

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS-R4-ES-2008-0104; MO 92210-0-0008-B2]

RIN 1018-AU88

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Georgia Pigtoe Mussel, Interrupted Rocksnail, and Rough Hornsnail and Designation of Critical Habitat**AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), list the Georgia pigtoe mussel (*Pleurobema hanleyianum*), interrupted rocksnail (*Leptoxis foremani*), and rough hornsnail (*Pleurocera foremani*) as endangered under the Endangered Species Act of 1973, as amended (Act). We also designate approximately 258 kilometers (km) (160 miles (mi)) of stream and river channels as critical habitat for the three species, in Cherokee, Clay, Coosa, Elmore, and Shelby Counties, Alabama; Gordon, Floyd, Murray, and Whitfield Counties, Georgia; and Bradley and Polk Counties, Tennessee.

DATES: This rule becomes effective on December 2, 2010.

ADDRESSES: This final rule and final economic analysis are available on the Internet 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 the U.S. Fish and Wildlife Service, Jackson Ecological Services Field Office, 6578 Dogwood View Parkway, Suite A, Jackson, MS 39213 (telephone 601-321-1122; facsimile 601-965-4340).

FOR FURTHER INFORMATION CONTACT: Stephen Ricks, Field Supervisor, U.S. Fish and Wildlife Service, Jackson Ecological Services Field Office (see **ADDRESSES** section). 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 as endangered the Georgia pigtoe mussel (*Pleurobema hanleyianum*), interrupted rocksnail (*Leptoxis foremani*), and rough hornsnail (*Pleurocera foremani*); and (2) a final

rule to designate critical habitat for each of these three species.

Previous Federal Action

Federal actions for these species prior to June 29, 2009 are outlined in our proposed rule for these actions (74 FR 31113). Publication of the proposed rule opened a 60-day comment period, which closed on August 28, 2009. We reopened the comment period from February 10, 2010, through March 12, 2010, in order to announce the availability of and receive comments on a draft economic analysis (DEA), and to extend the comment period on the proposed listing and designation to accommodate a public hearing (75 FR 6613).

Public Comments

We received comments from the public on the proposed listing action and proposed critical habitat designation, and, in this rule, we respond to these issues in a single comments section. Below, we present the listing analysis first, followed by the analysis for designation of critical habitat.

Background

It is our intent to discuss only those topics directly relevant to the listing and designation of critical habitat for the Georgia pigtoe mussel (*Pleurobema hanleyianum*), interrupted rocksnail (*Leptoxis foremani*), and rough hornsnail (*Pleurocera foremani*). For information on our proposed determination, refer to the proposed rule published in the **Federal Register** on June 29, 2009 (74 FR 31113).

Georgia Pigtoe Mussel

The Georgia pigtoe (*Pleurobema hanleyianum*) is a freshwater mussel in the family Unionidae. It was described in 1852 by Lea as *Unio hanleyianum* from the Coosawattee River in Georgia. The species was placed in the genus *Pleurobema* by Simpson in 1900. The uniqueness of the Georgia pigtoe has been verified both morphologically (Williams *et al.* 2008, p. 533) and genetically (Campbell *et al.* 2008, pp. 719-721).

The shell of the Georgia pigtoe reaches about 50 to 65 millimeters (mm) (2 to 2.5 inches (in)) in length. It is oval to elliptical and somewhat inflated. The posterior ridge is low and evenly rounded, when evident. The anterior end is rounded, while the posterior margin is bluntly pointed below. Dorsal and ventral margins are curved, and the beaks rise slightly above the hinge line. The periostracum (membrane on the surface of the shell) is yellowish-tan to

reddish-brown and may have concentric green rings. The beak cavity is shallow, and the shell interior is white to dull bluish-white (Parmalee and Bogan 1998, p. 185; Williams *et al.* 2008, p. 533).

Little is known about the habitat requirements or life history of the Georgia pigtoe; however, it is found in shallow runs and riffles with strong to moderate current and coarse sand-gravel-cobble bottoms. Unionid mussels, such as the Georgia pigtoe, filter-feed on algae, detritus, and bacteria from the water column. The larvae of most unionid mussels are parasitic, requiring a period of encystment on a fish host before they can develop into juvenile mussels. The fish hosts for glochidia (parasitic larvae) of Georgia pigtoe are currently unknown.

The Georgia pigtoe was historically found in large creeks and rivers of the Coosa River drainage of Alabama, Georgia, and Tennessee (Johnson and Evans 2000, p. 106; Williams *et al.*, 2008, p. 534). There are historical reports or museum records of the Georgia pigtoe from Tennessee (Conasauga River in Polk and Bradley Counties), Georgia (Conasauga River in Murray and Whitfield Counties, Chatooga River in Chatooga County, Coosa River in Floyd County, and Etowah River in Floyd County), and Alabama (Coosa River in Cherokee County, Terrapin Creek in Cherokee County, Little Canoe and Shoal Creeks in St. Clair County, Morgan Creek in Shelby County, and Hatchet Creek in Coosa County) (Florida Museum of Natural History Malacology Database (FLMNH) in litt. 2006; Gangloff 2003, p. 45). Based on these historical records, the range of the Georgia pigtoe included more than 480 km (300 mi) of river and stream channels. Additional historical Coosa River tributary records credited to Hurd (1974, p. 64) (for example, Big Wills, Little Wills, Big Canoe, Oothcalooga, Holly Creeks) have been found to be misidentifications of other species (Gangloff in litt. 2006).

In 1990, the Service initiated a status survey and reviewed the molluscan fauna of the Mobile River Basin (Hartfield 1991, p. 1). This led to extensive mollusk surveys and collections throughout the Coosa River drainage (Bogan and Pierson 1993a, pp. 1-27; Hartfield in litt. 1990-2001). At all localities surveyed in the Coosa River drainage, the freshwater mussel fauna had declined from historical levels, and at all but a few localized areas, the fauna proved to be completely eliminated or severely reduced due to a variety of impacts, including point and nonpoint source pollution, and channel modifications such as impoundment.

Following a review of these efforts and observations, the Service reported 14 species of mussels in the genus *Pleurobema*, including the Georgia pigtoe, as presumed extinct, based on their absence from collection records, technical reports, or museum collections for a period of 20 years or more (Hartfield 1994, p. 1).

The Service and others continued to conduct surveys in the Coosa River drainage for mollusks (Hartfield in litt. 2004; Williams and Hughes 1998, pp. 2–6; Johnson and Evans 2000, p. 106; Herod *et al.* 2001, pp. i–ii; Gangloff 2003, pp. 11–12; McGregor and Garner 2004, pp. 1–18; Johnson *et al.* 2005, p. 1). Several freshly dead and live individuals of the Georgia pigtoe were collected during these mussel surveys in the Upper Conasauga River, Murray and Whitfield Counties, Georgia (Williams and Hughes 1998, p. 10; Johnson and Evans 2000, p. 106). Gangloff (2003, pp. 11–12, 45) conducted mussel surveys of Coosa River tributaries in Alabama, including all known historical collection sites for the Georgia pigtoe, without relocating the species. McGregor and Garner (2004, p. 8) surveyed the Coosa River dam tailraces for mollusks without encountering the Georgia pigtoe.

The Georgia pigtoe is currently known from a few isolated shoals in the Upper Conasauga River in Murray and Whitfield Counties, Georgia, and in Polk County, Tennessee (Johnson and Evans 2000, p. 106; Evans 2001, pp. 33–34). All recent collection sites occur within a 43-km (27-mi) reach of the river. Within this reach, the Georgia pigtoe is very rare (Johnson and Evans 2000, p. 106), and no population estimates are available.

Interrupted Rocksnail

The interrupted rocksnail (*Leptoxis foremani*) is a small-to-medium-sized freshwater snail that historically occurred in the Coosa River drainage of Alabama and Georgia. The shell grows to approximately 22 mm (1 in) in length and may be ornamented by partial costae (folds in the surface). The shell is subglobose (not quite spherical); thick, dark brown to olive in color; occasionally spotted; and generally covered with fine striae (longitudinal ridges). The spire (apex) of the shell is very low, and the aperture (opening) is large and subrotund (not quite round).

The interrupted rocksnail, a member of the aquatic snail family Pleuroceridae, was described from the Coosa River, Alabama, by Lea in 1843. Goodrich (1922, p. 13) placed the species in the “*Anculosa* (= *Leptoxis*) *picta* (Conrad 1834) group,” which also

included the Georgia rocksnail (*Leptoxis downei* (Lea 1868)). *L. foremani* was considered to inhabit the Lower Coosa River, with *L. downei* inhabiting the Upper Coosa drainage (Goodrich 1922, pp. 18–19, 21–23). When a rocksnail population was rediscovered surviving in the Oostanaula River, Georgia, in 1997, it was initially identified as *L. downei* (Williams and Hughes 1998, p. 9; Johnson and Evans 2000, pp. 45–46); however, Burch (1989, p. 155) had previously placed *L. downei* within *L. foremani* as an ecological variant. Therefore, *L. downei* is currently considered an upstream phenotype of the interrupted rocksnail, and *L. foremani* is recognized as the valid name for the interrupted rocksnail (Turgeon *et al.* 1998, p. 67; Johnson 2004, p. 116).

Rocksnails live in shoals, riffles, and reefs (bedrock outcrops) of small to large rivers. Their habitats are generally subject to moderate currents during low flows and strong currents during high flows. These snails live attached to bedrocks, boulders, cobbles, and gravel and tend to move little, except in response to changes in water level. They lay their adhesive eggs within the same habitat (Johnson 2004, p. 116). In a hatchery setting, mean clutch size for 2-year-old interrupted rocksnails is around 8.83 (3 to 18 eggs per clutch), and clutch size of females greater than 3 years is 13.63 (2 to 21 eggs per clutch) (Johnson in litt. 2009). Interrupted rocksnails are currently found in shoal habitats with sand-boulder substrate, at water depths less than 50 centimeters (cm) (20 in), and in water currents less than 40 cm/second (sec) (16 in/sec) (Johnson 2004, p. 116). We know little of the life history of pleurocerid snails; however, they generally feed by ingesting periphyton (algae attached to hard surfaces) and biofilm detritus scraped off of the substrate by the snail's radula (a horny band with minute teeth used to pull food into the mouth) (Morales and Ward 2000, p. 1). Interrupted rocksnails have been observed grazing on silt-free gravel, cobble, and boulders (Johnson 2004, p. 116). They have survived as long as 5 years in captivity (Johnson in litt. 2006b).

The interrupted rocksnail was historically found in colonies on reefs and shoals of the Coosa River and several of its tributaries in Alabama and Georgia. The range of the rocksnail formerly encompassed more than 800 km (500 mi) of river and stream channels, including the Coosa River (Coosa, Calhoun, Cherokee, Elmore, Etowah, Shelby, St. Clair, and Talladega Counties), Lower Big Canoe Creek (St.

Clair County), and Terrapin Creek (Cherokee County) in Alabama; and the Coosa and Lower Etowah Rivers (Floyd County), the Oostanaula River (Floyd and Gordon Counties), the Coosawattee River (Gordon County), and the Conasauga River (Gordon, Whitfield, and Murray Counties) in Georgia (Goodrich 1922, pp. 19, 21; Johnson 2004, p. 116; FLMNH in litt. 2006).

Snail surveys conducted within the historical range of the interrupted rocksnail (Bogan and Pierson 1993a, pp. 1–27; Williams and Hughes 1998, pp. 1–21) resulted in the collection of only a single live specimen from the Oostanaula River, Floyd County, Georgia, during 1997 (Williams and Hughes 1998, p. 9). Intensive surveys of the Oostanaula, Coosa, Coosawattee, Etowah, and Conasauga Rivers since 1999 have located the species in about 12 km (7.5 mi) of the Oostanaula River upstream of the Gordon and Floyd County line (Johnson and Evans 2000, pp. 45–46; Johnson and Evans 2001, pp. 2, 25). A captive colony was maintained at the Tennessee Aquarium Research Institute (TNARI) from 2000 through 2005 for study and propagation. In coordination with TNARI and the Service, the Alabama Department of Conservation and Natural Resources (ADCNR) developed a plan and strategy to reintroduce interrupted rocksnails from the TNARI colony into the Coosa River above Wetumpka, Elmore County, Alabama (ADCNR 2003, pp. 1–4). In 2003, 2004, and 2005, approximately 3,200, 1,200, and 3,000 juvenile snails, respectively, from the TNARI culture were released into the Lower Coosa River (ADCNR 2004, p. 33; Johnson in litt. 2005a). In 2005, ADCNR established the Alabama Aquatic Biodiversity Center (AABC) at the Marion State Fish Hatchery for the culture of imperiled mollusk species, and the interrupted rocksnail TNARI colony was transferred to that facility.

Following its rediscovery, the interrupted rocksnail population size on shoals in the Oostanaula River declined from a high of 10 to 45 snails per square meter (m²) (1.2 square yards (yd²)) in 1999 (Johnson and Evans 2001, p. 22) to only 20 snails found during 6 search-hours in 2004 (Johnson in litt. 2003, 2004). The cause of decline was suspected to be some form of water contamination (Johnson in litt. 2003, 2004; Hartfield in litt. 2006). A July 2006 search for adults to use as hatchery stock failed to locate any rocksnails in more than 2 search-hours (Hartfield in litt. 2006). However, a subsequent search in August 2006 under lower flow conditions resulted in the location of 89 snails in 4 search-hours at one shoal,

and 2 rocksnails in 4 search-hours at another shoal (Johnson in litt. 2007a).

Since their reintroduction into the Lower Coosa River of Alabama, a few of the 2003 hatchery-cultured interrupted rocksnails were observed in the vicinity of the release site in 2004 (Johnson in litt. 2005c). An alternative site was selected for release in August 2005, and 18 snails were located 3 months following release (Pierson in litt. 2005). During a 40-minute search of this release area in 2006, two interrupted rocksnails were found (Johnson in litt. 2007b). Observations of only small numbers of reintroduced snails may be due to habitat size and dispersal, low fecundity of the species, predation, reproductive failure due to dispersal, or habitat disturbance (Johnson in litt. 2005b).

Rough Hornsnail

The rough hornsnail's (*Pleurocera foremani*) shell is elongated, pyramidal, and thick. Growing to about 33 mm (1.3 in.) in length, the shell has as many as nine yellowish-brown whorls. The aperture is elongated, angular, channeled at the base, and usually white inside. The presence of a double row of prominent nodules or tubercles on the lower whorls above the aperture is the most distinctive feature that separates it from other hornsnails (Tryon 1873, p. 53). These tubercles, along with the size and shape of the shell, distinguish the species from all other pleurocerid snails (*Elimia* spp., *Leptoxis* spp., *Pleurocera* spp.) in the Mobile River Basin. In a hatchery setting, however, the distinctive double row of tubercles do not appear until the second year of life (5 to 7 mm shell width) (Johnson in litt. 2009).

The rough hornsnail is a member of the aquatic snail family of Pleuroceridae. The species was described in 1843 by Lea as *Melania foremanii* (= *foremani*) (Tryon 1873, p. 52). It was later placed in the genus *Pleurocera* by Tryon (1873, p. 52), who noted that *P. foremani* closely resembled species of that genus. Goodrich (1935, p. 3) reported a variation of a species of *Pleurocera* in the Cahaba River that resembled *foremani*, but later identified that variant as a "mutation" or form of brook hornsnail (*P. vestitum*) (Goodrich 1941, p. 12). This variant, however, is no longer extant in the Cahaba River (Bogan and Pierson 1993b, p. 12; Sides 2005, pp. 21–22, 28). Goodrich (1944, p. 43) considered that the Coosa River *P. foremani* might also be eventually found to be simply a variant of smooth hornsnail (*P. prasinatum*), another more

widely distributed species in the Coosa River.

In a recent dissertation on the systematics of the Mobile River Basin *Pleurocera*, the rough hornsnail was found to be both morphologically and genetically distinct from other species in the genus (Sides 2005, pp. 26, 127). This analysis also found that the rough hornsnail was genetically more closely allied to a co-occurring species in the genus *Elimia*, and concluded that it should be recognized as *Elimia foremani* (Sides 2005, pp. 26–27). Although the Sides (2005, pp. 26–27) study provides some evidence that this species should be placed in the genus *Elimia*, this taxonomic change has not been formally peer-reviewed and published. Therefore, for the purposes of this action, we will continue to use currently recognized nomenclature for the rough hornsnail (*Pleurocera foremani*).

Rough hornsnails are primarily found on gravel, cobble, bedrock, and mud in moderate currents. They have been collected at depths of 1 m (3.3 ft) to 3 m (9.8 ft) (Hartfield 2004, p. 132). The species appears to tolerate low-to-moderate levels of silt deposition (Sides 2005, p. 127). Little is known regarding the life-history characteristics of this species. Snails in the genus *Pleurocera* generally lay their eggs in a spiral arrangement on smooth surfaces (Sides 2005, pp. 26–27), whereas *Elimia* snails generally lay eggs in short strings (P. Johnson pers. comm. 2006). Although some attempts to induce rough hornsnails to lay eggs in captivity have been unsuccessful (Sides 2005, p. 27), others have observed females laying eggs individually or in short "strips" (3 to 10 eggs) during late April into July (Johnson in litt. 2009). Cultured rough hornsnails have become reproductively active in their second year (Johnson in litt. 2009). Some adult individuals collected from the wild have survived in captivity for 3 years, suggesting a life span of 4 to 5 years (Garner in litt. 2009, Johnson in litt. 2009).

The rough hornsnail is endemic to the Coosa River system in Alabama. Goodrich (1944, p. 43) described the historical range as the Coosa River downstream of the Etowah River and at the mouths of a few tributaries. The Etowah River enters the Coosa River in Floyd County, Georgia; however, there are no known museum or site-specific records of the rough hornsnail that validate its range into the State of Georgia (Johnson in litt. 2006a). Historical museum records of the rough hornsnail in the Coosa River (FLMNH in litt. 2006, and elsewhere) indicate that they occurred from Etowah, St. Clair,

Shelby, Talladega, and Elmore Counties, Alabama, a historical range of approximately 322 river km (200 river mi). There are also historical museum records of this species from nine Coosa River tributaries in Alabama, including Big Wills Creek in Etowah County; Kelly, Big Canoe, and Beaver Creeks in St. Clair County; Ohatchee Creek in Calhoun County; Choccolocco and Peckerwood Creeks in Talladega County; Yellowleaf Creek in Shelby County; and Yellow Leaf Creek in Chilton County (FLMNH in litt. 2006).

The rough hornsnail is currently known to occur at two locations: Lower Yellowleaf Creek in Shelby County, Alabama; and the Lower Coosa River below Wetumpka Shoals in Elmore County, Alabama (Sides 2005, p. 40). There are also museum records of the species from Wetumpka Shoals in the early 1990s (FLMNH in litt. 2006); however, the species has not been collected from this shoal reach in recent surveys (Johnson 2002, pp. 5–9). Yellowleaf Creek is a moderately sized stream where rough hornsnails were, until recently, only known from about a 50-m (55-yd) length of the stream. At this location, rough hornsnails occur at densities of 8 to 32 per m² (1.2 per yd²) (Pierson in litt. 2006). Following publication of the proposed rule (74 FR 31113, June 29, 2009), an intensive survey of Yellowleaf Creek extended the range of rough hornsnails in this stream to about 1.6 km (1 mi) above and below the previously known site (Powell in litt. 2009). The Lower Coosa River is a large river channel where rough hornsnails have recently been found in two discrete areas (Hartfield pers. obsv. 2001, Crow in litt. 2008). No quantitative estimates have been made at these sites; however, at one site, rough hornsnail numbers were estimated at 300 to 400 individuals (Crow in litt. 2008). Searches of unimpounded reaches of the Coosa River and the lower portions of tributaries to the Coosa River have failed to locate the species elsewhere (Bogan and Pierson 1993a, pp. 1–27; Garner, pers. comm. 2005; Hartfield in litt. 2006). The two known surviving populations are separated by three impoundments and about 113 km (70 mi) of unsuitable, impounded channel habitat.

