluence of Goose Branch, Holmes County, FL; West Sandy Creek from its confluence with Sandy Creek, upstream 5.5 km (3.5 mi) to the confluence of an unnamed tributary, Walton County, FL; Wrights Creek from its confluence with the Choctawhatchee River, Holmes County, FL, upstream 43 km (27 mi) to County Road 4, Geneva County, AL; Tenmile Creek from its confluence with Wrights Creek upstream 6 km (3.5 mi) to the confluence of Rice Machine Branch, Holmes County, FL; West Pittman Creek from its confluence with the Choctawhatchee River, upstream 6.5 km (4 mi) to Fowler Branch, Holmes County, FL; East Pittman Creek from its confluence with the Choctawhatchee River upstream 4.5 km (3 mi) to County Road 179, Holmes County, FL; Parrot Creek from its confluence with the Choctawhatchee River upstream 6 km (4 mi) to Tommy Lane, Holmes County, FL; the Pea River from its confluence with the Choctawhatchee River, Geneva County, AL, upstream 91 km (57 mi) to the Elba Dam, Coffee County, AL; Limestone Creek from its confluence with the Pea River upstream 8.5 km (5 mi) to Woods Road, Walton County, FL; Flat Creek from the Pea River upstream 17 km (10 mi) to the confluence of Panther Creek, Geneva County, AL; Eightmile Creek from its confluence with Flat Creek, Geneva County, AL, upstream 15 km (9 mi) to the confluence of Dry Branch (first tributary upstream of County Road 181), Walton County, FL; Corner Creek from its confluence with Eightmile Creek, upstream 5 km (3 mi) to State Route 54, Geneva County, AL; Natural Bridge Creek from its confluence with Eightmile Creek, Geneva County, AL, upstream 4 km (2.5 mi) to the Covington-Geneva County line, AL; Double Bridges Creek from its confluence with the Choctawhatchee River, Geneva County, AL, upstream 46 km (29 mi) to the confluence of Blanket Creek, Coffee County, AL; Claybank Creek from its confluence with the Choctawhatchee River, Geneva County, AL, upstream 22 km (14 mi) to the Fort Rucker military reservation southern boundary, Dale County, AL; Claybank Creek from the Fort Rucker military reservation northern boundary, upstream 6 km (4 mi) to County Road 36, Dale County, AL; Steep Head Creek from the Fort Rucker military reservation western boundary, upstream 4 km (2.5 mi) to County Road 156, Coffee County, AL; Hurricane Creek from its confluence with the Choctawhatchee River upstream 14 km (8.5 mi) to State Route 52, Geneva County, AL; Little Choctawhatchee River from its confluence with the Choctawhatchee River, Dale and Houston Counties, upstream 20 km (13 mi) to the confluence of Newton Creek, Houston County, AL; Panther Creek from its confluence with Little Choctawhatchee River, upstream 4.5 km (2.5 mi) to the confluence of Gilley Mill Branch, Houston County, AL; Bear Creek from its confluence with the Little Choctawhatchee River, upstream 5.5 km (3.5 mi) to County Road 40 (Fortner Street), Houston County, AL; West Fork Choctawhatchee River from its confluence with the Choctawhatchee River, Dale County, AL, upstream 54 km (33 mi) to the fork of Pauls Creek and Lindsey Creek, Barbour County, AL; Judy Creek from its confluence with West Fork Choctawhatchee River upstream 17 km (11 mi) to County Road 13, Dale County, AL; Sikes Creek from its confluence with West Fork Choctawhatchee River Dale County, AL, upstream 8.5 km (5.5 mi) to State Route 10, Barbour County, AL; Pauls Creek from its confluence with West Fork Choctawhatchee River upstream 7 km (4.5 mi) to one mile upstream of County Road 20, Barbour County, AL; Lindsey Creek from its confluence with West Fork Choctawhatchee River upstream 14 km (8.5 mi) to the confluence of an unnamed tributary, Barbour County, AL; an unnamed tributary to Lindsey Creek from its confluence with Lindsey Creek upstream 2.5 km (1.5 mi) to 1.0 mile upstream of County Road 53, Barbour County, AL; and East Fork Choctawhatchee River from its confluence with the Choctawhatchee River, Dale County, AL, upstream 71 km (44 mi) to County Road 71, Barbour County, AL.