Summary of Comments and Recommendations

During the open comment periods for the proposed rule (74 FR 31113), draft economic analysis, and public hearing (75 FR 6613), we requested all interested parties submit comments or information concerning the proposed

listing and designation of critical habitat for the three mollusks. We contacted all appropriate State and Federal agencies, county governments, elected officials, scientific organizations, and other interested parties and invited them to comment. We also published newspaper notices inviting public comment in the following newspapers: Cherokee County Herald, Centre, AL; Daily Home, Talladega, AL; The Wetumpka Herald, Wetumpka, AL; Chatsworth Times, Chatsworth, GA; Rome News Tribune, Rome, GA; The Daily Citizen, Dalton, GA; The Calhoun Times, Calhoun, GA; Cleveland Daily Banner, Cleveland, TN; and Polk County News, Benton, TN.

We directly notified and requested comments from all affected States. The State of Alabama provided additional records of one species. None of the States expressed a position on the actions. During the comment periods, we received a total of 16 comments from one State agency, two Federal agencies, eight groups, and three individuals. At the public hearing, we received three oral comments. A transcript of the hearing is available for inspection at the Jackson, Mississippi Ecological Services Field Office (see **ADDRESSES** section).

Peer Review

In accordance with our peer review policy published in the **Federal Register** on July 1, 1994 (59 FR 34270), we requested the expert opinions of four knowledgeable individuals with expertise on freshwater mollusks, the Mobile River Basin, and conservation biology principles. The purpose of such review is to ensure that the designation is based on scientifically sound data, assumptions, and analyses, including input of appropriate experts and specialists.

We received written responses from three of the peer reviewers. All peer reviewers stated that the proposal included a thorough and accurate review of the available scientific and commercial data on these mollusks and their habitats. One peer reviewer provided additional details and minor corrections on the shell descriptions of the interrupted rocksnail and rough hornsnail. Two reviewers provided information on clutch size and life span of rough hornsnail. One reviewer noted the collection of rough hornsnail on mud bottoms, and recommended including this in the discussion of the physical and biological features that are essential to the conservation of that species (primary constituent elements (PCEs)). This information provided by the reviewers has been incorporated into the appropriate sections of this final rule. One peer reviewer suggested

additional stream reaches that could be designated as critical habitat for each of the three species. These suggestions are discussed below.

We reviewed all comments received for substantive issues and new data regarding the three mollusks, their critical habitats, and the draft economic analysis. Written comments and oral statements presented at the public hearing and received during the comment periods are addressed in the following summary. For readers' convenience, we have combined similar comments into single comments and responses.

Peer Reviewer Comments

(1) *Comment:* The Georgia pigtoe survives in only 3 to 5 miles (4.8 to 8 kilometers) of the Conasauga River, and has been extirpated from more than 99.9 percent of its historic range.

Our response: Over the past 20 years, the Georgia pigtoe has been collected from two localized collection sites on the Conasauga River, one at each extreme of a 43-km (27-mi) reach of the river. We have considered this entire reach as occupied because of the similarity of habitat within this reach, and the potential of the species to occur within any portion of the reach.

(2) *Comment:* Big Canoe, Choccolocco, and Weogufka Creeks should be designated as critical habitat for Georgia pigtoe.

Our response: While Big Canoe, Choccolocco, and Weogufka Creeks are within the geographical range of the Georgia pigtoe and appear to be suitable for the species, we are unaware of any verified historical records of the species from these three tributaries. Although we have not included these areas as critical habitat in this final rule, they are within the geographical range of the species and may prove to be important in the future to the conservation of the species.

(3) *Comment:* Choccolocco, Hatchet, and Terrapin Creeks should be designated as critical habitat for the interrupted rocksnail.

Our response: Choccolocco, Hatchet, and Terrapin Creeks are within the geographical area historically occupied by the interrupted rocksnail. Most museum specimens and historical records of interrupted rocksnail were from the mainstem Coosa River and larger tributaries (Oostanaula, Coosawhattee, Conasauga, and Etowah Rivers), and we were able to document records of interrupted rocksnail from the lower reach of Terrapin Creek. It is also likely that some populations extended into the lower reaches of some other tributaries. However, this species

requires moderate to high stream flow, and the lower reaches of Choccolocco and Hatchet Creeks have little flow, due to embayment by Coosa River reservoirs. As a result, we did not include these areas as critical habitat in this final rule. Lower Terrapin Creek continues to experience natural flow, and will be available to colonization if the species is successfully reintroduced into Unit IR 1.

(4) *Comment:* Recent sampling has extended the range of the rough hornsnail in Yellowleaf Creek.

Our response: Following publication of the proposed rule and closure of the first comment period, a snail survey of lower Yellowleaf Creek was conducted by biologists from the Service, ADCNR, and Alabama Power Company. The rough hornsnail was found at several sites within the upper and lower limits of the proposed critical habitat. The information that the rough hornsnail currently inhabits all of the area within Unit RH 2, Yellowleaf Creek, has been incorporated into the Background and Critical Habitat sections of this final rule.

(5) *Comment:* Choccolocco Creek, Kelly Creek, and the Coosa River below Logan Martin Dam in the vicinity of the confluence of Kelly Creek should be included as critical habitat for the rough hornsnail.

Our response: We identified two areas with greatest conservation potential for the rough hornsnail, Lower Coosa River (Unit IR 1) and Yellowleaf Creek (Unit IR 2), as both of these units contain unoccupied habitat adjacent to occupied areas, with the potential of natural dispersal and recolonization. Lower Choccolocco Creek was considered to have minimal conservation potential for the species at this time because it is embayed by Logan Martin Lake, and is on the Alabama 303(d) list of impaired waters. Kelly Creek, and the short associated reach of the Coosa River, is remote from currently occupied areas. Although this area was not included in the critical habitat designation for rough hornsnail, it may become important for the conservation of the species at some point in the future.

Comments from States

(6) *Comment:* There are records of Georgia pigtoe from Kelly, Big Canoe, and Choccolocco Creeks that were not acknowledged in the historical distribution.

Our response: It is probable that any large Coosa River tributary may have supported historical populations of the Georgia pigtoe at some time in the past. We have relied on published records and museum specimens to confirm the species' historical presence for purposes

of this critical habitat designation. Some historical Coosa River tributary records, however, have been found to be misidentifications of other closely related species, and we were unable to document any historical records of Georgia pigtoe from Kelly, Big Canoe, and Choccolocco Creeks.

Public Comments

(7) *Comment:* The conclusions supporting the proposed designation of the critical habitat units are not supported by data or sound science. The Act requires the Service to refrain from designating critical habitat when the biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat (citing *Cape Hatteras Access Preserv. Alliance v. U.S. Dept. Int.*, 344 F. Supp. 2nd 108, 123 (D.D.C. 2004)).

Our response: We determined that, based on the best available scientific and commercial data, sufficient information is available to identify physical and biological features essential to the conservation of the species and specific areas that meet the definition of critical habitat (see Primary Constituent Elements (PCEs) section).

In the case cited by the commenter, the Service had not identified any features essential to the conservation of the species (primary constituent elements (PCEs)) within some portions of a broad critical habitat designation for piping plover, but argued that designation was proper because PCEs would likely be found in the future. The court found that this was “beyond the pale of the [Act].” In contrast, in both the proposed and this final rule, we identified PCEs within the designated habitat (see Criteria Used To Identify Critical Habitat, and Critical Habitat Designation sections). Therefore, we have complied with the requirements of the Act.

(8) *Comment:* The Service exceeded the statutory basis for proposing to designate Units GP2 and IR1 as unoccupied critical habitat by including the potential for minimum flows as baseline criteria for the establishment of the units. The Act does not provide for special management or operational considerations for proposed units that are presently unoccupied by target species (citing *Cape Hatteras Access Preserv. Alliance v. U.S. Dept. Int.*, 344 F. Supp. 2nd 108, 123 (D.D.C. 2004)).

Our response: In the case cited by the commenter, the Service included areas that clearly did not contain PCEs within a broad critical habitat designation for piping plover. The Court determined that the Service must show that PCEs, which may in the future require special

consideration or management, are found on the areas it designated as critical habitat.

In this designation, when considering areas as critical habitat, we assessed whether the areas contained features that are essential to the conservation of the species (PCEs) and whether those features may require special management considerations or protections. The presence of one or more PCE was documented (see Critical Habitat Designation section) in all of the stream reaches designated as unoccupied critical habitat for the Georgia pigtoe, interrupted rocksnail, and rough hornshell. We use the language “* * * one or more * * *” in recognition that all areas essential to the conservation of a species may not contain all PCEs, based on the biology of the species. For example, a species may require one area for feeding and growing, another for reproduction or roosting, and still other areas for passage between feeding and growing areas. So while all areas may not contain the same constituent elements, they may be important at some life stage or during some time of the year and collectively they are essential to the conservation of the species.

Unit GP 2 for the Georgia pigtoe includes the lower reach of Terrapin Creek, downstream to its confluence with the Coosa River, and the Coosa River from Weiss Dam downstream to a point below the confluence of Terrapin Creek in Cherokee County, Alabama (see Critical Habitat Designation, Unit GP 2, below). All five PCEs identified for Georgia pigtoe are present in Terrapin Creek and in the Coosa River portion of Unit GP 2 below the confluence of Terrapin Creek. Unit IR 1 for the interrupted rocksnail includes the Coosa River channel between Weiss Dam to a point below the confluence of Terrapin Creek (see Critical Habitat Designation, Unit IR 1, below). All four PCEs identified for the interrupted rocksnail are present in the Coosa River portion of the Unit below Terrapin Creek. Two of the five PCEs for Georgia pigtoe, and two of the four PCEs for interrupted rocksnail, are currently present in the Coosa River portion of the units between Weiss Dam and the confluence of Terrapin Creek. Minimum flows are projected to be released from Weiss Dam as part of a Federal Energy Regulatory Commission relicensing agreement in the near future that will restore the remaining PCEs for both of these species in this portion of the reach, but that was not the sole basis for this designation.

(9) *Comment:* It is unreasonable to designate unoccupied areas adjacent to current populations as critical habitat in

light of the Service’s lack of knowledge of specific habitat requirements.

Our response: All recent records of the Georgia pigtoe, interrupted rocksnail, and rough hornshell are extremely localized. Because rare aquatic snails and mussels can be difficult to locate, 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 the adequacy of occupied habitat for conservation of the species, and determined that designating only occupied habitat would not be sufficient to conserve each of these species (see Criteria Used To Identify Critical Habitat section). For identification of unoccupied areas essential to the conservation of the species, we established six criteria for their consideration (see *Stream Reaches Not Currently Occupied* section), including the presence of PCEs. One of these criteria prioritized stream reaches adjacent to currently occupied areas. These reaches are similar in stream size, geology, and water quality to adjacent occupied areas, and we believe that it is reasonable and cost effective to protect areas available for natural dispersal and reoccupation.

(10) *Comment:* Critical habitat designation of currently uninhabited areas remote from occupied areas (Units GP 2, GP 3, IR 1, IR 3) is not supported by the record, and would be arbitrary and capricious because there is no analysis, data, or discussion whether released, captive-bred stock can become self-sustaining.

Our response: Many endangered aquatic mollusks are so rare that relocations are not an option (National Native Mussel Conservation Committee 1997, p. 8). However, freshwater mussels, including endangered and threatened species, have been relocated with some success from areas of disturbance into new habitats (Cope and Waller 1995, p. 147; U.S. Fish and Wildlife Service 2004, p. 4). Attempts to relocate imperiled mollusks from areas of natural abundance into historical habitats have also been successful (e.g., Ahlstedt 1991, p. 141). Aquatic mollusk hatchery husbandry is a relatively new science. However, much progress has been made over the past 2 decades and hatchery propagation of aquatic mollusks is now a viable conservation tool (e.g., Freshwater Mollusk Conservation Society 2006, p. 1–13). Reintroduction with hatchery propagules is recognized as a primary recovery task for rare aquatic species in the Mobile River Basin Aquatic

Ecosystem Recovery Plan (U.S. Fish and Wildlife Service 2000, p. 30). As noted in the Background, above, the interrupted rocksnail has been successfully propagated and produced in sufficient numbers for limited releases. Another closely related snail, the plicate rocksnail, has been propagated, and attempts to reintroduce the species into historical habitat in Alabama have shown success in terms of survival and natural recruitment in the reintroduced population (Johnson in litt. 2008). The available information indicates that the Georgia pigtoe and interrupted rocksnail cannot be conserved without extending the species' range into historically occupied areas (see Criteria Used To Identify Critical Habitat section). Reintroduction using hatchery reared offspring is currently the only option to achieve this conservation benchmark.

(11) *Comment:* The Act and its application in designating critical habitat is unconstitutional in light of the clear limitations on the use of Federal power in the property clause of the Constitution's Fifth Amendment ("* * * private property [shall not] be taken for public use, without just compensation").

Our response: The designation of critical habitat, in and of itself, has no legal effect on property rights or constitute a physical or regulatory "taking" of real estate property. Critical habitat does not preclude property use; rather, it only affects Federal authorization or funding of projects that may adversely modify critical habitat. In the event such a finding is made in a section 7 consultation with the Federal funding or authorizing agency, the Service is required to identify reasonable and prudent project alternatives. Exemption procedures under the Act provide sufficient opportunity to accomplish the Service's statutory mandates without precluding compatible use of private property. Therefore, critical habitat designation, by itself, does not affect a taking of private property.

(12) *Comment:* FWS should conduct an analysis under the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq.*) prior to listing and designating critical habitat.

Our response: Environmental assessments and environmental impact statements, as defined under NEPA, are not required for regulations enacted under section 4 of the Act (see 48 FR 49244, October 25, 1983). The FWS has determined that, outside of the jurisdiction of the United States Court of Appeals for the Tenth Circuit, a NEPA

analysis is not required for critical habitat designation.

(13) *Comment:* Interrupted rocksnails in Alabama (Unit IR 3) that are covered by the proposal are not wild, naturally occurring species. The reintroduced colony is not reproducing and is not viable.

Our response: Any interrupted rocksnails currently surviving in Unit IR 3 are surviving individuals from releases made by ADCNR in 2003 through 2005, or their offspring. While there is currently no evidence that natural recruitment of rocksnails has occurred on the shoal since the release, we are unable to confirm their extirpation from the site. Including this single shoal in the designation alerts Federal action agencies to the species' potential presence.

(14) *Comment:* The determination that reintroduction of interrupted rocksnail into Units IR 1 and IR 3 is essential to its conservation is not supported by the record and is arbitrary and capricious.

Our response: Under the Summary of Factors Affecting the Species section, below, we note that the surviving populations of each species are small, extremely localized, isolated, and vulnerable to habitat modification, toxic spills, progressive degradation from land surface runoff, and catastrophic changes to their habitats from flood scour and drought. Under the Criteria Used To Identify Critical Habitat section, we discuss areas currently occupied by the species, the species' limited extent, their vulnerability to random events, and the inability of these species to naturally recolonize historically occupied areas that might now support them. This information was used to determine that the designation of unoccupied critical habitat is essential to the conservation of the species. Also under the Criteria Used To Identify Critical Habitat section, we discuss our process for assessing the potential of historically occupied stream reaches as unoccupied critical habitat, the criteria we used to determine if they were essential to the conservation of the species, and the PCEs currently present in each stream reach considered for designation as critical habitat. Our reasons for designating Units IR 1 and IR 3 as critical habitat for the interrupted rocksnail are discussed in some detail in the Critical Habitat sections, below. These include the presence of PCEs in both units, the presence of species in both units that are closely related to the interrupted rocksnail and require similar PCEs, improvements in water quality and quantity over the past 2 decades, and the potential of these two

stream reaches for reoccupation by the interrupted rocksnail through reintroduction efforts. Based on this analysis, and our review of the best available scientific information, all unoccupied stream reaches included in the critical habitat designations for each of these three species, including Units IR 1 and IR 3, are essential to their conservation. Units IR 1 and IR 3, however, are remote and separated by one (Unit IR 1) or more (Unit IR 3) impoundments from the only surviving population of the interrupted rocksnail in the Oostanaula River. Therefore, conservation of the interrupted rocksnail will require reintroduction of the species into Unit IR 1, and appropriate areas in Unit IR 3.

(15) *Comment:* Smaller and more protected tributaries should be considered for reintroductions of the interrupted rocksnail.

Our response: While smaller and more protected tributaries are within the historical geographical range of the interrupted rocksnail, and may become important to its conservation, we relied on documented historically occupied areas for the purposes of preparing this critical habitat designation for the reasons discussed above (see our response to Comment 6, above).

(16) *Comment:* There are no rough hornsnails in the habitat proposed to be designated as critical habitat.

Our response: Rough hornsnails were documented from Unit RH 1, Coosa River above the Fall Line during the 1990s (FLMNH in litt. 2006), and have most recently been documented from two locations below the Fall Line (Hartfield in litt. 2001, Crow in litt. 2008). In Unit RH 2, Yellowleaf Creek, rough hornsnails occur throughout the designated reach (see Background section).

(17) *Comment:* The Service appears to be proposing to designate critical habitat on the chance a particular species might move into it at some point in the future. What happens to unoccupied critical habitat if a species does not naturally repopulate the area?

Our response: With appropriate management, we hope to conserve the Georgia pigtoe, interrupted rocksnail, and rough hornsnail within currently occupied areas and promote natural dispersal into unoccupied areas adjacent to occupied reaches. We recognize that there is little chance of natural dispersal of the Georgia pigtoe and interrupted rocksnail into the designated unoccupied areas that are remote from surviving populations due to the presence of multiple dams and large areas of impounded (and thus unsuitable) channels. However, newly

developed information and technology are promising for successful reintroductions of hatchery-reared individuals into these areas.

(18) *Comment:* What happens to critical habitat if a species becomes definitively extinct?

Our response: The Act requires us to conduct 5-year reviews on the status of listed species. If a species is determined to be extinct, it can be removed from the List of Endangered and Threatened Wildlife through the formal rulemaking process. If a species is removed from the List due to extinction, areas that have been designated as critical habitat for that species will no longer be subject to the section 7 consultation requirements of the Act.

(19) *Comment:* The Service did not consider whether the reintroduced population of interrupted rocksnail present in Unit IR 3 should be designated as experimental under section 10(j) of the Act. Listing and designating critical habitat for reintroduced species is bad public policy, and is an attempt to circumvent the purposes of section 10(j) of the Act.

Our response: Under section 10(j), the Secretary of the Department of the Interior can designate reintroduced populations established outside the species' current range, but within its historical range, as "experimental." Based on the best available information, we must determine whether an experimental population is "essential" or "nonessential" to the continued existence of the species. Experimental populations that are essential to the continued existence of the species are treated as a threatened species, and the Secretary may promulgate regulations under section 4(d) of the Act. Experimental populations that are not essential to the continued existence of the species are treated as species proposed for listing. Section 10(j)(C)(ii) prohibits designation of critical habitat only for experimental populations that are not essential to the continued existence of the species.

Within this rule, we reviewed the status of the interrupted rocksnail, its historical and current range, the threats affecting the conservation of the species, and the areas available for its conservation. We used this information to identify Unit IR 3 as an area essential for the conservation of the interrupted rocksnail, and we are designating it as critical habitat (*see Unit IR3: Lower Coosa River, Elmore County, Alabama, below*).

(20) *Comment:* The reintroduction of the interrupted rocksnail into Alabama prior to the proposed listing did not allow for consideration of the Act's

reintroduction provisions, or alert the public to the Service's consideration of experimental status.

Our response: As noted in our response to Comment 13, above, the reintroduction of the interrupted rocksnail into the lower Coosa River, Alabama, was a State action conducted under State regulations. The public was notified by the State through a press release and publication of the reintroduction in public media.

(21) *Comment:* The Service recognizes (in the 2003 draft, Freshwater Mussels and Snails of the Mobile River Basin: Plan for the Controlled Propagation, Augmentation, and Reintroduction) that reintroductions of hatchery mollusk propagules is experimental in nature. Therefore, they should be designated as experimental populations under section 10(j) of the Act.

Our response: The 2003 draft plan for controlled propagation was addressed to scientists, institutions, and agencies contemplating propagation of mollusks as a management strategy. In 2003, mollusk propagation was an emerging science and technology. This was the first propagation plan developed for mollusk species, and sought to alert the intended audience (*i.e.*, scientists and State and Federal agencies contemplating propagation of mollusks) of the need for rigorous documentation and monitoring. The use of the term "experimental" in this document has no direct connection to the term's use under section 10(j) of the Act, where it is a term used to identify reintroduced populations of listed species outside of their geographical range that may receive specific exemptions from section 9 of the Act.