(ii) Map of Unit GCM6, Choctawhatchee River and Lower Pea River Drainages, follows (to preserve detail, the map is divided into south, central, and north sections):

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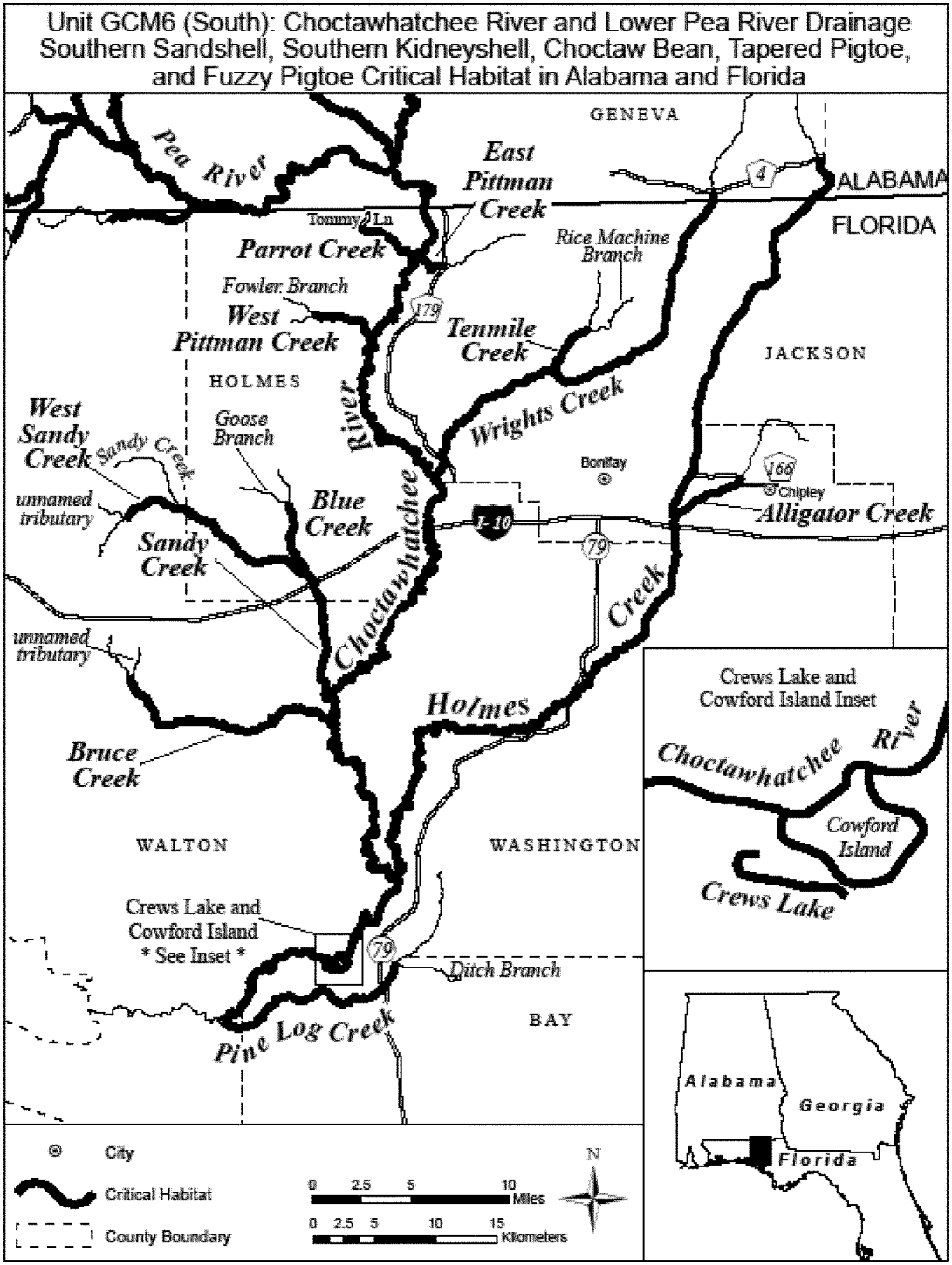
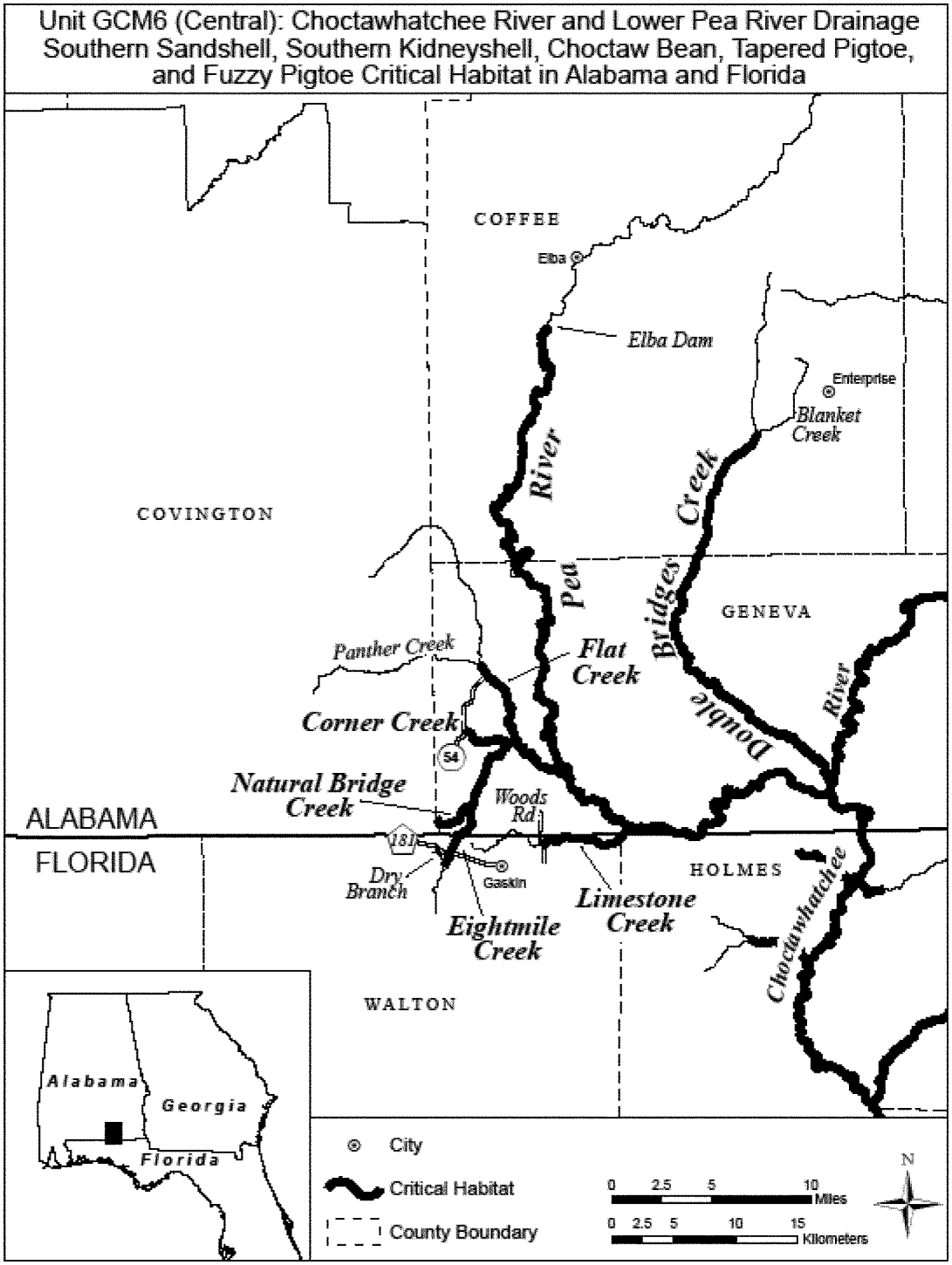
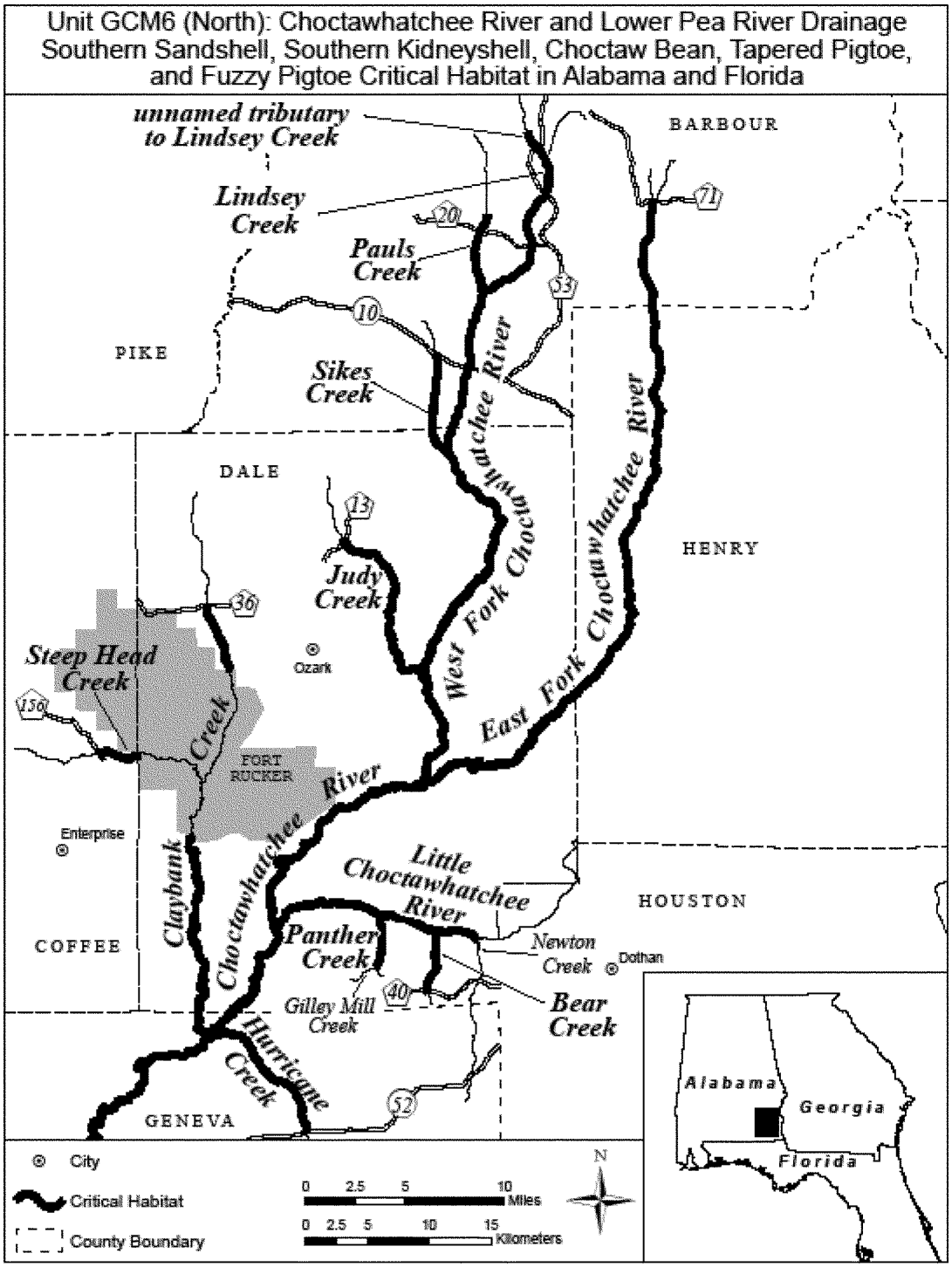