(22) *Comment:* The lack of experimental population designation for interrupted rocksnails (in IR 3) may cause serious negative impacts to landowners, businesses, and users of the Coosa River, through limiting landowners' ability to manage properties and creating uncertainty for landowners and waterway users.

Our response: Unit IR 3 is occupied by the federally protected tulotoma snail and fine-lined pocketbook, which are currently subject to the section 7 consultation provisions, as well as the section 9 prohibitions, of the Act. Apart from limited hydropower flow modifications to reduce take of tulotoma snail by the Alabama Power Company, we are unaware of any negative impacts to landowners, businesses, or users of this reach of the Coosa River due to the presence of mollusk species currently protected under the Act. It is not anticipated that this listing and the reintroduction of interrupted rocksnails

will impair legal activities in the unit by landowners and waterway users.

(23) *Comment:* The proposed critical habitat designation of unoccupied habitat for the interrupted rocksnail should be withdrawn.

Our response: We are required by section 4(a) of the Act to designate critical habitat at the time a species is listed, and to designate unoccupied areas as critical habitat when we determine that the best available scientific data demonstrate that the designation of that area is essential to the conservation needs of the species (*see* Critical Habitat section). We determined that Unit IR 1 and unoccupied portions of Units IR 2 and IR 3 are essential to the conservation of the interrupted rocksnail (*see* Criteria Used to Identify Critical Habitat section).

(24) *Comment:* The data in the proposed rule relative to released captive interrupted rocksnails are not consistent with ADCNR records. The proposed rule states that approximately 7,400 interrupted rocksnails were released into the Coosa River by the State of Alabama 2003–2005, while information from ADCNR indicates that 10,476 rocksnails were released during this same period.

Our response: The numbers reported in the proposed rule were a typographical error. Records provided to us by TNARI and the State of Alabama document the release of 7,513 interrupted rocksnails into the Coosa River 2003–2005. We intended to state that approximately 7,500 snails were released. TNARI records indicate around 10,476 snails were produced at its hatchery during 2003–2005. These production numbers may have been erroneously reported as released snails in a presentation by Dr. Paul Johnson (Johnson in litt. 2010).

(25) *Comment:* The Service should develop a programmatic safe harbor agreement (SHA) to cover future releases of listed aquatic mollusks in Alabama.

Our response: SHAs have been developed as tools to encourage private landowners and entities to implement conservation measures that maintain existing populations, encourage colonization by listed species, or expand existing populations. Programmatic SHAs have been developed to envelop multiple landowners under a single agreement, encouraging cooperative implementation and greatly reducing paperwork. SHAs and programmatic SHAs can be important conservation tools in recovering listed species, particularly in situations where the

cessation of voluntary conservation actions may result in take of listed species, and return their numbers to a pre-agreement baseline. We are willing to enter into SHAs, where appropriate, and where they would result in conservation benefits to the species.

(26) *Comment:* Due to the lack of specific information on the biology of these species, the U.S. Army Corps of Engineers (Corps) could face operational restrictions (at Carters Reservoir) that have no relation to the conservation of the species.

Our response: Under section 7 of the Act, the Corps will need to consult with us should their activities adversely affect the species or adversely modify their critical habitats. We have broadly defined activities that may destroy or adversely modify critical habitat below (see *Application of the "Adverse Modification" Standard*, below), and will work with the Corps to ensure that the best available information is used when they consult with us. Carters Reservoir is remote from any of the areas designated as critical habitat by this rule. The Coosawattee River below Carters Reservoir was designated as critical habitat for several mussel species in 2004 (see 69 FR 40084, July 1, 2004). Our final economic analysis (Industrial Economics, Inc. 2010, pp. 3–6—3–10) found that there would only be incremental administrative costs associated with this listing and critical habitat designation and operations at Carters Reservoir.

(27) *Comment:* What is the present need for designation of critical habitat and its related administrative costs at a time of severe economic difficulty?

Our response: We are required by the Act to designate critical habitat, when prudent and determinable, at the time of listing. However, our economic analysis identified relatively small incremental costs that will occur due to this critical habitat designation (Industrial Economics, Inc. 2010). Specifically, incremental costs are anticipated to result entirely from the added administrative requirements of forecast section 7 consultations, and are estimated to be approximately \$44,000 annually, assuming a 7 percent discount rate. These administrative costs are unlikely to have a significant effect on regional or national economic conditions.

(28) *Comment:* The Service should avoid interference with barge transportation in the Alabama-Coosa-Tallapoosa (ACT) River system.

Our response: The critical habitat designations in this rule are outside of or peripheral to areas used for barge transportation in the ACT River system.

The economic analysis does not anticipate economic effects to barge transportation in the ACT River system as a result of this designation.

(29) *Comment:* Speculation on future environmental flow releases at Carters Reservoir is pre-decisional, as the Corps' Water Control Manual update is not complete.

Our response: The economic analysis draws on publically available information, as well as insights from professionals involved in water management in the ACT basin, to arrive at reasonable estimates of the future economic impacts of species conservation efforts on hydropower and other water management activities. The final economic analysis includes additional caveats with regard to impacts associated with potential environmental flow releases related to Corps facilities (Industrial Economics, Inc. 2010, pp. 3–6—3–10).

(30) *Comment:* Critical habitat designation could impact power production, increase costs, and potentially have significant impacts to municipalities and cooperatives that benefit from hydropower.

Our response: The potential effects of this designation on power production were considered in the economic analysis. The economic analysis finds that water managers at four hydroelectric production facilities in the ACT Basin are likely to undertake conservation efforts for listed species that will benefit the three mollusks, at an estimated cost of \$8.8 million annually. Specifically, three facilities (Carters, Weiss, Jordan) are expected to modify operations to provide additional flows for the benefit of downstream aquatic species. However, these modifications related to conserving the Georgia pigtoe, interrupted rocksnail, and rough hornshell are expected to occur absent these critical habitat designations, because the areas affected have been previously designated as critical habitat for, and are occupied by, other listed mollusk species with similar PCEs and habitat needs. Incremental economic impacts resulting from these critical habitat designations are expected to arise from expected administrative requirements of forecast section 7 consultations between Federal regulatory agencies and the Service (see our response to Comment 27, above).

(31) *Comment:* The listing of the interrupted rocksnail and its critical habitat could have serious negative impacts on landowners, businesses, and users of the Coosa River system because it will require take avoidance and section 7 consultations for an activity

that may affect the population or its critical habitat.

Our response: The Act does not require analysis of the costs of designating species as endangered or threatened. The potential economic impacts associated with critical habitat designation for the interrupted rocksnail, as well as costs of protective measures for the species already expected to occur without proposed critical habitat designation, are presented in the economic analysis as baseline costs. Specifically, incremental costs are anticipated to result entirely from the added administrative requirements of forecast section 7 consultations, and are estimated to be approximately \$44,000 annually, assuming a 7 percent discount rate. Costs associated with future conservation efforts that may benefit the three mollusks in critical habitat areas are estimated to be \$8.97 million to \$9.16 million annually, assuming a 7 percent discount rate. Most (96 percent) of baseline costs quantified are conservation efforts related to potential lost hydropower production value at three facilities.

Summary of Factors Affecting the Species

Section 4 of the Act (16 U.S.C. 1533), and implementing regulations at 50 CFR part 424, set forth procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a) of the Act, we may list a species on the basis of any of five factors, as follows: (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.

The following analysis examines all five factors currently affecting or that are likely to affect Georgia pigtoe, interrupted rocksnail, and rough hornshell snail. The five factors listed under section 4(a)(1) of the Act and their application to the Georgia pigtoe mussel (*Pleurobema hanleyianum*), interrupted rocksnail (*Leptoxis foremani*), and rough hornshell (*Pleurocera foremani*) are as follows:

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

All three species have experienced significant curtailment of their occupied habitats (see Background section). The Georgia pigtoe has been eliminated from

more than 90 percent of its historical range of 480 river km (298 river mi). It now inhabits only 43 river km (27 river mi). Interrupted rocksnail has been eliminated from 99 percent of its historical range of 800 river km (497 river mi), and is now known from 12 river km (7 river mi). The rough hornsnail has disappeared from more than 99 percent of its historical range of 321 river km (199 river mi), and now occurs in less than 1 river km (0.6 river mi). The primary cause of range curtailment for all three species has been modification and destruction of river and stream habitats, primarily by the construction of large hydropower dams on the Coosa River. This habitat loss was compounded by fragmentation and isolation of the remaining free-flowing portions of the Coosa River and its tributaries, as well as the species' increased vulnerability to local historical events of water quality and habitat degradation.

Dams and Impoundments

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 species (Watters 1999, pp. 261–264; McAllister *et al.* 2000, p. iii; Marcinek *et al.* 2005, pp. 20–21). Within impounded waters, decline of freshwater mollusks has been attributed to sedimentation, decreased dissolved oxygen, and alteration in resident fish populations (Neves *et al.* 1997, pp. 63–64; Watters 1999, pp. 261–264; Marcinek *et al.* 2005, pp. 9–10). Below dams, mollusk declines are associated with changes and fluctuation in flow regime, scouring and erosion, reduced dissolved oxygen levels and water temperatures, and changes in resident fish assemblages (Williams *et al.* 1992b, p. 7; Neves *et al.* 1997, pp. 63–64; Watters 1999, pp. 261–264; Marcinek *et al.* 2005, pp. 20–21). The decline and extinction of freshwater snails and mussels in the Mobile River Basin has been directly attributed to construction of numerous large impoundments in the major river systems (Williams *et al.* 1992b, pp. 1–8; Bogan *et al.* 1995, pp. 250–251; Lydeard and Mayden 1995, pp. 803–804; Neves *et al.* 1997, pp. 62, 64; Marcinek *et al.* 2005, p. 9).

The Georgia pigtoe, interrupted rocksnail, and rough hornsnail are all endemic to the Coosa River system. The Coosa River was impounded by six major dams constructed between 1928 and 1966. Today, more than 60 percent

of the Coosa River and its 19 largest tributaries are inundated or affected by flow regulation (Marcinek *et al.* 2005, pp. 12–16).

Dam construction on the Coosa River had a secondary effect of fragmenting the ranges of aquatic mollusk species, such as the Georgia pigtoe, interrupted rocksnail, and rough hornsnail, leaving relict habitats and populations isolated by the structures as well as by extensive areas of uninhabitable, impounded waters. Isolated populations were left more vulnerable to, and affected by, natural events (such as droughts), runoff from common land-use practices (such as agriculture, mining, urbanization), discharges (such as municipal and industrial wastes), and accidents (such as chemical spills) that reduced population levels or eliminated habitat (Neves *et al.* 1997, pp. 64–71; U.S. Fish and Wildlife Service 2000, pp. 14–15). As a result, many relict populations became locally extirpated, and many mollusk species were driven to extinction (Bogan *et al.* 1995, pp. 250–251; Lydeard and Mayden 1995, pp. 803–804; Neves *et al.* 1997, pp. 54, 62; U.S. Fish and Wildlife Service 2000, pp. 6–9). If conditions subsequently improved, the surviving mollusk species were unable to naturally recolonize suitable areas, due to impediments created by the dams and impounded waters.

The only known natural population of the interrupted rocksnail occurs in the free-flowing Oostanaula River (Williams and Hughes 1998, p. 9; Johnson and Evans 2001, p. 25). The Oostanaula River is formed by the confluence of the Conasauga and Coosawatee Rivers. The Upper Coosawatee is impounded by Carters Dam, a hydropower dam which discharges into Carters Re-regulation Dam and from there into the Coosawatee River. Hydropower discharges from Carters Dam are believed to be implicated in the disappearance of the interrupted rocksnail from the Coosawatee River (Johnson and Evans 2001, p. 26). The effects of power generation discharges from Carters Dam, including cold water temperatures are evident downstream (Williams and Hughes 1998, p. 11), even to the shoals on the Oostanaula River where the interrupted rocksnail is found (Johnson and Evans 2001, p. 26; Marcinek *et al.* 2005, p. 15). A Federal Energy Regulatory Commission (FERC) license was issued to construct a hydroelectric facility on the Carters Re-regulation Dam (FERC 2001, pp. 1–2). A notice of probable termination of license has been issued due to failure to commence construction in a timely manner (FERC 2005a, pp. 1–2). The applicant appealed

the termination order (FERC 2005b, p. 1), but was denied (FERC 2006a, pp. 1–3). However, the applicant has since applied for a preliminary permit to proceed with the hydroelectric facility and issued a Notice of Intent and related documents to file for a license application at Carters Re-Regulation Dam (Fall Line Hydro Company, Inc. 2009).

Rough hornsnails currently survive in Lower Yellowleaf Creek, at the transitional area between the flowing stream and the embayment created by Lay Dam, and in a small area of the Coosa River below the shoals along the Fall Line near Wetumpka, Alabama. Known from the main channel of the Coosa River and the mouths of some of the larger tributaries, all historical habitats, including the two where the rough hornsnail currently survives, are affected to some degree by impounded waters and hydropower releases.

The Georgia pigtoe historically occurred in the Coosa River and many of its major tributaries. As noted above, the Coosa is impounded throughout most of its length by major hydropower dams. In addition, all historically occupied tributaries are isolated from each other by one or more of these dams and extensive reaches of impounded waters. The species is currently known to survive only in the Upper Conasauga River, far above the influence of the Coosa River impoundments.

Water and Habitat Quality

The disappearance of shoal populations of rough hornsnail, interrupted rocksnail, and Georgia pigtoe from unimpounded relict habitats in the Coosa River drainage is likely due to historical pollution problems. Pleurocerid snails and freshwater mussels are highly sensitive to water and habitat quality (Havlik and Marking 1987, pp. 1–15; Neves *et al.* 1997, pp. 64–69). Historical causes of water and habitat degradation in the Coosa River and its tributaries included drainage from gold mining activities, industrial and municipal pollution events, and construction and agricultural runoff (for example, Hurd 1974, pp. 38–40; Lydeard and Mayden 1995, pp. 803–804; Freeman *et al.* 2005, pp. 560–562).

Prior to the passage of the Federal Clean Water Act (33 U.S.C. 1251 *et seq.*, 1972) and the adoption of State water quality regulations and criteria, water pollution was a significant factor in the disappearance of mollusks from unimpounded river and stream channels in the Mobile River Basin (Baldwin 1973, p. 23; Hurd 1974, pp. 38–40, 144–151). Hurd (1974, pp. 147–149), for example, noted the extirpation

of freshwater mussel communities from the Conasauga River below Dalton, Georgia, apparently as a result of textile and carpet mill waste discharges. He also attributed the disappearance of the mussel fauna from the Etowah River and other tributaries of the Coosa River to organic pollution and siltation. Baldwin (1973, p. 23) documented the loss of mussel diversity in the Cahaba River and identified the primary causes as pollution from coalfields and industrial and urban wastes.

Although Federal and State water quality laws and regulations have generally reduced the impacts of point source discharges, nonpoint source pollution continues to affect and possibly threaten the remaining populations of each of these mollusk species. Nonpoint source pollution has been identified as a concern in the Yellowleaf Creek and Lower Coosa River watersheds (Alabama Clean Water Partnership (ACWP) 2005 Chapter 12). These drainages encompass historical habitat for the interrupted rocksnail and Georgia pigtoe, currently occupied habitat for the rough hornsnail, and a recent reintroduction of the interrupted rocksnail. Both Yellowleaf Creek and the eastern watershed of the Lower Coosa River have been designated as High Priority Watersheds by the ACWP (2005 Chap. 12), due to the high potential of nonpoint source pollution associated with expanding human population growth rates and urbanization. The headwaters of Yellowleaf Creek are about 5 km (3 mi) southeast of the greater metropolitan area surrounding Birmingham, and the watershed is highly dissected by county roads. The Lower Coosa River is about 16 km (10 mi) north of the Montgomery greater metropolitan area and is accessible by a four lane highway. Both general areas are experiencing growth due to their proximity to major metropolitan areas.

Nonpoint source pollution and habitat deterioration are also problems in the Upper Coosa River Basin, including the Conasauga and Oostanaula rivers (Georgia Department of Natural Resources (GDNR) 1998, pp. 4.27–4.42). In the reaches of the Conasauga River where the Georgia pigtoe continues to survive, overall molluscan abundance and diversity have experienced a general decline over the past 2 decades that has been primarily attributed to water or sediment toxicity and channel instability (Johnson and Evans 2000, pp. 171–173; Sharpe and Nichols 2005, pp. 81–88). Sedimentation has been identified as a potential limiting factor for the interrupted rocksnails in the Oostanaula River (Johnson and Evans

2001, p. 26). Following its rediscovery, the interrupted rocksnail population size in the Oostanaula River has declined from a high of 10 to 45 snails per square meter (10.7 sq ft) in 1999 (Johnson and Evans 2001, p. 22) to only 20 snails found during 6 search-hours in 2004 (Johnson in litt. 2003, 2004). The cause of decline is suspected to be some form of water contamination (Johnson in litt. 2003, 2004; Hartfield in litt. 2006).

Nonpoint source pollution from land surface runoff originates from virtually all land use activities and includes sediments; fertilizer, herbicide, and pesticide residues; animal or human wastes; septic tank leakage and gray water discharge; and oils and greases (GDNR 1998, pp. 4.27–4.42; ACWP 2005, Chap. 9). Nonpoint source pollution can cause excess sedimentation, nutrification, decreased dissolved oxygen concentration, increased acidity and conductivity, and other changes in water chemistry that can seriously impact aquatic mollusks. Land use types around the Georgia pigtoe, interrupted rocksnail, and rough hornsnail populations include pastures, row crops, timber, and urban and rural communities.

Excessive sediments are believed to impact riverine mollusks requiring clean, stable streams (Ellis 1936, pp. 39–40; Brim Box and Mossa 1999, p. 99). 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, upon which snails may feed); affect respiration, growth, reproductive success, and behavior of aquatic insects and mussels; and affect fish growth, survival, and reproduction (Waters 1995, pp. 173–175). Potential sediment sources within a watershed include virtually all activities that disturb the land surface, and all localities currently occupied by these mollusks are affected to varying degrees by sedimentation.

Land surface runoff also contributes nutrients to rivers and streams. Excessive nutrient input (for example, nitrogen and phosphorus from fertilizers, sewage, and animal manure) can result in effects that are detrimental to aquatic species. High levels of nutrients in surface runoff can promote excessive filamentous algal growth. Dense algal growth covers gravel, cobble, or bedrock substrates and interstices (spaces between bottom particles), and can seriously reduce dissolved oxygen in waters during dark hours due to algal respiration (Shepard *et al.* 1994, pp. 61–64), which affects feeding, reproduction, and respiration

in adult and juvenile mussels and snails, and limits access to substrate interstices important to juvenile and adult mussels. Algal mats also provide cover for invertebrate predators of juvenile mollusks (such as flatworms, hydra, and chironomids) and increase their vulnerability to such predators. 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). In hatcheries, filamentous algal growth reduces juvenile mussel survival by reducing flow, increasing sedimentation, and causing competition with and reduction of the unicellular algal community on which the mussels feed (Neves Pers. comm. 2002). Nutrient and sediment pollution may have synergistic effects (when the toxic effect of two or more pollutants operating together is greater than the sum of the effects of the pollutants operating individually) on freshwater mollusks, as has been suggested for aquatic insects (Waters 1995, p. 67).

Land surface runoff contributes the majority of human-induced sediments and nutrients to water bodies throughout the United States. The human population is expanding within the areas currently occupied by the Georgia pigtoe, interrupted rocksnail, and rough hornsnail, increasing the sediment and nutrient input to their riverine habitats, and leaving these mollusks vulnerable to progressive water and habitat degradation from land surface runoff.

Accidental spills that may affect water or habitat quality also threaten surviving populations of each species. For example, on September 12, 2006, a train derailment spilled four tank cars of soybeans into a tributary of Yellowleaf Creek (Birmingham News in litt. 2006). A large rain event flushed the decomposing soybeans into Yellowleaf Creek, resulting in a serious decline in dissolved oxygen in the stream, killing fishes, mussels (including two endangered species, southern pigtoe (*Fusconaia cerina*) and triangular kidneyshell (*Ptychobranchus greenii*)), and snails (including the endangered cylindrical lioplax (*Lioplax cyclostomaformis*)) (Johnson 2006). Fortunately, the location of the largest surviving population of rough hornsnail is in the lowest reaches of Yellowleaf Creek, remote from the spill, and no mortality was observed in this population as a result of the spill (Johnson 2006).

In summary, the historical loss of habitat and range is currently, and projected to continue to be, a significant

threat to the rough hornsnail, interrupted rocksnail, and Georgia pigtoe. Curtailment of habitat and range also amplifies threats from nonpoint source water and habitat quality degradation, accidental spills, or violation of permitted discharges. Due to the extremely limited extent of habitat currently occupied by each species, and the severity and magnitude of this threat, we have determined that the present or threatened destruction, modification, or curtailment of habitat and range represents an ongoing and significant threat to the rough hornsnail, interrupted rocksnail, and Georgia pigtoe.

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

The Georgia pigtoe, interrupted rocksnail, and rough hornsnail are not commercially utilized. Each species has been taken for scientific and private collections in the past, yet collecting is not considered a factor in the decline of these species. While collection is not considered a current threat, the desirability of these species in scientific and commercial collections may increase as their existence and rarity becomes known, and their localized distributions and small population sizes leaves them vulnerable to overzealous recreational or scientific collecting.

C. Disease or Predation

Diseases of freshwater mollusks are poorly known and are not currently considered to be a threat to the Georgia pigtoe, interrupted rocksnail, or rough hornsnail, nor a factor in their decline. Aquatic snails and mussels are consumed by various vertebrate predators, including fishes, mammals, and possibly birds. Although predation by naturally occurring predators is a normal aspect of the population dynamics of a species and is not known to be a threat to any of these species, changes in water flows, depths, temperatures, and other environmental factors within some portions of their ranges may have led to increased numbers of native mollusk-eating fish, such as freshwater drum (Johnson in litt. 2005b). In addition, the potential now exists for the black carp (*Mylopharyngodon piceus*), a mollusk-eating Asian fish recently introduced into the waters of the United States (U.S. Fish and Wildlife Service 2002, p. 49280), to eventually enter and disperse through the Mobile River Basin via the Tennessee-Tombigbee Waterway, or by their accidental release from catfish farms or other aquaculture facilities.

In summary, disease in freshwater mollusks is poorly known and is not currently considered a threat to the Georgia pigtoe, interrupted rocksnail, or rough hornsnail. Although there is no direct evidence at this time that predation is detrimentally affecting the Georgia pigtoe, interrupted rocksnail, or rough hornsnail, their small populations and limited ranges leaves them vulnerable to threats of predation from natural or introduced predators. Therefore, we have concluded that predation currently represents a threat of low magnitude, but it could potentially become a significant future threat to the Georgia pigtoe, interrupted rocksnail, or rough hornsnail due to their small population sizes.

D. The Inadequacy of Existing Regulatory Mechanisms

The Alabama Department of Conservation and Natural Resources currently recognizes the rough hornsnail as a "Priority 1" species (Highest Conservation Concern) (Mirarchi *et al.* 2004, p. 117; ADCNR 2005, p. 302). The interrupted rocksnail is considered "Extirpated (in Alabama)—Conservation Action Underway" (Mirarchi *et al.* 2004, p. 114), and the Georgia pigtoe is listed as "extinct" (Mirarchi *et al.* 2004, p. 13). While these classifications identify the status of imperiled species in the State of Alabama, they convey no legal protection. Interrupted rocksnail and Georgia pigtoe currently lack any official status recognition by the State of Georgia, but they have been nominated for inclusion on the State Protected Species List. The Georgia pigtoe is identified as a species of the Greatest Conservation Need by the State of Tennessee. NatureServe (2010) identifies the Georgia pigtoe, interrupted rocksnail, and rough hornsnail as G1 critically imperiled species; however, no State or Federal protection is conveyed by these classifications. Without State or Federal protection, these three species are not currently given any specific special consideration under environmental laws when project impacts are reviewed, other than those provided for water quality.

The mollusk fauna (including the Georgia pigtoe) of the Conasauga River and the interrupted rocksnail in the Oostanaula River have experienced significant declines in recent years, apparently due to water quality or sediment toxicity (Evans 2001, p. 3; Johnson in litt. 2004; Sharpe and Nichols 2005, pp. 1–4; Konwick *et al.* 2008, pp. 2016–2017). There is no specific scientific information on the sensitivity of the Georgia pigtoe,

interrupted rocksnail, and rough hornsnail or their host fish species to common industrial and municipal pollutants, and little information on other freshwater mollusks. Current State and Federal regulations regarding pollutants are assumed to be protective of freshwater mollusks; however, these species may be more susceptible to some pollutants than test organisms commonly used in bioassays. For example, several recent studies suggest that U.S. Environmental Protection Agency's (EPA) criteria for ammonia may not be protective of freshwater mussels (Augsburger *et al.* 2003, p. 2571; Augspurger *et al.* 2007, p. 2026; Newton *et al.* 2003, pp. 2559–2560; Newton and Bartsch 2007, p. 2057; Ward *et al.* 2007, p. 2075).

In a review of the effects of eutrophication on mussels, Patzner and Muller (2001, p. 329) noted that stenoeicous (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). Other studies also suggest that early life stages of mussels are more sensitive to metals and such inorganic chemicals as chlorine and ammonia than are common bioassay test organisms (Keller and Zam 1991, pp. 543–545; Goudreau *et al.* 1993, p. 221; Naimo 1995, pp. 354–355). Therefore, it appears that inadequate research and data prevent existing regulations, such as the Clean Water Act (administered by the EPA and the Corps), from being fully utilized or effective in the management and protection of these species.

Rough hornsnails currently survive at localized sites in Yellowleaf Creek and in the Lower Coosa River below Wetumpka Shoals in Alabama. In addition, the interrupted rocksnail was recently reintroduced into Wetumpka Shoals. The Alabama Department of Environmental Management (ADEM) has designated the water use classification for some portions of Yellowleaf Creek as "Swimming" (S) and others as "Fish and Wildlife" (F&W). The F&W designation establishes minimum water quality standards that are believed to protect existing species and water uses (for example, fishing, recreation, irrigation) within the designated area, while the S classification establishes higher water quality standards that are protective of human contact with the water. The Lower Coosa River below Wetumpka is currently designated as F&W by ADEM, and adjacent tributaries are classified as S. Both water bodies are currently believed to support their designated

uses. However, Yellowleaf Creek and the eastern watershed of the Lower Coosa have been designated as High Priority Watersheds by the ACWP (2005, Chap. 12), due to a lack of monitoring data and the high potential of nonpoint source pollution in these drainages associated with expanding human population growth rates and urbanization.

The reach of the Conasauga River at and below the Tennessee–Georgia State Line supports the only known surviving population of the Georgia pigtoe. This river reach is identified on Georgia's 303(d) list of impaired waters as partially supporting its designated use of Fishing–Drinking Water (GDNR 2006, p. 35). The Georgia 303(d) list identifies high levels of fecal coliform bacteria and polychlorinated biphenyls (PCBs) as the reasons for this river reach's inclusion on the list; nonpoint pollution is identified as the source of pollutants (GDNR 2006, p. 35). Recent studies also implicate sediment and water toxicity in the decline of mollusks in the Conasauga River (Sharpe and Nichols 2005, pp. 81–88; Konwick *et al.* 2008, pp. 2016–2017).

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. For water bodies on the 303(d) list, States are required under the Clean Water Act to establish a total maximum daily load (TMDL) for the pollutants of concern that will bring water quality into the applicable standard. The Georgia Department of Natural Resources has identified TMDLs for the Oostanaula River to address existing problems of PCBs and fecal coliform loads from nonpoint source and urban runoff sources.

In summary, recent declines in mollusk communities within the ranges of each of these species has been attributed to poor water or sediment quality. Although regulatory mechanisms are in place to protect aquatic species, a lack of specific information on the sensitivity of the Georgia pigtoe, interrupted rocksnail, and rough hornsnail and their host fish to common industrial and municipal pollutants limits their application. Water and sediment quality is believed to currently affect (and is expected to continue to affect) the Georgia pigtoe and interrupted rocksnail and has been identified as a concern for the rough hornsnail in Yellowleaf Creek. Therefore, we determine that inadequate existing regulatory mechanisms are an

imminent threat of high magnitude to the Georgia pigtoe, interrupted rocksnail, and rough hornsnail.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

As noted under Factor A, above, the Georgia pigtoe, interrupted rocksnail, and rough hornsnail have been eliminated from 90 percent or more of their historical ranges. Surviving populations of each species are small, extremely localized, isolated, and vulnerable to habitat modification, toxic spills, and progressive degradation from land surface runoff (nonpoint source runoff) (see Factor A: Dams and Impoundments, Water and Habitat Quality; and Factor D: The inadequacy of existing regulatory mechanisms). These conditions also leave each species vulnerable to catastrophic changes to their habitats that may result from natural events such as flood scour or drought.

There is a growing concern that climate change may lead to increased frequency of severe storms and droughts (for example, Golladay *et al.* 2004, p. 504; McLaughlin *et al.* 2002, p. 6074; Cook *et al.* 2004, p. 1015). During 2007 and 2008, a severe drought affected the Coosa River watershed in Alabama and Georgia. Streamflow for the Conasauga River at Tilton, Georgia, during September 2007, was the lowest recorded for any month in 69 years (U.S. Geological Survey 2007, pp. 1–2). Although the effects of the drought on the Georgia pigtoe, interrupted rocksnail, and rough hornsnail have not been quantified, mollusk declines as a direct result of drought have been documented (for example, Golladay *et al.* 2004, p. 494; Haag and Warren 2008, p. 1165). Reduction in local water supplies due to drought is also compounded by increased human demand and competition for surface and ground water resources for power production, irrigation, and consumption (Golladay *et al.* 2004, p. 504).

Freshwater mussels and snails are capable of moving only short distances. As noted previously (see discussion under Factor A: Dams and Impoundments), there are numerous obstacles in the Coosa River drainage preventing long distance movement of snails, mussels, or the fish hosts of mussels between relict patches of historically occupied and potentially suitable riverine habitats. Therefore, even if habitat conditions improve for the survival of the Georgia pigtoe, interrupted rocksnail, and rough hornsnail in historically occupied stream and river habitats, they will be unable to recolonize those areas without

human assistance. Low numbers of individuals within these isolated populations also increase the risks and consequences of inbreeding and reduced genetic diversity (Lynch 1996, pp. 493–494).

The Georgia pigtoe may be adversely affected by the loss or reduction in numbers of the fish host(s) essential to its parasitic glochidial stage. The specific fish host(s) for the glochidia of the Georgia pigtoe is unknown; therefore, specific impacts on this aspect of the mussels' life cycle cannot be evaluated. However, other species of mussels in the genus *Pleurobema* are known to parasitize various species of chubs, minnows, stonerollers, and other stream fish species.

In summary, a variety of natural or manmade factors, such as droughts, storms, and toxic spills, threaten surviving populations of the Georgia pigtoe, interrupted rocksnail, and rough hornsnail due to the highly restricted and fragmented nature of their habitats and their small population sizes. Other factors, such as inbreeding, reduced genetic diversity, and loss or reduction of fish hosts for the Georgia pigtoe, may threaten each of the three species; however, the severity and magnitude of these threats are not currently known. However, we have determined that natural and manmade factors, such as accidental spills, floods, and droughts, currently pose an imminent and high degree of threat to the Georgia pigtoe, interrupted rocksnail, and rough hornsnail, and the levels of these threats are projected to continue or increase in the future.

Conclusion and Determination

We carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the Georgia pigtoe, interrupted rocksnail, and rough hornsnail. 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.” We find that each of these three species is presently in danger of extinction throughout its entire range, based on the immediacy and magnitude of the threats described above. Based on our analysis, we have no reason to believe that population trends for any of the three species addressed in this final rule will improve, nor will the effects of current threats acting on the species be ameliorated in the foreseeable future. Therefore, on the basis of the best available scientific and commercial information, we are listing the Georgia pigtoe, interrupted rocksnail, and rough hornsnail as endangered under the Act.

Without the protection of the Act, these species are in danger of extinction throughout all of their ranges. This could occur within a few years, given recurring drought conditions, accidents, or other existing threats. Furthermore, because of their curtailed ranges, and immediate and ongoing significant threats to each species throughout their entire respective ranges, as described above in the five-factor analysis, we find that it is unnecessary to analyze whether there are any significant portions of ranges for each species that may warrant a different determination of status.

Summary of Critical Habitat Changes From Proposed Rule

We have considered all comments and information received during the open comment period for the proposed rule to designate critical habitat for the Georgia pigtoe mussel, interrupted rocksnail, and rough hornsnail. We have included mud as a substrate utilized by the rough hornsnail based upon information provided by a peer reviewer, and added this descriptor into PCE 4 for the rough hornsnail (*see Peer Review*, above, and rough hornsnail PCE 4, below). We have also modified PCE 3 for all three species to reflect information under Factors A and D, above, that some parameters identified under current water quality life criteria established under the Clean Water Act (33 U.S.C. 1251–1387) are not adequate to sustain normal behavior, growth, and viability of all life stages of mollusks. We have also defined the upstream and downstream limits of the critical habitat units by Universal Transverse Mercator (UTM) zone 16, coordinates in the Regulation Promulgation, below. No other changes have been made to the proposed designation, including the number, extent, and location of the individual units designated as critical habitat.

Critical Habitat

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

(1) The specific areas within the geographical area occupied by a 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 a 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 any endangered species or threatened species to the point at which measures provided under the Act are no longer necessary.

Critical habitat receives protection under section 7 of the Act through the prohibition against Federal agencies carrying out, funding, or authorizing the destruction or adverse modification of critical habitat. Section 7(a)(2) of the Act requires consultation on Federal actions that may affect 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 private 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) may apply. However, even in the event of a destruction or adverse modification finding, the Federal action agency's and the applicant's obligation is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

To be included in a critical habitat designation, the habitat within the geographic area occupied by the species must first have the physical and biological features that are essential to the conservation of the species. The Service must identify, to the extent known using the best scientific data available, habitat areas that provide essential life cycle needs of the species (*i.e.*, areas on which are found the Primary Constituent Elements (PCEs), as defined at 50 CFR 424.12(b)). Second, to be included in the designation, the features at issue must also be ones that may require special management considerations or protection. Under the Act, we can designate unoccupied areas as critical habitat only when we determine that the best available scientific data demonstrate that the designation of that area is essential to the conservation needs 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. Furthermore, 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 represent the best scientific data available.

When determining which areas we should propose as critical habitat, our primary source of information is generally the information developed during the listing process for the species. Additional information sources may include the recovery plan for the species, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, or other unpublished materials and expert opinion or personal knowledge.

Habitat is often dynamic, and species may move from one area to another over time. Furthermore, we recognize that designation of critical habitat may not include all of the habitat areas that we may eventually determine, based on scientific data not now available to the Service, are necessary for the recovery of the species. For these reasons, a critical habitat designation should not be interpreted as meaning that habitat outside the designated area is unimportant or may not be required for recovery of the species in question.

Areas that support populations, but are outside the critical habitat designation, will continue to be subject to conservation actions we implement under section 7(a)(1) of the Act. They are also subject to the regulatory protections afforded by the section 7(a)(2) jeopardy standard, as determined on the basis of the best available scientific information at the time of the agency action. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. 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 to these planning efforts calls for a different outcome.

Methods

As required by section 4(b)(2) of the Act, we use the best scientific data available in determining occupied areas

that contain the features that are essential to the conservation of the Georgia pigtoe, interrupted rocksnail, and rough hornsnail, and unoccupied areas that are essential to the conservation of the Georgia pigtoe, interrupted rocksnail, and rough hornsnail.

We have reviewed the available information pertaining to historical and current distributions, life histories, and habitat requirements of these species. Our sources included: peer reviewed scientific publications; unpublished survey reports; unpublished field observations by the Service, State, and other experienced biologists; and notes and communications from qualified biologists or experts.

Primary Constituent Elements (PCEs)

In accordance with sections 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12, in determining which areas within the geographical area occupied at the time of listing are critical habitat, we identify the specific PCEs required for the Georgia pigtoe, interrupted rocksnail, and rough hornsnail based on their biological needs. We consider the physical and biological features that are essential to the conservation of each species to be the PCEs laid out in the appropriate quantity and spatial arrangement for the conservation of the Georgia pigtoe, interrupted rocksnail, and rough hornsnail. 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, and rearing (or development) of offspring; and
- (5) Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distribution of a species.

The PCEs required for the Georgia pigtoe, interrupted rocksnail, and rough hornsnail are derived from biological needs of the species as described in the Background section of this rule. Unfortunately, little is known of the specific habitat requirements of any of these mollusk species other than all three require flowing water, stable stream or river channels, and adequate water quality. Georgia pigtoe mussel larvae also require a currently unknown fish host for development to juvenile mussels. To identify the physical and biological needs of the species, we have relied on current conditions at locations where each of the species survive, the

limited information available on these three species and their close relatives, and factors associated with the decline and extirpation of these and other aquatic mollusks from extensive portions of the Mobile River Basin.

Space for Individual and Population Growth and for Normal Behavior

The Georgia pigtoe, interrupted rocksnail, and rough hornsnail were all historically associated with stream and river shoals of the Coosa River drainage (Goodrich 1922, p. 5; Johnson and Evans 2001, p. 21; Williams *et al.* 2008). The decline of the aquatic mollusk fauna of the Mobile River Basin is directly associated with the loss of shoal habitats, primarily due to inundation by impounded waters (Bogan *et al.* 1995, pp. 250–251; Lydeard and Mayden 1995, pp. 803–804; Neves *et al.* 1997, pp. 63–64; Marcinek *et al.* 2005, pp. 7–10, 20–21). Shoals are defined as discrete areas that are of lower depth, greater slope, higher velocity flows, and coarser bed materials relative to other channel segments. Shoals include areas that are also referred to as riffles, gravel bars, and reefs. Shoals generally have substrates composed of bedrock, cobble, boulder, and gravel interspersed with sands, and sufficient current velocities to remove finer sediments and maintain interstitial habitats (Marcinek *et al.* 2005, p. 4). The interrupted rocksnail and rough hornsnail are found clinging to gravel, cobble, and boulders in moderate to strong currents in shoals, while Georgia pigtoe mussels are found imbedded in sand–gravel substrates within shoals. Rough hornsnails are also found in pools with mud or silt bottoms below shoals. Shoals and associated pools not only provide space for these three mollusks, but also provide cover and shelter and sites for breeding, reproduction, and growth of offspring.

Shoal–pool habitats are formed and maintained by water quantity, channel slope, and 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 mollusks. Therefore, we believe that stream channel stability is essential to the conservation of the Georgia pigtoe, interrupted rocksnail, and rough hornsnail.

Food

The interrupted rocksnail and rough hornsnail generally feed by ingesting periphyton and biofilm detritus scraped off the substrate by the snail's radula (Morales and Ward 2000, p. 1). Unionid mussels, such as the Georgia pigtoe, filter algae, detritus, and bacteria from

the water column (Williams *et al.* 2008, p. 67). Food availability and quality for the Georgia pigtoe, interrupted rocksnail, and rough hornsnail in shoal habitats are affected by habitat stability, water flow, and water quality.

Water

The Georgia pigtoe, interrupted rocksnail, and rough hornsnail are riverine-adapted species that depend upon adequate water flow (Williams *et al.* 2008, p. 534; Goodrich 1922, p. 5) and are not found in ponds or lakes. Continuously flowing water is a habitat feature associated with all surviving populations of the three species. Flowing water maintains the stream bottom and shoal habitats where these species are found, transports food items to the sedentary juvenile and adult life stages of the Georgia pigtoe, supports the periphyton and biofilm ingested by the interrupted rocksnail and rough hornsnail, removes wastes, and provides oxygen for respiration for each of the three species.