Unit GCM6 (South): Choctawhatchee River and Lower Pea River Drainage
Southern Sandshell, Southern Kidneyshell, Choctaw Bean, Tapered Pigtoe,
and Fuzzy Pigtoe Critical Habitat in Alabama and Florida
GENEVA
Pea River
East Pittman Creek
ALABAMA
FLORIDA
Tommy Ln
Parrot Creek
Rice Machine Branch
Fowler Branch
West Pittman Creek
179
Tenmile Creek
JACKSON
HOLMES
West Sandy Creek
Sandy Creek
Goose Branch
River
Wrights Creek
Bonifay
166
Chipley
unnamed tributary
Blue Creek
I-10
Alligator Creek
Sandy Creek
79
Choctawhatchee
Creek
unnamed tributary
Crews Lake and Cowford Island Inset
Holmes
Choctawhatchee River
Bruce Creek
Cowford Island
WALTON
WASHINGTON
Crews Lake
Crews Lake and Cowford Island
* See Inset *
79
Ditch Branch
BAY
Pine Log Creek
Alabama
Georgia
Florida
City
Critical Habitat
County Boundary
N
0 2.5 5 10 Miles
0 2.5 5 10 15 Kilometers

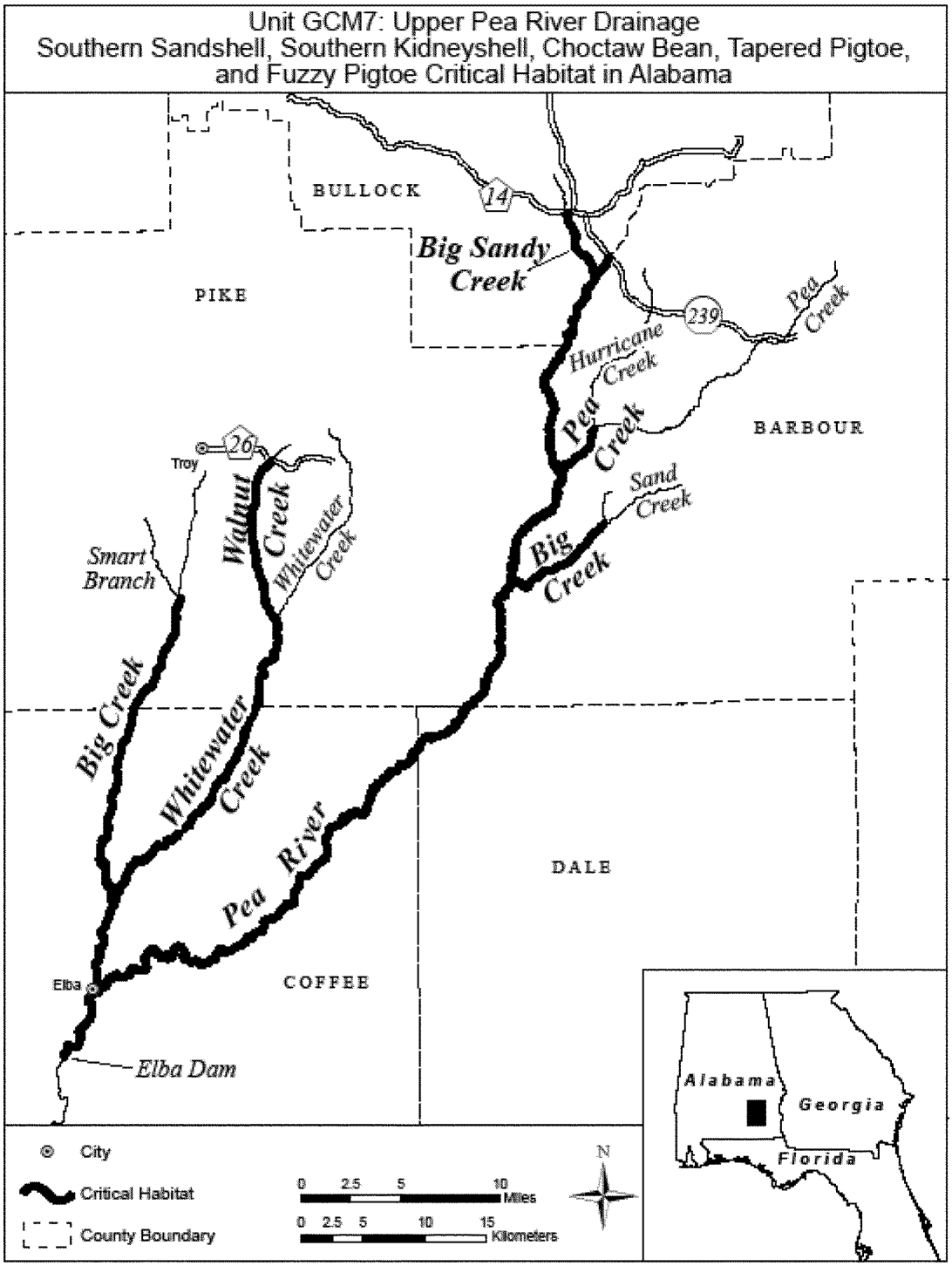

Unit GCM6 (Central): Choctawhatchee River and Lower Pea River Drainage
Southern Sandshell, Southern Kidneyshell, Choctaw Bean, Tapered Pigtoe,
and Fuzzy Pigtoe Critical Habitat in Alabama and Florida
COFFEE
Elba
Elba Dam
Enterprise
Blanket Creek
Pea River
Bridges Creek
COVINGTON
GENEVA
Panther Creek
Flat Creek
Double River
Corner Creek
54
Natural Bridge Creek
Woods Rd
ALABAMA
FLORIDA
181
Dry Branch
Gaskin
Eightmile Creek
Limestone Creek
HOLMES
Choctawhatchee
WALTON
Alabama
Georgia
Florida
City
Critical Habitat
County Boundary
0 2.5 5 10 Miles
0 2.5 5 10 15 Kilometers
N