The ranges of standard physical and chemical water quality parameters (such as temperature, dissolved oxygen, pH, conductivity) that define suitable habitat conditions for the Georgia pigtoe, interrupted rocksnail, and rough hornsnail have not been investigated. However, as relatively sedentary animals, aquatic snails and 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 three species currently exist 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 shoal 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, adequate water flow and water quality (as defined below) are essential to the conservation of the Georgia pigtoe, interrupted rocksnail, and rough hornsnail. 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 three mollusks. However, some States' standards may not adequately protect mollusks, or are not being appropriately measured, monitored, or achieved in some reaches (see Factor A: The present or threatened destruction, modification, or curtailment of its habitat or range, Water and Habitat Quality; and Factor D: Inadequacy of existing regulatory mechanisms, above). The Service is currently in consultation with the EPA to evaluate the protectiveness of criteria approved in EPA's water quality standards for endangered and threatened 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, nonpoint source runoff from adjacent land surfaces (for example, excessive amounts of nutrients, pesticides, and sediment), 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 Georgia pigtoe, interrupted rocksnail, and rough hornshell.

Sites for Breeding, Reproduction, or Rearing

Pleurocerid snails require clean hard surfaces, such as gravel, cobble, boulder, or bedrock, for laying eggs and for survival of juveniles (Bogan *et al.* 1995, p. 251). Excessive fine sediments or dense growth of filamentous algae can restrict or eliminate spawning sites and expose juveniles to entrainment (being swept away) or predation. Geomorphic instability may result in entrainment and loss of eggs by scouring currents or burial of eggs by excessive deposition. Therefore, stable shoals with low amounts of filamentous algae are essential to the conservation of the interrupted rocksnail and rough hornshell.

Freshwater mussels require a host fish for transformation of larval mussels (glochidia) to juvenile mussels (Williams *et al.* 2008, p. 68), and presence of the appropriate host fish is essential to the conservation of the Georgia pigtoe. The specific fish host(s) for the Georgia pigtoe is currently unknown. However, other species of mussels in the genus *Pleurobema* are

known to parasitize various species of chubs, minnows, stonerollers, and other stream-adapted fish species (Haag and Warren 2003, p. 85).

Juvenile Georgia pigtoe mussels require interstitial shoal 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 interstitial habitats and juvenile mussels due to scouring or deposition (e.g., Hartfield 1993, pp. 132–139). Therefore, stable shoals with low to moderate amounts of filamentous algae growth are essential to the conservation of the Georgia pigtoe.

PCEs for the Georgia pigtoe, Interrupted Rocksnail, and Rough Hornshell

Based on the above needs and our current knowledge of the life history, biology, and ecology of the species, we have determined that the Georgia pigtoe's PCEs 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) A hydrologic flow regime (the magnitude, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species is found. Unless other information becomes available, existing conditions at locations where the species occurs will be considered as minimal flow requirements for survival.

(3) Water quality, including temperature, pH, hardness, turbidity, oxygen content, and chemical characteristics necessary for normal behavior, growth, and viability of all life stages.

(4) Sand, gravel, cobble, boulder, or bedrock substrates with low to moderate amounts of fine sediment and attached filamentous algae.

(5) The presence of fish host(s) for the Georgia pigtoe (currently unknown). Diverse assemblages of native chubs, minnows, stonerollers, and other stream-adapted fish species will serve as a potential indication of presence of host fish.

The PCEs required for the interrupted rocksnail 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) A hydrologic flow regime (the magnitude, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species is found. Unless other information becomes available, existing conditions at locations where the species occurs will be considered as minimal flow requirements for survival.

(3) Water quality, including temperature, pH, hardness, turbidity, oxygen content, and chemical characteristics necessary for normal behavior, growth, and viability of all life stages.

(4) Sand, gravel, cobble, boulder, or bedrock substrates with low to moderate amounts of fine sediment and attached filamentous algae.

The PCEs required for the rough hornshell 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) A hydrologic flow regime (the magnitude, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species are found. Unless other information becomes available, existing conditions at locations where the species occur will be considered as minimal flow requirements for survival.

(3) Water quality, including temperature, pH, hardness, turbidity, oxygen content, and chemical characteristics necessary for normal behavior, growth, and viability of all life stages.

(4) Sand, gravel, cobble, boulder, bedrock, or mud substrates with low to moderate amounts of fine sediment and attached filamentous algae.

This critical habitat designation is designed for the conservation of the physical and biological features essential to the life-history functions that were the basis for the determination of endangered status and the areas containing those features (that is, the PCEs in the appropriate spatial arrangement and quantity). Because not all life history functions require all the PCEs, not all PCEs may be present throughout the critical habitat units.

Units are designated based on sufficient PCEs being present to support at least one of the species' life history functions. Some areas contain all PCEs and support multiple life processes, while some areas may contain only a portion of the PCEs necessary to support the species' particular use of that habitat.

Special Management Considerations or Protections

When designating critical habitat, we assess whether the areas within the geographical area occupied by the species at the time of listing contain features that are essential to the conservation of the species and whether those features may require special management considerations or protections. All of the critical habitat units identified for these three species below, with the exception of a portion of Unit RH 1, have been designated as critical habitat for other mollusk species that are already listed under the Act. None of the areas are presently under special management or protection provided by a legally operative management plan or agreement for the conservation of the interrupted rocksnail, rough hornsnail, or Georgia pigtoe. Various activities in or adjacent to each of the critical habitat units described below may affect one or more of the PCEs. Some of these activities include, but are not limited to, those discussed in the Summary of Factors Affecting the Species, above. For example, three of the units described below (Units IR 1, IR 2, and RH 1 (which includes IR 3)) may require special management considerations due to detrimental effects of hydropower generation or lack of minimum flow releases from dams (see Factor A: Dams and Impoundments, above). Features in all of the critical habitat units may require special management due to threats posed by land-use runoff and point- and nonpoint-source water pollution (see Factor A: Water and Habitat Quality, and Factor D: Inadequacy of existing regulatory mechanisms, above). Other activities that may affect PCEs in the critical habitat units include those listed in the Effects of Critical Habitat Designation section as Federal Activities that may affect critical habitat and require consultation, below.

Criteria Used To Identify Critical Habitat

We are designating as critical habitat all stream channels that are currently occupied by the species, as well as some specific areas not currently occupied but that were historically occupied, because we have determined that these additional areas are essential for the conservation of the Georgia pigtoe, interrupted rocksnail, and rough hornsnail, and that designating only occupied habitat is not sufficient to conserve each of these species.

When identifying critical habitat boundaries, we make every effort to

avoid including developed areas such as lands covered by buildings, pavement, and other structures because such lands usually lack PCEs for endangered or threatened species. Areas identified as critical habitat for the Georgia pigtoe, interrupted rocksnail, and rough hornsnail, below, include only stream channels within the ordinary high water line and do not contain any developed areas or structures.

Occupied Stream Reaches Designated as Critical Habitat

We have defined occupied habitat as those stream reaches known to be currently occupied by the Georgia pigtoe, interrupted rocksnail, or rough hornsnail. We used information from surveys and reports prepared by the U.S. Geological Survey, the Alabama Department of Conservation and Natural Resources, the Tennessee Aquarium, Alabama Geological Survey, Auburn University, University of Alabama, and Service field records to identify the specific locations occupied by the Georgia pigtoe, interrupted rocksnail, or rough hornsnail.

Currently, occupied habitat for each of the three species is extremely limited and isolated. The Georgia pigtoe persists only in a restricted series of shoals in the Conasauga River (Johnson and Evans 2000, p. 106). The interrupted rocksnail naturally survives in a short reach of the Oostanaula River in Gordon and Floyd Counties, Georgia, and population reintroductions have been attempted into a shoal of the Lower Coosa River, Elmore County, Alabama (ADCNR 2004, p. 33). The rough hornsnail is known from two small, localized, and isolated populations: Yellowleaf Creek, Shelby County, Alabama, and a short reach of the Lower Coosa River, Elmore County, Alabama (Sides 2005, p. 40). We believe that all currently occupied areas contain features essential to the conservation of these species. With such limited distribution, each of these species is at a high risk of extinction and highly susceptible to stochastic events.

Unoccupied Stream Reaches Designated as Critical Habitat

The streams not currently occupied that we are designating as critical habitat were all historically occupied. We believe that the designation of additional areas not known to be currently occupied by the Georgia pigtoe, interrupted rocksnail, or rough hornsnail is essential for their conservation because:

(1) The range of each species has been severely curtailed, occupied habitats are limited and isolated, and population sizes are extremely small for each

species. While occupied units provide habitat for current populations, they are at high risk of extirpation and extinction from stochastic events, whether periodic natural events or existing 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 for each species.

(2) The essential unoccupied areas may offer habitat that is superior to that in the occupied units (the potential viability of the mollusks in unoccupied units may be higher) because the essential unoccupied areas may be faced with fewer and more easily treated threats than the occupied units (see discussion under Factor A: Dams and Impoundments).

(3) The protection of PCEs in currently occupied areas is directly related to conditions in adjacent unoccupied stream reaches (such as the Oostanaula and Lower Coosa Rivers).

Based on the best scientific data available, we believe that areas that are not currently occupied by the Georgia pigtoe, interrupted rocksnail, or rough hornsnail are essential for their conservation.

Length of Occupied Stream Reaches

Following the identification of occupied stream reaches, the next step was to delineate the length of upstream and downstream reaches of known occupied areas to determine the length of stream reaches that are needed for the conservation of the populations for each species. All known occurrences for each species are extremely localized, and rare aquatic snails and 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, as discussed below.

Georgia pigtoe

The Georgia pigtoe is currently known to survive only in a 52-km (32-mi) reach of the Upper Conasauga River extending from Polk County, Tennessee, downstream into Murray and Whitfield Counties, Georgia (Johnson and Evans 2000, p. 106; Evans 2001, pp. 33–34). The Georgia pigtoe has been recently collected from three shoals within this reach: one located at each end of the reach, and one additional site in the lower third of the reach. Other shoals

within the reach continue to be inhabited by a diverse mussel community, including the federally endangered triangular kidneyshell and southern pigtoe and the threatened fine-lined pocketbook. These species historically co-occurred in the same shoal habitats with the Georgia pigtoe, and their persistence indicates the presence of PCEs for the pigtoe throughout the reach. Therefore, we consider the entire 52-km (32-mi) reach between the uppermost and lowermost recent collection sites for the Georgia pigtoe as occupied habitat. In the area identified as critical habitat below, boundaries extend from the nearest downstream landmark at both ends of the reach.

Interrupted rocksnail

The interrupted rocksnail is known to survive in several shoals along a 12-km (7.4-mi) reach of the Oostanaula River between Ship Island and the confluence of Armuchee Creek, Gordon and Floyd counties, Georgia (Johnson and Evans 2000, pp. 45–46; Johnson and Evans 2001, pp. 2, 25). Although rocksnails live attached to the stream bottom, they are small and often difficult to locate when their population numbers are low. Therefore, we consider the reach of the Oostanaula River between Ship Island and the confluence of Armuchee Creek as habitat occupied by interrupted rocksnail. Attempts to reintroduce the species into the Lower Coosa River, Elmore County, Alabama, have also been made by the ADCNR. ADCNR attempted to reintroduce the interrupted rocksnail into Gray Island Shoals in the Lower Coosa River, about 3.2 km (2 mi) below Jordan Dam, Elmore County, Alabama. Although we do not yet know if this reintroduced population is viable, it is within the historical range of the interrupted rocksnail, and we are considering the 1-km (0.6-mi) reach encompassing Gray Island Shoals in the Lower Coosa River as occupied habitat.

Rough hornsnail

The rough hornsnail is known to survive at only two locations, Yellowleaf Creek and the Lower Coosa River. At the time we proposed these areas as critical habitat (74 FR 31113) for the rough hornsnail, we considered only a 3.2-km (2-mi) reach of Yellowleaf Creek, Shelby County, Alabama, as occupied by the species. A snail survey conducted by a Service biologist and others (Powell in litt. 2009) has since found the species throughout the designated area. Therefore, we consider the entire designated 6.4-km (4-mi) reach of Yellowleaf Creek as occupied by the rough hornsnail.

Collections during the 1990s from the Lower Coosa River, Elmore County, Alabama, show the rough hornsnail extended from the shoals below Jordan Dam, downstream to just below the Fall Line at Wetumpka, Alabama (FLMNH in litt. 2006). Therefore, we consider this 14-km (8-mi) reach as habitat occupied by the rough hornsnail.

Stream Reaches Not Currently Occupied

In identifying unoccupied stream reaches that are essential to the conservation of each species (Georgia pigtoe, interrupted rocksnail, and rough hornsnail), we first considered the availability of potential habitat throughout their historical ranges that may be suitable for the survival and persistence of each species. A large proportion of the streams that formerly supported each species have been modified by dams and their impounded waters, and we eliminated these areas from consideration, because none of these species can survive under the modified conditions (*see* Primary Constituent Elements (PCEs) section, above). We also eliminated from consideration free-flowing streams without any historical records of occurrence. We eliminated from consideration other streams with historical occurrence records because of limited habitat availability, isolation, degraded habitat, or low management value or potential (such as Coosawattee River and Etowah River).

All of the areas identified as critical habitat that are currently not known to be occupied meet one or more of the following criteria:

- (1) The stream habitat contains sufficient PCEs (for example, such characteristics as geomorphically stable channels, perennial water flows, adequate water quality, and appropriate benthic substrates) to support life-history functions of the mollusks (all unoccupied critical habitat units);
- (2) The stream supports diverse aquatic molluscan communities, including the presence of closely related species requiring PCEs similar to the Georgia pigtoe, interrupted rocksnail, and rough hornsnail (all unoccupied critical habitat units);
- (3) The stream reaches are adjacent to currently occupied areas where there is potential for natural dispersal and reoccupation by the Georgia pigtoe, interrupted rocksnail, or rough hornsnail (Oostanaula River, Lower Coosa River, and Yellowleaf Creek);
- (4) The stream reaches lack major anthropogenic disturbance (Hatchet Creek);
- (5) Areas are remote from currently occupied areas and have experienced

improvements in water quality or quantity during the past decades due to implementation of minimum flows below dams, changes in adjacent land uses, or implementation of the Clean Water Act (Coosa River below Weiss Dam and Jordan Dam, Terrapin Creek, and Hatchet Creek); and

(6) The stream reaches have potential for reoccupation by the species through future reintroduction efforts (all unoccupied critical habitat units).

Based on the above factors, all unoccupied stream reaches included in the critical habitat designations for each of these three species are essential to their conservation.

Georgia Pigtoe

We identified 101 km (63 mi) of habitat in two stream reaches that are currently unoccupied by the Georgia pigtoe and that meet several of the criteria for designation as critical habitat. Historical records of Georgia pigtoe occur from the Coosa River near the present location of Weiss Dam and from Terrapin Creek, from its confluence with the Coosa River upstream to the vicinity of Alabama Highway 9. Terrapin Creek flows into the Coosa River approximately 11 km (7 mi) below Weiss Dam in Cherokee County, Alabama. Together these two confluent stream reaches encompass 35 km (22 mi) of stream habitat that meet Criteria 1, 2, 5, and 6 listed above in this section. Terrapin Creek and this short reach of the Coosa River support diverse mollusk and fish communities. Water quality in Terrapin Creek meets current State criteria for Fish and Wildlife. The Mobile River Basin Mollusk Restoration Committee (2009, p. 22) recognizes this reach of the Coosa River and Terrapin Creek as an appropriate reintroduction site for the Georgia pigtoe. Based on the information we have to date, which does not necessarily suggest there is an increased probability of Georgia pigtoe conservation in specific areas within the reach, we are designating the entire reach of Terrapin Creek and the Coosa River as critical habitat.

Historical records of Georgia pigtoe occur from an approximately 66-km (41-mi) reach of Hatchet Creek between Clay County Road 4 downstream to the confluence with Swamp Creek in Coosa County, Alabama. This stream reach meets Criteria 1, 2, 4, 5, and 6 listed above in this section and has been identified by the Mobile River Basin Mollusk Restoration Committee (2008, p. 40) as having high conservation potential for the reintroduction of imperiled mollusks. Hatchet Creek supports diverse mollusk and fish communities and has been designated

as an Outstanding Alabama Water, the highest protective classification assigned by the State. Based on the information we have to date, which does not necessarily suggest there is an increased probability of Georgia pigtoe conservation in specific areas within the reach, we are designating the entire reach of Hatchet Creek as critical habitat.

Interrupted Rocksnail

We identified 88 km (55 mi) of habitat in three stream reaches that are currently unoccupied by the interrupted rocksnail and that meet several of the criteria for designation as unoccupied habitat. The Coosa River from Weiss Dam to just below the confluence of Terrapin Creek (11 km (7 mi)) is within the historical range of the interrupted rocksnail, and meets Criteria 1, 2, 5, and 6 listed above in this section. Several mollusk species requiring similar PCEs currently inhabit a portion of the reach. Projected minimum flows (Weiss Bypass Working Group 2005, pp. 6–8) will improve PCEs in the remainder of the reach, and reservoir-stored water will provide protection from nonpoint source pollution and reduce the potential of stochastic threats. The Mobile River Basin Mollusk Restoration Committee (2008, p. 53) recognizes this reach of the Coosa River as an appropriate reintroduction site for interrupted rocksnail.

The interrupted rocksnail is currently known to inhabit shoals along a 12-km (7.4-mi) reach of the Oostanaula River between Ship Island and the Confluence of Armuchee Creek, Gordon and Floyd Counties, Georgia. However, appropriate habitat extends approximately 49 km (30 mi) above Ship Island to the Conasauga-Coosawattee confluence in Gordon County, Georgia, and approximately 16 km (10 mi) below the confluence of Armuchee Creek to the Georgia Highway 1 Loop in Floyd County, Georgia. This unoccupied area encompasses an additional 65 km (40

mi) of river habitat that meets Criteria 1, 2, 3, and 6 listed above in this section. The unoccupied upstream and downstream reaches of the Oostanaula River contain one or more of the PCEs required by the species, including geomorphically stable channels and natural flows. They are adjacent to areas currently occupied by interrupted rocksnail, and there is potential for natural dispersal and re-occupation by the interrupted rocksnail. These areas are also currently occupied by other mollusk species with similar habitat requirements.

The Lower Coosa River below Jordan Dam is within the historical range of the interrupted rocksnail, and a small population of the species has been reintroduced into a shoal there (ADCNR, p. 33). Apparently suitable habitat extends approximately 13 km (8 mi) from the tailwaters of Jordan Dam to Alabama Highway 111 in Elmore County, Alabama. This reach meets Criteria 1, 2, 3, 5, and 6 listed above in this section. The steep river gradient below the dam to the Fall Line at Alabama Highway 111 in Wetumpka results in the presence of numerous high-quality and stable shoals and pools characteristic of habitats formerly inhabited by the interrupted rocksnail. The reach is occupied by other species of pleurocerid snails, as well as a diverse mussel fauna, indicating the presence of PCEs in this reach. Minimum flows that have been established from Jordan Dam have eliminated historical threats, such as seasonal loss of flow and low dissolved oxygen levels. The Mobile River Basin Mollusk Restoration Committee (2008, p. 53) recognizes this reach of the Coosa River as an appropriate reintroduction site for interrupted rocksnail, and the ADCNR has initiated attempts to reintroduce the species to the reach.

Rough Hornsnail

We identified 7 km (4 mi) of habitat that is unoccupied by the rough

hornsnail and that meets Criteria 1, 2, 3, and 6 listed above in this section. The species inhabits a 14-km (8-mi) reach of the Lower Coosa River below Jordan Dam; however, appropriate habitat extends an additional 7 km (4 mi) downstream of currently occupied areas. This stream reach is available for natural recolonization and contains one or more of the PCEs required by the rough hornsnail, including a geomorphically stable channel and adequate water quality and substrate, as indicated by the presence of closely related pleurocerids and other mollusk species with similar habitat requirements.

Critical Habitat Designation

We are designating three units as critical habitat for the Georgia pigtoe (GP 1, GP 2, and GP 3), three units for interrupted rocksnail (IR 1, IR 2, and IR 3), and two units for rough hornsnail (RH 1 and RH 2). The critical habitat areas described below constitute our best assessment of areas that currently meet the definition of critical habitat for the Georgia pigtoe, interrupted rocksnail, and rough hornsnail. Table 1 identifies the units for each species; shows the occupancy of the units, the approximate extent designated as critical habitat for the Georgia pigtoe (GP), interrupted rocksnail (IR), and rough hornsnail (RH); and provides information on the ownership of lands within the designated units. Critical habitat includes only the stream channel within the ordinary high water line. In Alabama and Georgia, the State owns navigable stream bottoms within the ordinary high water line, and all designated units in Alabama and Georgia are considered navigable. In Tennessee, the riparian landowner owns the stream bottom to the middle of the channel.

TABLE 1—OCCUPANCY AND OWNERSHIP OF CRITICAL HABITAT UNITS FOR GEORGIA PIGTOE (GP), INTERRUPTED ROCKSNAIL (IR), AND ROUGH HORNSNAIL (RH)

Unit	Location	Occupancy	Private ownership river kilometers (miles)	State ownership river kilometers (miles)
GP 1 ..	Conasauga River	Occupied	5 (3)	47 (29)
GP 2 ..	Terrapin Creek and Coosa River	Unoccupied	0	135 (22)
GP 3 ..	Hatchet Creek	Unoccupied	0	66 (41)
Total			5 (3)	148 (92)
IR 1	Coosa River	Unoccupied	0	111 (7)
IR 2	Oostanaula River	Occupied	0	12 (7.4)
		Unoccupied	0	65 (40.6)

TABLE 1—OCCUPANCY AND OWNERSHIP OF CRITICAL HABITAT UNITS FOR GEORGIA PIGTOE (GP), INTERRUPTED ROCKSNAIL (IR), AND ROUGH HORNSNAIL (RH)—Continued

Unit	Location	Occupancy	Private ownership river kilometers (miles)	State ownership river kilometers (miles)
IR 3	Lower Coosa River	Occupied	0	² 1 (0.6)
		Unoccupied	0	² 12 (7.4)
Total			0	101 (63)
RH 1 ..	Lower Coosa River	Occupied	0	² 14 (9)
		Unoccupied	0	7 (4)
RH 2 ..	Yellowleaf Creek	Occupied	0	6.4 (4)
		Unoccupied	0	0
Total			0	27.4 (17)

¹ IR 1 overlaps in part with GP 2.² IR 3 overlaps in part with RH 1. See Unit descriptions, below.

We present brief descriptions of all units and reasons why they meet the definition of critical habitat for each species below. The critical habitat units include the creek and river channels within the ordinary high water line. For this purpose, we applied the ordinary high water line definition found at 33 CFR 329.11, which is defined for 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. For each stream reach identified as a critical habitat unit, the upstream and downstream boundaries are described generally below; more precise estimates are provided in the Regulation Promulgation section at the end of this final rule.

Unit GP 1: Conasauga River, Bradley and Polk Counties, Tennessee, and Murray and Whitfield Counties, Georgia

Unit 1 for the Georgia pigtoe includes 52 km (32 mi) of the Upper Conasauga River from the confluence of Minnewaga Creek near Willis Springs, Polk County, Tennessee, downstream to U.S. Highway 76 in Murray and Whitfield Counties, Georgia. Critical habitat includes the stream channel within the ordinary high water line only. In Tennessee, the riparian landowner owns the stream bottom to the middle of the channel. Therefore, 5 km (3 mi) of GP 1 in Tennessee is privately owned. In Georgia, the State owns navigable stream bottoms within the ordinary high water line, and the

Conasauga River is considered navigable. Therefore, the State of Georgia owns 47 km (29 mi) of Unit GP 1.

The Georgia pigtoe has been collected from three shoals within the reach of the Conasauga River identified as GP 1, one located at each end of the reach and one site in between (Johnson and Evans 2000, p. 106; Evans 2001, pp. 33–34). Therefore, we consider the entire reach of the Conasauga River that composes GP 1 as occupied. Other shoals within the reach continue to be inhabited by a diverse mussel community, including the endangered triangular kidneyshell and southern pigtoe and the threatened fine-lined pocketbook. These species historically co-occurred in the same shoal habitats with the Georgia pigtoe, they have similar habitat requirements, and their persistence indicates the presence of PCEs 1, 2, 3, and 4 for the Georgia pigtoe. The persistence of the Georgia pigtoe within three shoals of this reach also indicates the presence of an appropriate fish host (PCE 5). This small population of Georgia pigtoe is at a high risk of extinction due to changes in flow, habitat or water quality, and stochastic events such as drought. Threats to the Georgia pigtoe and its habitat that may require special management of the PCEs include 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; the potential of significant changes in the existing flow regime due to such activities as impoundment, water diversion, or water withdrawal; the potential of significant alteration of water chemistry or water quality; and the potential of significant changes in

stream bed material composition and quality by activities such as construction projects, livestock grazing, timber harvesting, off-road vehicle use, and other watershed and floodplain disturbances that release sediments or nutrients into the water.

Unit GP 2: Terrapin Creek and Coosa River, Cherokee County, Alabama

Unit 2 for the Georgia pigtoe includes 24 km (15 mi) of Terrapin Creek from Alabama Highway 9 downstream to its confluence with the Coosa River, and 11 km (7 mi) of the Coosa River from Weiss Dam downstream to approximately 1.6 km (1 mi) below the confluence of Terrapin Creek in Cherokee County, Alabama. The State of Alabama owns navigable stream bottoms within the ordinary high water line, and both Lower Terrapin Creek and the Coosa River are considered navigable streams.

The Georgia pigtoe is not currently known to occur in Terrapin Creek or the Coosa River. However, Unit 2 is essential to the conservation of the Georgia pigtoe due to the high potential for stochastic events in the Conasauga River (the only extant population of Georgia pigtoe), and the need to re-establish the species within other portions of its historical range in order to reduce threats from stochastic events.

Lower Terrapin Creek and the Coosa River are within the species' historical range, and we consider them to be essential to the conservation of the Georgia pigtoe. Terrapin Creek flows into the Coosa River below Weiss Dam. Terrapin Creek continues to support a diverse mollusk assemblage, including the endangered southern pigtoe, a closely related species that co-occurs with the Georgia pigtoe in the Conasauga River, indicating the presence of PCEs 1, 2, 3, and 4. The

endangered southern clubshell, the threatened fine-lined pocketbook, and other mussel and snail species requiring PCEs 1, 2, 3, and 4 similar to the Georgia pigtoe continue to survive in the Coosa River just below the confluence of Terrapin Creek. Additionally, a diverse fish fauna, including potential fish hosts for the Georgia pigtoe (PCE 5), is known from Terrapin Creek and Coosa River.

Minimum flows from Weiss Dam into the Coosa River will be implemented upon completion of the Alabama Power Company Coosa River hydropower relicensing process with FERC (Weiss Bypass Working Group 2005, pp. 6–8), which is currently in progress. These minimum flows will improve the PCEs necessary for the survival of the Georgia pigtoe in the Coosa River, particularly above the confluence with Terrapin Creek. Because the minimum flows will originate from the large reservoir impounded by Weiss Dam, there is little threat of nonpoint source pollution and reduced potential of stochastic threats, such as drought and spills. ADCNR recognizes this reach of the Coosa River as having high conservation potential for imperiled mollusks in Alabama and is planning to reintroduce imperiled mollusks, including the Georgia pigtoe, following implementation of minimum flows. Over the past few decades, changes in land uses, use of best management practices for agriculture and forestry activities in the watershed, and implementation of State water quality standards resulted in improved water quality and shoal habitats in Terrapin Creek. The Mobile River Basin Mollusk Restoration Committee (2008, p. 40) recognizes Terrapin Creek as an appropriate reintroduction opportunity for the Georgia pigtoe.

Unit GP 3: Hatchet Creek, Coosa and Clay Counties, Alabama

Unit 3 for the Georgia pigtoe includes approximately 66 km (41 mi) of Hatchet Creek, extending from Clay County Road 4, Clay County, downstream to the confluence of Swamp Creek at Coosa County Road 29, Coosa County, Alabama. The State of Alabama owns navigable stream bottoms within the ordinary high water line, and Hatchet Creek is considered navigable.

The Georgia pigtoe does not currently occupy Hatchet Creek. However, historical records of the species show its presence in this stream from the stream's confluence with the Coosa River, Coosa County, upstream into Clay County, Alabama. An extensive reach of Hatchet Creek is occupied by the threatened fine-lined pocketbook, along with other mollusk species that currently or historically co-occur with

Georgia pigtoe, indicating the presence of PCEs 1, 2, 3, and 4. A diverse fish fauna, including several potential fish hosts for the pigtoe (PCE 5), is also known to inhabit Hatchet Creek. Water quality and shoal habitats in this stream have improved relative to past historical conditions due to changes in land uses, implementation of best management practices in agriculture and forestry activities in the watershed, and implementation of State water quality standards. Due to these improvements, Hatchet Creek has been designated as an Outstanding Alabama Water, which also provides for increased water quality protections. The Mobile River Basin Mollusk Restoration Committee (2008, p. 40) recognizes Hatchet Creek as having high conservation potential for reintroduction of the Georgia pigtoe.

Re-establishing Georgia pigtoe in Hatchet Creek will significantly reduce the level of stochastic threats to the species' survival and is essential to the conservation of the species. We do not know which specific shoals or reaches of Hatchet Creek may be capable of supporting the Georgia pigtoe. Therefore, we have designated all apparently suitable habitat within the historical range of the species in Hatchet Creek as critical habitat essential to the conservation of Georgia pigtoe.

Unit IR 1: Coosa River, Cherokee County, Alabama (overlaps in part with GP 2, described above)

Unit 1 for the interrupted rocksnail includes approximately 11 km (7 mi) of the Coosa River extending from Weiss Dam downstream to about 1.6 km (1 mi) below the confluence of Terrapin Creek, Cherokee County, Alabama. The State of Alabama owns navigable stream bottoms within the ordinary high water line, and the Coosa River is considered navigable.

The interrupted rocksnail historically inhabited the Coosa River in Cherokee County. Although the species does not currently occupy the area, Unit 1 is essential to the conservation of the interrupted rocksnail due to the high degree of stochastic threats to the single surviving population in the Oostanaula River and the need to re-establish the species within other portions of its historical range. The presence of the endangered southern clubshell, the threatened fine-lined pocketbook, and other mussel and snail species in the Coosa River at and below the confluence of Terrapin Creek indicates the presence of PCEs 1, 2, 3, and 4 for the interrupted rocksnail.

Minimum flows from Weiss Dam into the Coosa River will be implemented upon completion of the Alabama Power

Company Coosa River hydropower relicensing process with FERC (Weiss Bypass Working Group 2005, pp. 6–8) currently in progress. These minimum flows will improve the PCEs necessary for the survival of the interrupted rocksnail in about 11 km (7 mi) of the Coosa River, between Weiss Dam downstream to the confluence with Terrapin Creek. Implementation of minimum flows from Weiss Dam (Weiss Bypass Working Group 2005, pp. 6–8) will improve PCEs necessary for the survival of the interrupted rocksnail. The majority of flow into the reach above the confluence of Terrapin Creek originates from Weiss Dam. Therefore, there is little threat of nonpoint source pollution, and reduced potential of stochastic threats such as drought and spills. ADCNR recognizes this reach as having high conservation potential for imperiled mollusks in Alabama and is planning to reintroduce imperiled mollusk species, including the interrupted rocksnail, into the reach following initiation of minimum flows. Re-establishing the interrupted rocksnail into the Coosa River will significantly reduce stochastic threats to the survival of the species and is essential to its conservation.

Unit IR 2: Oostanaula River, Gordon and Floyd Counties, Georgia

Unit 2 for the interrupted rocksnail includes approximately 77 km (48 mi) of the Oostanaula River from the Conasauga–Coosawattee confluence in Gordon County, downstream to Georgia Highway 1 loop in Floyd County, Georgia. The State of Georgia owns navigable stream bottoms within the ordinary high water line, and the Oostanaula River is considered navigable.

The interrupted rocksnail occupies shoals along a 12-km (7.4-mi) reach of the Oostanaula River, extending from the confluence of Johns Creek in Gordon and Floyd Counties, downstream to the confluence of Armuchee Creek in Floyd County, Georgia. Threats to the interrupted rocksnail and its habitat in the Oostanaula River that may require special management of the PCEs include the potential of activities (such as channelization, impoundment, and channel excavation) that could cause aggradation or degradation of the channel bed elevation or significant bank erosion; the potential of significant changes in the existing flow regime due to activities such as impoundment, hydropower generation, water diversion, or water withdrawal; the potential of significant alteration of water chemistry or water quality; and the potential of significant changes in

stream bed material composition and quality by activities such as construction projects, livestock grazing, timber harvesting, off-road vehicle use, and other watershed and floodplain disturbances that release sediments or nutrients into the water.

Although there are no recent collections of the species from shoal habitats above and below the currently inhabited reach, these currently unoccupied areas contain three of the PCEs required by the species, including geomorphically stable stream channels, natural flows, and appropriate substrates (PCEs 1, 2, and 4). The presence of other mollusk species with similar habitat requirements as the interrupted rocksnail in this reach, including the endangered triangular kidneyshell, along with more common species of pleurocerid snails, also indicates the potentially suitable presence of appropriate water quality (PCE 3). Shoals within the 65 km (40.6 mi) of currently unoccupied reaches of the Oostanaula River are available to natural recolonization of the species. Expanding the range of the interrupted rocksnail into adjacent shoals in the river would greatly reduce the degree of threat from stochastic events, and is essential to the conservation of the interrupted rocksnail.

Unit IR 3: Lower Coosa River, Elmore County, Alabama

Unit 3 for the interrupted rocksnail includes 13 km (8 mi) of the Lower Coosa River between Jordan Dam and Alabama Highway 111 in Elmore County, Alabama. The State of Alabama owns navigable stream bottoms within the ordinary high water line, and the Coosa River is considered navigable.

The Lower Coosa River is within the historical range of the species, and a small population of the interrupted rocksnail has been reintroduced into a 1-km (0.6-mi) portion of a shoal there (ADCNR 2004, p 33). However, this reintroduced population will likely require augmentations over several years before population size can reach self-sustainable levels. The remaining 12 km (7.4 mi) of this reach, from Jordan Dam downstream to the Fall Line at Wetumpka, contains numerous high-quality shoals and pools characteristic of the large river habitats historically occupied by the species. Several other species of pleurocerid snails, the endangered tulotoma snail, and a diverse mussel fauna are currently found throughout the reach, indicating the presence and suitability of PCEs 1, 2, 3, and 4 for the interrupted rocksnail in this reach. Historical threats, including seasonal loss of flow and low

dissolved oxygen, were eliminated in 1990 by implementation of minimum flows from Jordan Dam by the Alabama Power Company. As noted, ADCNR recognizes the Lower Coosa River as an appropriate location for imperiled mollusk reintroductions and has begun efforts to reestablish the interrupted rocksnail into this reach. Due to the extremely limited distribution of the interrupted rocksnail and the high degree of stochastic threats to the single natural population, reestablishing the species in the Lower Coosa River is essential to the conservation of the interrupted rocksnail.

Unit RH 1: Lower Coosa River, Elmore County, Alabama (overlaps in part with IR 3, described above)

Unit 1 for the rough hornsnail includes 21 km (13 mi) of the Lower Coosa River extending from Jordan Dam, downstream to the confluence of the Tallapoosa River in Elmore County, Alabama. The State of Alabama owns navigable stream bottoms within the ordinary high water line, and the Coosa River is considered navigable. We believe PCEs 1, 2, 3, and 4 to be suitable throughout the reach, due to the presence of rough hornsnail colonies or other closely related pleurocerid snail species that are known to co-occur with the hornsnail and have similar habitat requirements.

Early 1990 records of rough hornsnail from the reach of the Coosa River between Jordan Dam and the Fall Line (FLMNH in litt. 2006), and more recent records of the hornsnail extending 2 km (1.2 mi) below the Fall Line (Hartfield pers. obsv. 2001; Crow in litt. 2008), indicate an occupied range of 14 km (9 mi) in the Lower Coosa River. An additional 7-km (4-mi) channel reach extending downstream to the confluence of the Tallapoosa River is not currently occupied. This downstream unoccupied area is available for natural recolonization, and contains PCEs 1, 2, 3, and 4, including a geomorphically stable channel, and adequate flow, water quality, and substrate, as indicated by the presence of closely related pleurocerids and other mollusk species with similar habitat requirements. Expanding the range of rough hornsnail into the currently unoccupied downstream habitat would reduce the level of stochastic threats to the species, and is essential to its conservation.

Threats to the rough hornsnail and its habitat in the Coosa River that may require special management of the PCEs include the potential of activities (such as channelization, impoundment, and channel excavation) that could cause

aggradation or degradation of the channel bed elevation or significant bank erosion; the potential of significant changes in the existing flow regime due to such activities as hydropower generation, water diversion, or water withdrawal; the potential of significant alteration of water chemistry or water quality due to discharges or land use activities; and 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.

Unit RH 2: Yellowleaf Creek, Shelby County, Alabama

Unit 2 for the rough hornsnail includes approximately 6.4 km (4 mi) of the Yellowleaf Creek channel from the confluence of Morgan Creek, downstream to 1.6 km (1 mi) below the Alabama Highway 25 crossing in Shelby County, Alabama. The State of Alabama owns navigable stream bottoms within the ordinary high water line, and the lower reach of Yellowleaf Creek is considered navigable.

The rough hornsnail has been found to occupy this entire reach (Powell in litt. 2009). This reach of Yellowleaf Creek is characterized by a stable channel, natural flows, and appropriate water quality and substrates (PCEs 1, 2, 3, and 4). Threats to the rough hornsnail and its habitat in Yellowleaf Creek that may require special management of PCEs 1, 2, 3, and 4 include the potential of activities (such as channelization, impoundment, and channel excavation) that could cause aggradation or degradation of the channel bed elevation or significant bank erosion; the potential of significant changes in the existing flow regime due to such activities as water diversion or water withdrawal; the potential of significant alteration of water chemistry or water quality due to discharges or nonpoint source pollution; and 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.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out are not likely to destroy or adversely modify critical

habitat. Decisions by the courts of appeals for the Fifth and Ninth Circuits have invalidated our 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 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 remain functional (or retain the current ability for the PCEs to be functionally established) to serve its intended conservation role for the species.

If a species is listed or critical habitat is designated, 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 to destroy or adversely modify its critical habitat. Activities on State, tribal, local, or private lands requiring a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or a permit from the Service under section 10 of the Act) or involving some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency) are subject to the section 7(a)(2) consultation process. Federal actions not affecting listed species or critical habitat, and actions on State, tribal, local, or private lands that are not federally funded, authorized, or permitted, do not require section 7(a)(2) consultations.

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. As a result of this 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, and 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 or destroy or adversely modify critical habitat, we also provide reasonable and prudent alternatives to the project, if any are identifiable. We define “reasonable and prudent alternatives” at 50 CFR 402.02 as alternative actions identified during consultation that:

- Can be implemented in a manner consistent with the intended purpose of the action,
- Can be implemented consistent with the scope of the Federal agency’s legal authority and jurisdiction,
- Are economically and technologically feasible, and
- Would, in the Director’s opinion, avoid jeopardizing the continued existence of the listed species or 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 may sometimes 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, or would retain its current ability for the PCEs to be functionally established. Activities that may destroy or adversely modify critical habitat are those that alter the PCEs to an extent that appreciably reduces the conservation value of critical habitat for each species (the Georgia pigtoe, interrupted rocksnail, and rough hornshell).

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 each species (Georgia pigtoe, interrupted rocksnail, and rough hornshell) include, but are not limited to:

(1) Actions that would alter the geomorphology of stream and river habitats. Such activities could include, but are not limited to, instream excavation or dredging, impoundment, channelization, and discharge of fill materials. These activities could cause aggradation or degradation of the channel bed elevation or significant bank erosion and result in entrainment or burial of these mollusks, and could cause other direct or cumulative adverse effects to these species and their life cycles.

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

(3) Actions that would significantly alter water chemistry or water quality (for example, temperature, pH, contaminants, and excess nutrients). Such activities could include, but are not limited to, hydropower discharges, or the release of chemicals, biological pollutants, or heated effluents into surface water or connected groundwater at a point source or by dispersed release (nonpoint source). These activities could alter water conditions that are beyond the tolerances of these mollusks and result in direct or cumulative adverse effects to the species 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, off-road vehicle use, 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 mollusks by causing excessive sedimentation and burial of the species or their habitats, or eutrophication leading to excessive filamentous algal growth. Excessive

filamentous algal growth can cause reduced nighttime dissolved oxygen levels through respiration, cover the hard substrates required by aquatic snails for egg deposition, and prevent mussel glochidia from settling into stream sediments.