(14) Unit GCM7: Upper Pea River Drainage in Coffee, Dale, Pike, Barbour, and Bullock Counties, AL. The Pea River drainage is within the Choctawhatchee River Basin. This unit is critical habitat for the southern kidneyshell, Choctaw bean, tapered pigtoe, southern sandshell, and fuzzy pigtoe.

(i) The unit includes the Pea River mainstem from the Elba Dam, Coffee County, upstream 123 km (76 mi) to State Route 239, Bullock and Barbour Counties, AL; Whitewater Creek from its confluence with the Pea River, Coffee County, upstream 45 km (28 mi) to the confluence of Walnut Creek, Pike County, AL; Walnut Creek from its confluence with Whitewater Creek upstream 14 km (9 mi) to County Road 26, Pike County, AL; Big Creek (Coffee County) from its confluence with Whitewater Creek, Coffee County, upstream 30 km (18 mi) to the confluence of Smart Branch, Pike County, AL; Big Creek (Barbour County) from its confluence with the Pea River upstream 10 km (6 mi) to the confluence of Sand Creek, Barbour County, AL; Pea Creek from its confluence with the Pea River upstream 6 km (4 mi) to the confluence of Hurricane Creek, Barbour County, AL; and Big Sandy Creek from its confluence with the Pea River upstream 6.5 km (4 mi) to County Road 14, Bullock County, AL.

(ii) Map of Unit GCM7, Upper Pea River Drainage, follows:



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Dated: September 20, 2012.

Rachel Jacobson,

Principal Deputy Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 2012–24161 Filed 10–9–12; 8:45 am]

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