Exemptions and Exclusion

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. 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.”

There are no Department of Defense lands with a completed INRMP within the critical habitat designation for any of the three species. Therefore, there are no specific lands that meet the criteria for being exempted from the designation of critical habitat under section 4(a)(3) of the Act.

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

Section 4(b)(2) of the Act states that the Secretary must designate or revise 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 legislative history is clear that the Secretary has broad discretion regarding which factors to use and how much weight to give to any factor.

Under section 4(b)(2) of the Act, we must consider the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. For example, we consider whether there are lands owned or managed by the Department of Defense (DOD) where a national security impact might exist. We also consider whether landowners have developed any conservation plans for the area, or whether there are conservation partnerships that would be encouraged by designation of, or exclusion of lands 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 the economic impacts, environmental impacts, and any social impacts that might occur because of the designation.

Under section 4(b)(2) of the Act, in considering whether to exclude a particular area from the designation, we must identify the benefits of including the area in the designation, identify the benefits of excluding the area from the designation, and determine whether the benefits of exclusion outweigh the benefits of inclusion. If, based on this analysis, we determine that the benefits of exclusion outweigh the benefits of inclusion, we can exclude the area only if such exclusion would not result in the extinction of the species.

In the proposed rule, we requested information on why any area should or should not be designated as critical habitat as provided by section 4 of the Act (16 U.S.C. 1531 *et seq.*), including whether the benefit of designation would outweigh threats to the species caused by designation such that the designation of critical habitat is prudent. In this instance, we have examined all comments submitted with respect to providing adequate protection and management for the Georgia pigtoe, interrupted rocksnail, and rough hornshell. None of the comments provided sufficient information to satisfy the criteria necessary for exclusion from final critical habitat.

In preparing this final rule, we determined that the lands within the designation of critical habitat for the Georgia pigtoe, interrupted rocksnail, and rough hornshell are not owned or managed by the Department of Defense; there are currently no conservation partnerships for the Georgia pigtoe, interrupted rocksnail, and rough hornshell; and the designation does not include any tribal lands or trust resources. Since the critical habitat designation includes only aquatic areas that are generally held in public trust, involves no Tribal lands, and includes no areas presently under special management or protection provided by a legally operative plan or agreement for the conservation of these mussels, we believe that, other than economics, there are no other relevant impacts to evaluate under section 4(b)(2).

Economic Analysis (EA)

We prepared an economic analysis that is consistent with the ruling of the United States Court of Appeals for the Tenth Circuit in *New Mexico Cattle Growers Ass'n v. United States Fish and Wildlife Service*, 248 F.3d 1277 (2001), and that was available for public review and comment during the comment period for the proposed rule. The final economic analysis is available on the Internet at <http://www.regulations.gov>. The final EA (Industrial Economics 2009) considers the potential economic effects of actions relating to the conservation of the Georgia pigtoe, interrupted rocksnail, and rough hornshell, including costs associated with sections 4, 7, and 10 of the Act, and including those attributable to designating critical habitat. It further considers the economic effects of protective measures taken as a result of other Federal, State, and local laws that aid habitat conservation for the Georgia pigtoe, interrupted rocksnail, and rough hornshell in essential habitat areas. The EA considers both economic efficiency and distributional effects. In the case of habitat conservation, efficiency effects generally reflect the “opportunity costs” associated with the commitment of resources to comply with habitat protection measures (for example, lost economic opportunities associated with restrictions on land use).

The final economic analysis states that costs associated with future conservation efforts that may benefit the three mollusks in critical habitat areas are estimated to be \$8.97 million to \$9.16 million annually, assuming a 7 percent discount rate. Most (96 percent) of baseline costs quantified in this analysis are conservation efforts related to lost hydropower production value at

three facilities. The remaining 4 percent of potential future baseline costs are related to transportation activities, water quality management activities, and National Forest management activities.

However, extensive actions are already currently planned within most of the critical habitat areas designated for these three species, on behalf of 11 other listed mollusk species for which the areas have been previously designated as critical habitat (69 FR 40083, July 1, 2004). Only 5 river miles (8 river kilometers) of this critical habitat designation do not overlap habitat for the 11 mussels, and no known projects are planned within, or which may affect, critical habitat in those areas. As such, incremental costs are anticipated to result entirely from the added administrative requirements of forecast section 7 consultations, and are estimated to be approximately \$44,000 annually, assuming a 7 percent discount rate.

Based on the best available information, including the prepared economic analysis, we believe that all of the eight units are essential for the conservation of these species. Critical habitat aids in the conservation of the species specifically by protecting the primary constituent elements on which the species depends. It can also result in benefits by providing information to the public, local and State governments, Federal agencies, and other entities engaged in activities or long-range planning in areas essential to the conservation of the species. Conservation of the interrupted rocksnail, rough hornsnail, and Georgia pigtoe and essential features of their habitats will require habitat management, protection, and restoration, which will be facilitated by knowledge of habitat locations and the physical and biological features of those habitats. We conclude that these benefits of inclusion outweigh the above-described costs of designation for all areas we are designating as critical habitat in this rule.

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 encourages and results in conservation actions by Federal, State, and private agencies; groups; and individuals. The Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. The protection

required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, 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 being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to 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 activities that may affect the Georgia pigtoe, interrupted rocksnail, and rough hornsnail include, but are not limited to, the carrying out or the issuance of permits for reservoir construction, stream alterations, discharges, wastewater facility development, water withdrawal projects, pesticide registration, mining, and road and bridge construction. It has been the experience of the Service, however, that nearly all section 7 consultations have been resolved so that the species have been protected and the project objectives have been met.

Listing the Georgia pigtoe, interrupted rocksnail, and rough hornsnail initiates the development and implementation of rangewide recovery plans for each species. These plans will bring together Federal, State, and local agency efforts for the conservation of these species. Recovery plans will establish a framework for agencies to coordinate their recovery efforts. The plans will set recovery priorities and estimate the costs of the tasks necessary to accomplish the priorities. They also will describe the site-specific actions necessary to achieve conservation and survival of each species.

Listing also will require us to review any actions on Federal lands and activities under Federal jurisdiction that may affect the three species; allow State plans to be developed under section 6 of the Act; encourage scientific investigations of efforts to enhance the propagation or survival of the species under section 10(a)(1)(A) of the Act; and promote habitat conservation plans non-Federal lands and activities under section 10(a)(1)(B) of the Act.

The Act and its implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and

exceptions that apply to all endangered wildlife. These prohibitions, 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 or 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. It also is illegal to possess, sell, deliver, carry, transport, or ship any wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances. Regulations governing permits are set forth at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities.

Under the Interagency Cooperative Policy for Endangered Species Act Section 9 Prohibitions, published in the **Federal Register** on July 1, 1994 (59 FR 34272), we identify to the maximum extent practicable those activities that would or would not constitute a violation of section 9 of the Act when the Georgia pigtoe, interrupted rocksnail, and rough hornsnail are listed. The intent of this policy is to increase public awareness as to the effects of these listings on future and ongoing activities within a species' range. We believe, based on the best available information, that the following actions will not result in a violation of the provisions of section 9 of the Act, provided these actions are carried out in accordance with existing regulations and permit requirements:

(1) Possession, delivery, or movement, including interstate transport that does not involve commercial activity, of specimens of these species that were legally acquired prior to the addition of these three mollusks to the Federal List of Endangered or Threatened Wildlife;

(2) Discharges into waters supporting the Georgia pigtoe, interrupted rocksnail, and rough hornsnail, provided these activities are carried out in accordance with existing regulations and permit requirements (e.g., activities subject to section 404 of the Clean Water Act and discharges regulated under the National Pollutant Discharge Elimination System (NPDES));

(3) Agricultural and silvicultural activities or development and construction activities designed and

implemented under State and local water quality regulations and implemented using approved best management practices; and

(4) Any actions that may affect the Georgia pigtoe, interrupted rocksnail, and rough hornsnail that are authorized, funded, or carried out by a Federal agency (such as bridge and highway construction, pipeline construction, hydropower licensing), when the action is conducted in accordance with the consultation requirements for listed species under section 7 of the Act.

Potential activities that we believe will likely be considered a violation of section 9 of the Act, include, but are not limited to, the following:

(1) Unauthorized possession, collecting, trapping, capturing, killing, harassing, sale, delivery, or movement, including interstate and foreign commerce, or harming, or attempting any of these actions, of the Georgia pigtoe, interrupted rocksnail, and rough hornsnail;

(2) Unlawful destruction or alteration of their habitats (such as unpermitted instream dredging, impoundment, channelization, or discharge of fill material) that impairs essential behaviors, such as breeding, feeding, or sheltering, or results in killing or injuring any of these species;

(3) Violation of any discharge or water withdrawal permit that results in harm or death to any of these species or that results in degradation of their occupied habitat to an extent that essential behaviors such as breeding, feeding, and sheltering are impaired; and

(4) Unauthorized discharges or dumping of toxic chemicals or other pollutants into waters supporting the Georgia pigtoe, interrupted rocksnail, and rough hornsnail that kills or injures these species, or otherwise impairs essential life-sustaining requirements, such as reproduction, food, or shelter.

Other activities not identified above will be reviewed on a case-by-case basis to determine if a violation of section 9 of the Act may be likely to result from such activity. The Service does not consider these lists to be exhaustive and provides them as information to the public.

If you have questions regarding whether specific activities will likely violate the provisions of section 9 of the Act, contact the Jackson, Ecological Services Field Office (*see ADDRESSES*). Requests for copies of regulations regarding listed species and inquiries about prohibitions and permits should be addressed to the U.S. Fish and Wildlife Service, Ecological Services Division, 1875 Century Boulevard,

Atlanta, GA 30345 (phone 404-679-7313; fax 404-679-7081).

Required Determinations

Regulatory Planning and Review—Executive Order 12866

The Office of Management and Budget (OMB) has determined that this rule is not significant under Executive Order 12866 (E.O. 12866). OMB bases its determination upon the following four criteria:

(a) Whether the rule will have an annual effect of \$100 million or more on the economy or adversely affect an economic sector, productivity, jobs, the environment, or other units of the government.

(b) Whether the rule will create inconsistencies with other Federal agencies' actions.

(c) Whether the rule will materially affect entitlements, grants, user fees, loan programs, or the rights and obligations of their recipients.

(d) Whether the rule raises novel legal or policy issues.

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

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq.*), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA), 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 effect of the rule on small entities (*i.e.*, small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of an 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 factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities. In this final rule, we are certifying that the critical habitat designation for the three mollusks will not have a significant economic impact on a substantial number of small entities. The following discussion explains our rationale.

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. 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 rule could significantly affect a substantial number of small entities, we consider the number of small entities affected within particular types of economic activities (*e.g.*, housing development, grazing, oil and gas production, timber harvesting). 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 are 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 three mollusks. 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 reinstitute consultation for ongoing Federal

activities (see *Application of the "Adverse Modification" Standard* section).

In our final economic analysis of the proposed critical habitat designation, we evaluated the potential economic effects on small business entities resulting from conservation actions related to the listing of the three mollusks and the proposed designation of critical habitat. The analysis is based on the estimated impacts associated with the proposed rulemaking as described in Sections 2 through 6 and Appendix B of the analysis and evaluates the potential for economic impacts related to: (1) Water management; (2) water quality; and (3) other activities (dredging, general construction, bridge construction, and natural gas pipeline).

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 only incremental impacts associated with this rulemaking are administrative costs of consultation under section 7 of the Act, which are expected to be approximately \$44,000 annually, using a 7 percent discount rate. The average of such costs to a small business over the next 20 years, discounted at 7 percent, is estimated to range from \$0 to \$18,300. The annualized incremental impacts, discounted at 7 percent, are expected to be distributed among specific activities as follows: 42 percent transportation/construction, 33 percent water quality, 18 percent National Forest activities, and 7 percent water management.

In summary, we considered whether this designation will 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 three mollusks 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

Pursuant to Executive Order No. 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," issued May 18, 2001, Federal agencies must prepare and submit a "Statement of Energy Effects" for all "significant energy

actions." The purpose of this requirement is to ensure that all Federal agencies "appropriately weigh and consider the effects of the Federal Government's regulations on the supply, distribution, and use of energy."

The Office of Management and Budget (OMB) has provided guidance for implementing E.O. 13211 that outlines nine outcomes that may constitute "a significant adverse effect" when compared without the regulatory action under consideration. The economic analysis finds that incremental impacts of the designation of critical habitat are the subject of the analysis under Executive Order No. 13211. The potential effects of this designation on power production were considered in the economic analysis. The economic analysis finds that water managers at four hydroelectric production facilities in the ACT Basin are likely to undertake conservation efforts for listed species that will benefit the three mollusks, at an estimated cost of \$8.8 million annually. Specifically, three facilities (Carters, Weiss, Jordan) are expected to modify operations to provide additional flows for the benefit of downstream aquatic species. However, these modifications related to conserving the Georgia pigtoe, interrupted rocksnail, and rough hornsnail are expected to occur absent these critical habitat designations, because the areas affected have been previously designated as critical habitat for, and are occupied by, other listed mollusk species with similar PCEs and habitat needs. Incremental impacts incurred from this critical habitat designation are all expected to be administrative in nature, and the designation of critical habitat for the Georgia pigtoe, interrupted rocksnail, and rough hornsnail is not expected to lead to any of the adverse outcomes specified in the OMB guidance. As such, this final designation of critical habitat is not expected to significantly affect energy supplies, distribution, or use, and a Statement of Energy Effects is not required.

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

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501), the Service makes the following findings:

(a) 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, 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; AFDC 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 jeopardize the continued existence of the species, or 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 listing these species or designating critical habitat shift the costs of the large entitlement programs listed above on to State governments.

(b) We have determined that the designation of critical habitat for the Georgia pigtoe, interrupted rocksnail, or

rough hornsnail will significantly or uniquely affect small governments because these mollusk species occur primarily in State-owned river channels, or in remote privately owned stream channels. As such, a Small Government Agency Plan is not required.

Takings

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 Georgia pigtoe, interrupted rocksnail, and rough hornsnail in a takings implications assessment. The takings implications assessment concludes that this designation of critical habitat for the Georgia pigtoe, interrupted rocksnail, and rough hornsnail does not pose significant takings implications.

Federalism—Executive Order 13132

In accordance with Executive Order 13132 (Federalism), the rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with DOI and Department of Commerce policy, we requested information from, and coordinated development of this critical habitat designation with, appropriate State resource agencies in Alabama, Georgia, and Tennessee. The critical habitat designation may have some benefit to these governments in that the areas that contain the features essential to the conservation of the species are more clearly defined, and the PCEs of the habitat necessary to the conservation of the species are specifically identified. While making this definition and identification does not alter where and what federally sponsored activities may occur, it may assist these local governments in long-range planning (rather than waiting 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) of the Act would 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—Executive Order 12988

In accordance with Executive Order 12988, the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and meets the requirements of sections 3(a) and 3(b)(2) of the Order. We have designated critical habitat for the Georgia pigtoe, interrupted rocksnail, and rough hornsnail in accordance with the provisions of the Act. This final rule uses standard property descriptions and identifies the PCEs within the designated areas to assist the public in understanding the habitat needs of the Georgia pigtoe, interrupted rocksnail, and rough hornsnail.

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

This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act. 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) (42 U.S.C. 4321 et seq.)

We determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted under section 4(a) of the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

Also, it is our position that, outside the jurisdiction of the United States Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses as defined by 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 assertion was upheld by the Circuit Court of the United States 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, and the Department of 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, 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. One parcel of land adjacent to Unit RH-1 is owned by the Poarch Creek Band of Indians, and the Creek Indian Enterprises, a small entity, runs a small casino on the site. We contacted the Poarch Creek Band regarding our proposed listing and critical habitat designation, and the draft economic analysis. As of the publication date of this rule, we have not received any concerns from, or been contacted by, the Poarch Creek Band regarding the designation of critical habitat adjacent to their lands.

References Cited

A complete list of all references cited in this rulemaking is available on the Internet at <http://www.regulations.gov> and upon request from the Field Supervisor, Jackson Ecological Services Field Office (see **ADDRESSES** section).

Author(s)

The primary author of this package is Paul Hartfield of the Jackson Ecological Services Field Office (see **ADDRESSES**).

List of Subjects in 50 CFR Part 17

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

Regulation Promulgation

■ Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

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) as follows:

■ a. Add "Pigtoe, Georgia" in alphabetical order under CLAMS; and
 ■ b. Add "Hornsnail, rough" and "Rocksnail, interrupted" in alphabetical order under SNAILS, 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							
* * * * *							
Pigtoe, Georgia	<i>Pleurobema hanleyianum</i> .	U.S.A. (AL, GA, TN) ...	NA	E	777	17.95(f)	NA
* * * * *							
SNAILS							
* * * * *							
Hornsnail, rough	<i>Pleurocera foremani</i>	U.S.A. (AL)	NA	E	777	17.95(f)	NA
* * * * *							
Rocksnail, interrupted ..	<i>Leptoxis foremani</i>	U.S.A. (AL, GA)	NA	E	777	17.95(f)	NA
* * * * *							

■ 3. Amend § 17.95(f) by adding entries for “Georgia pigtoe (*Pleurobema hanleyianum*)”, “Interrupted Rocksnail (*Leptoxis foremani*)”, and “Rough Hornsnail (*Pleurocera foremani*)” at the end of the paragraph to read as set forth below:

§ 17.95 Critical habitat—fish and wildlife.

* * * * *

(f) *Clams and Snails.*

* * * * *

Georgia Pigtoe (*Pleurobema hanleyianum*)

(1) Critical habitat units are depicted for Cherokee, Coosa, and Clay Counties, Alabama; Murray and Whitfield Counties, Georgia; and Bradley and Polk Counties, Tennessee, on the maps below.

(2) The primary constituent elements (PCEs) of critical habitat for the Georgia pigtoe are the habitat components that provide:

(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) A hydrologic flow regime (the magnitude, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats where the species is found. Unless other information becomes available, existing conditions at locations where the species occurs will be considered as minimal flow requirements for survival.

(iii) Water quality (including temperature, pH, hardness, turbidity, oxygen content, and chemical constituents) that meets or exceeds the current aquatic life criteria established under the Clean Water Act (33 U.S.C. 1251–1387).

(iv) Sand, gravel, cobble, boulder, or bedrock substrates with low to moderate

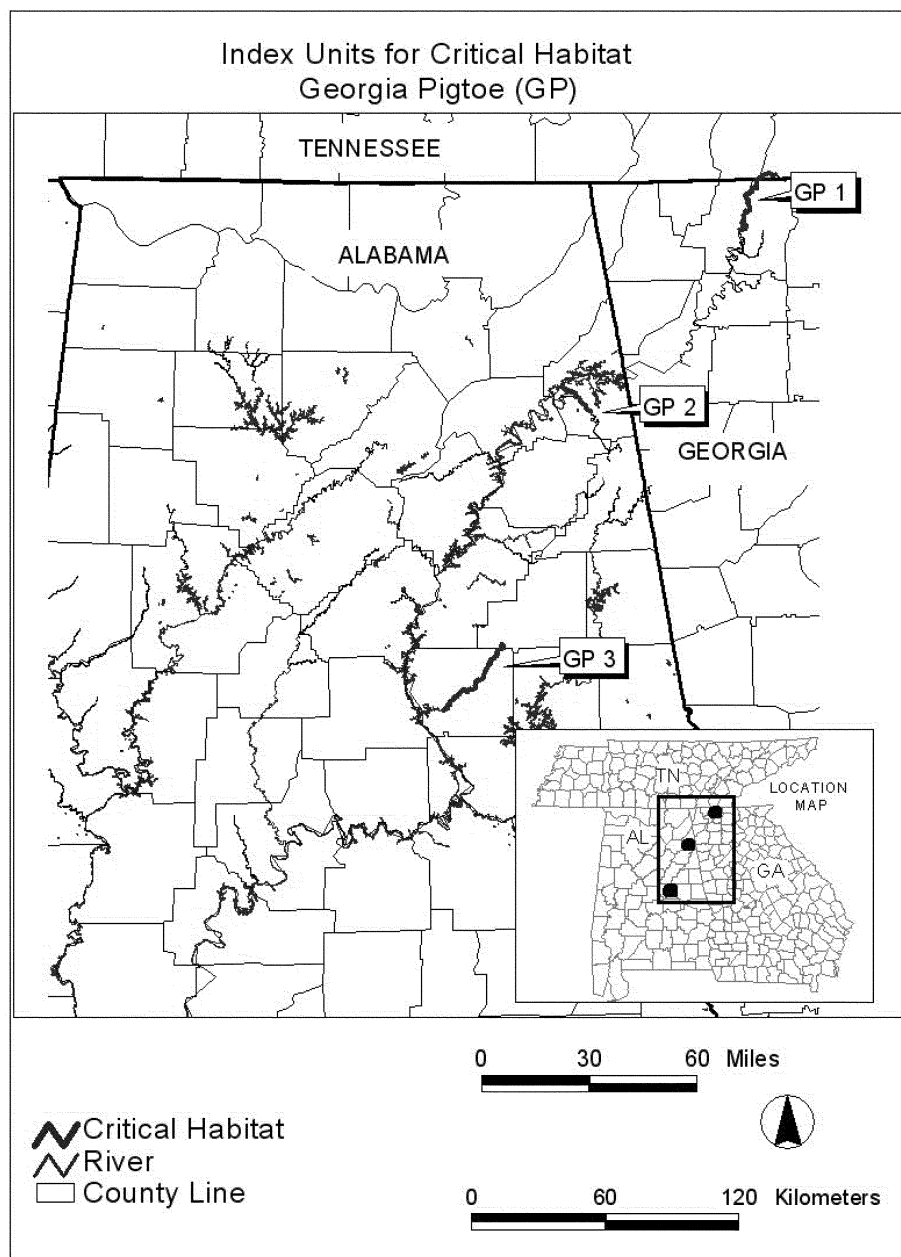
amounts of fine sediment and attached filamentous algae.

(v) The presence of fish host(s) for the Georgia pigtoe (species currently unknown). Diverse assemblages of native fish will serve as a potential indication of presence of host fish.

(3) Critical habitat does not include manmade structures existing on the effective date of this rule and not containing one or more of the PCEs, such as buildings, bridges, aqueducts, airports, and roads, and the land on which such structures are located.

(4) *Critical habitat unit maps.* Maps were developed from USGS 7.5' quadrangles. Critical habitat unit upstream and downstream limits were then identified by longitude and latitude using decimal degrees and converted to Universal Transverse Mercator (UTM) zone 16, coordinates.

(5) *Note:* Index map of critical habitat units for the Georgia pigtoe follows:



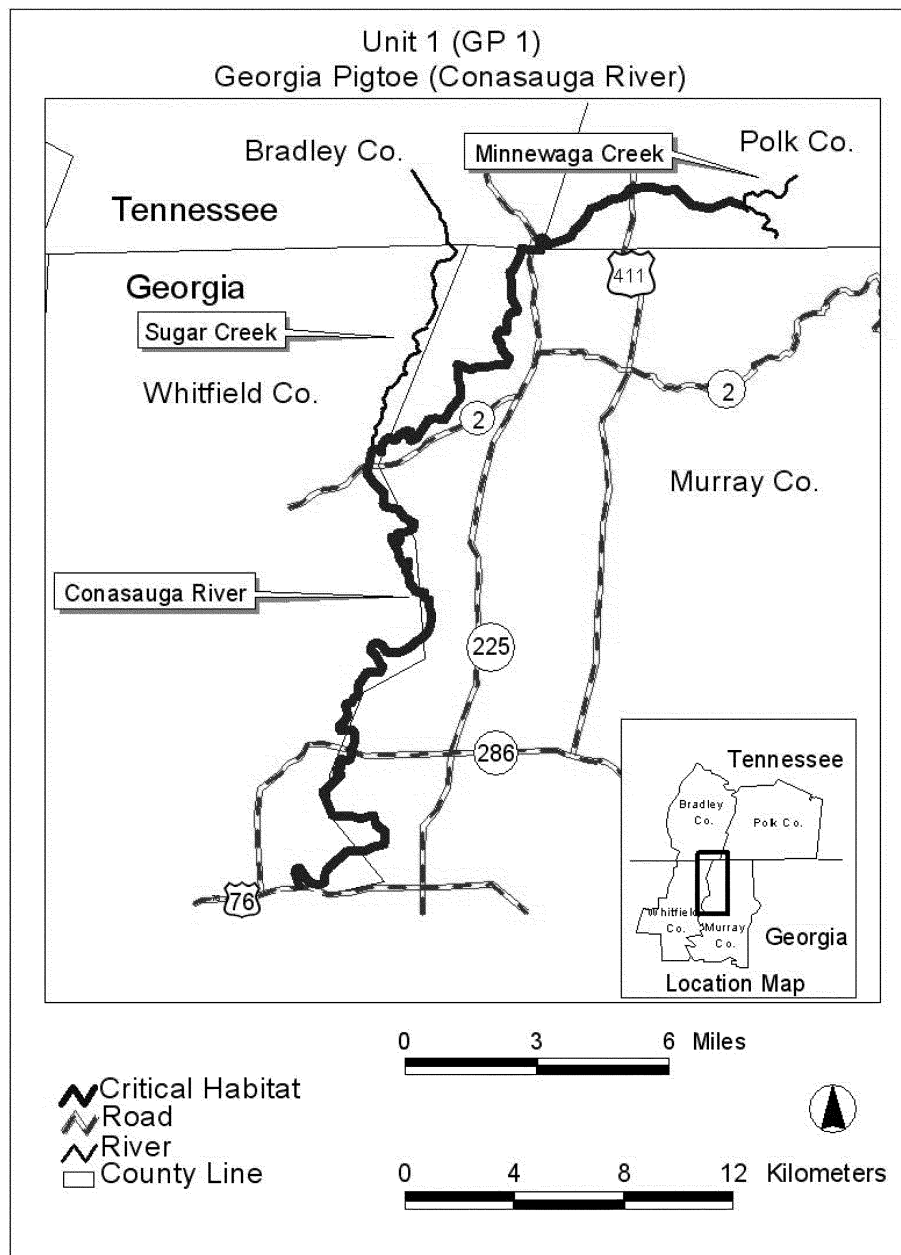
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(6) Unit 1 for Georgia pigtoe (GP 1): Conasauga River, Bradley and Polk Counties, Tennessee; Murray and Whitfield Counties, Georgia.

(i) Unit GP 1 includes the channel of the Conasauga River from the confluence of Minnewaga Creek (710752.23E, 3875891.03N), Polk County, Tennessee, downstream to U.S.

Highway 76 (694611.06E, 3851057.36N), Murray/Whitfield County, Georgia.

(ii) *Note:* Map of Unit 1 (GP 1) for Georgia pigtoe (Conasauga River) follows:



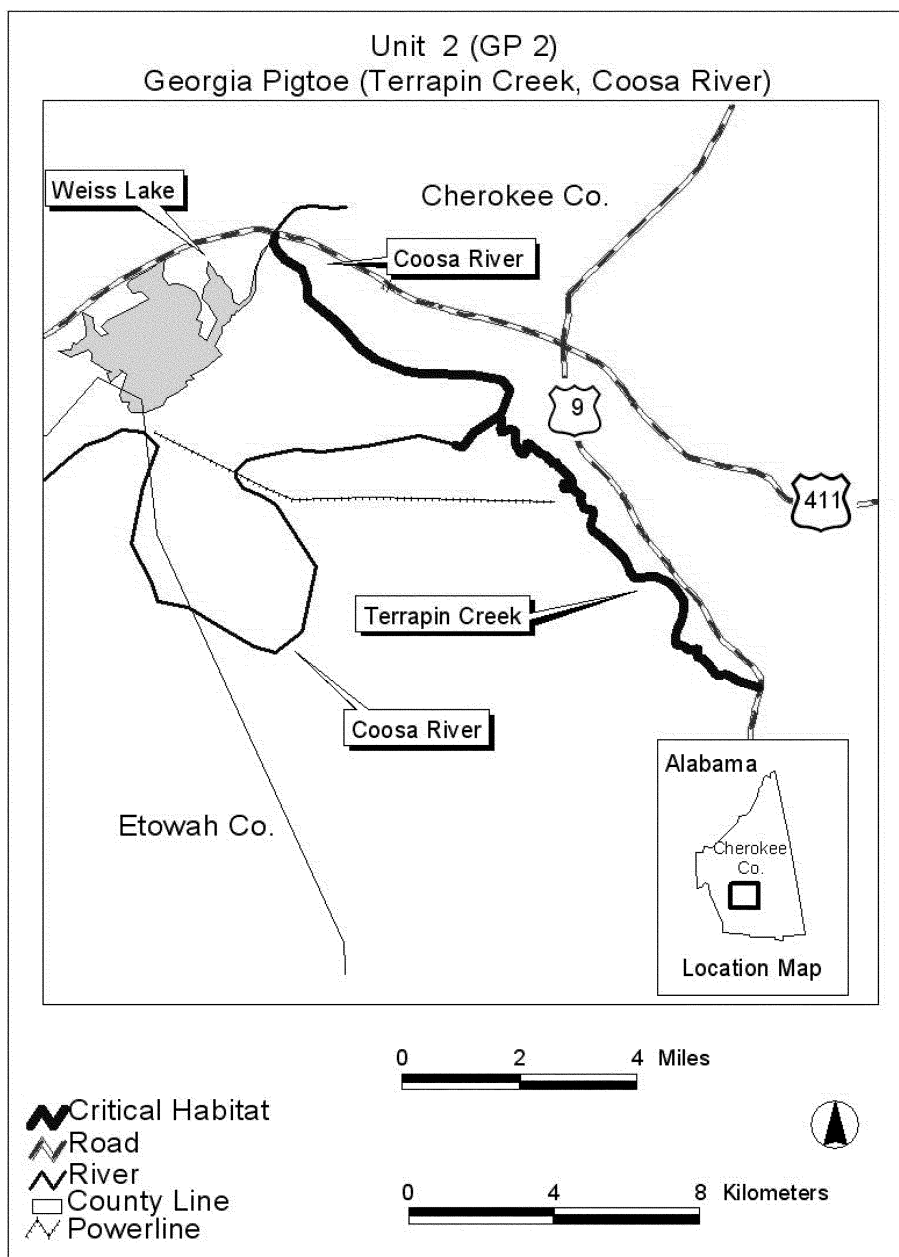
(7) Unit 2 for Georgia pigtoe (GP 2), Terrapin Creek and Coosa River, Cherokee County, Alabama.

(i) Unit GP 2 includes the channel of Terrapin Creek from Alabama Highway 9 (628065.76E, 3770007.078N),

downstream to the confluence with the Coosa River (621001.27E, 3777441.03N), Cherokee County, Alabama; and the Coosa River channel from Weiss Dam (614866.54E, 3781969.16N), downstream to a point 1.6 km (1 mi)

below the confluence of Terrapin Creek (619751.69E, 3776654.79N), Cherokee County, Alabama.

(ii) *Note:* Map of Unit 2 (GP 2) for Georgia pigtoe (Terrapin Creek, Coosa River) follows:

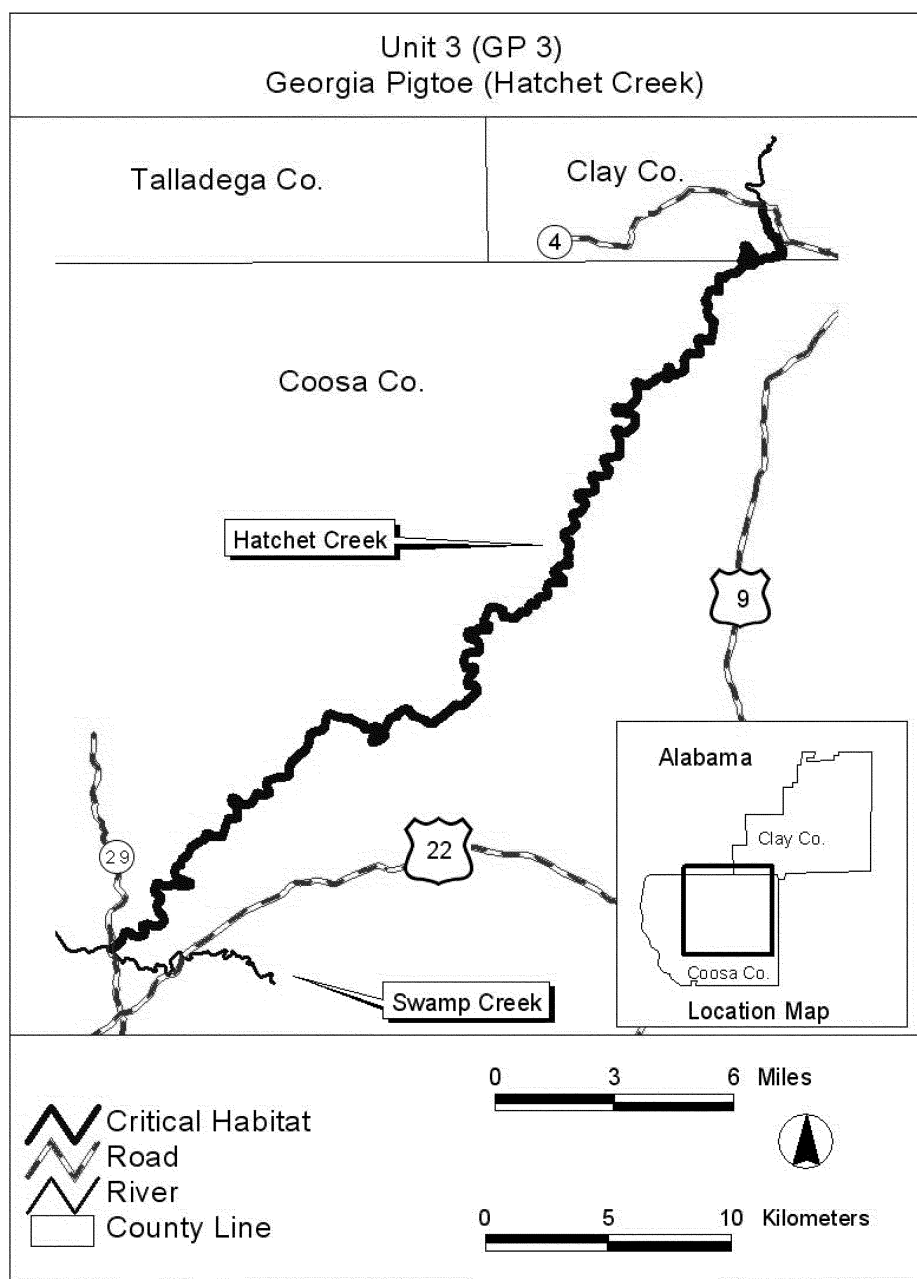


(8) Unit 3 for Georgia pigtoe (GP 3): Hatchet Creek, Coosa and Clay Counties, Alabama.

(i) Unit GP 3 includes the channel of Hatchet Creek from Clay County Road 4

(588215.16E, 3666038.46N), Clay County, downstream to the confluence of Swamp Creek at Coosa County Road 29 (561904.90E, 3636065.37N), Coosa County, Alabama.

(ii) *Note:* Map of Unit 3 (GP 3) for Georgia pigtoe (Hatchet Creek) follows:



Interrupted Rocksnail (*Leptoxis foremani*)

(1) Critical habitat units are depicted for Cherokee and Elmore Counties, Alabama, and Gordon and Floyd Counties, Georgia, on the maps below.

(2) The primary constituent elements (PCEs) of critical habitat for the interrupted rocksnail are the habitat components that provide:

(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) A hydrologic flow regime (the magnitude, frequency, duration, and

seasonality of discharge over time) necessary to maintain benthic habitats where the species is found. Unless other information becomes available, existing conditions at locations where the species occurs will be considered as minimal flow requirements for survival.

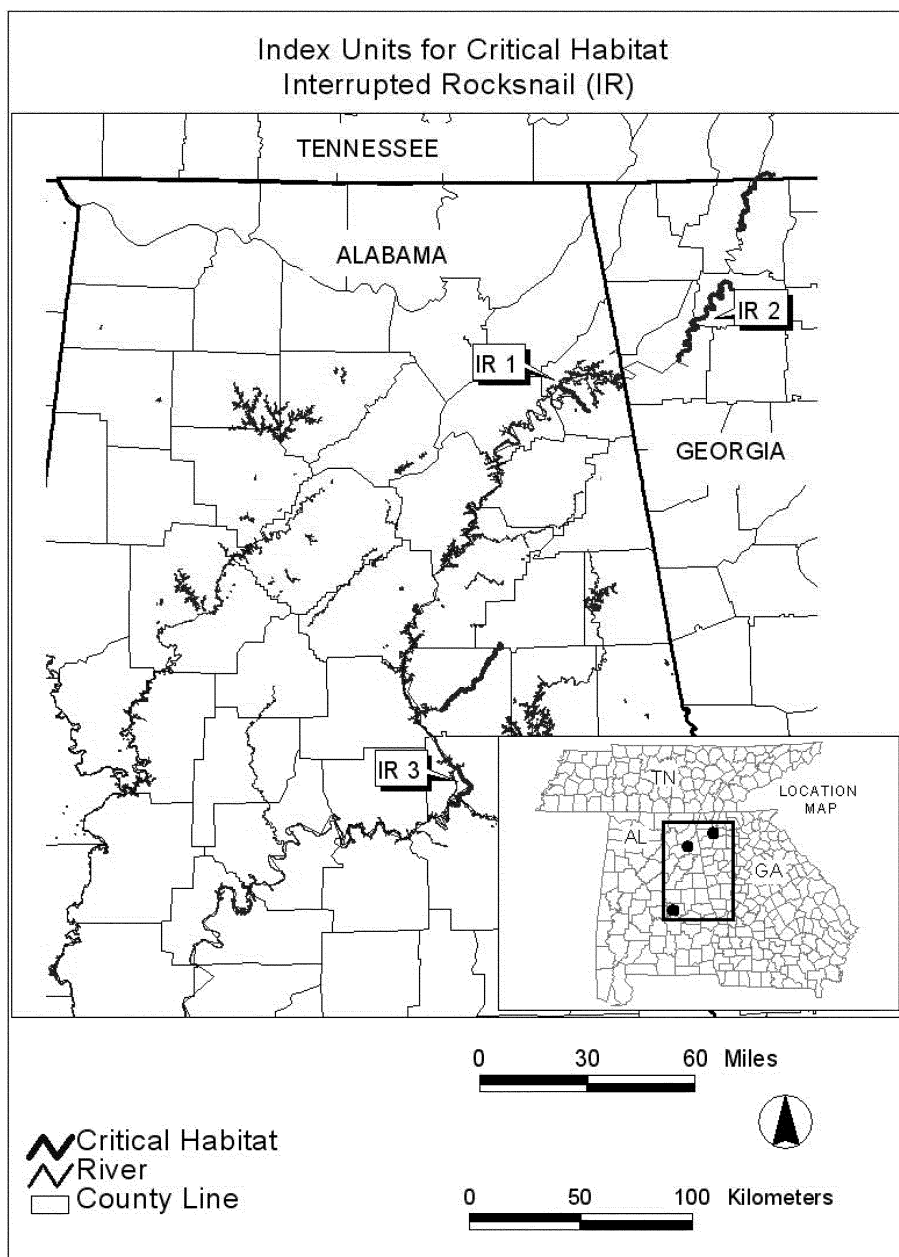
(iii) Water quality (including temperature, pH, hardness, turbidity, oxygen content, and chemical constituents) that meets or exceeds the current aquatic life criteria established under the Clean Water Act (33 U.S.C. 1251–1387).

(iv) Sand, gravel, cobble, boulder, or bedrock substrates with low to moderate amounts of fine sediment and attached filamentous algae.

(3) Critical habitat does not include manmade structures existing on the effective date of this rule and not containing one or more of the PCEs, such as buildings, bridges, aqueducts, airports, and roads, and the land on which such structures are located.

(4) *Critical habitat unit maps.* Maps were developed from USGS 7.5' quadrangles. Critical habitat unit upstream and downstream limits were then identified by longitude and latitude using decimal degrees and converted to Universal Transverse Mercator (UTM) zone 16, coordinates.

(5) *Note:* Index map of critical habitat units for the interrupted rocksnail follows:

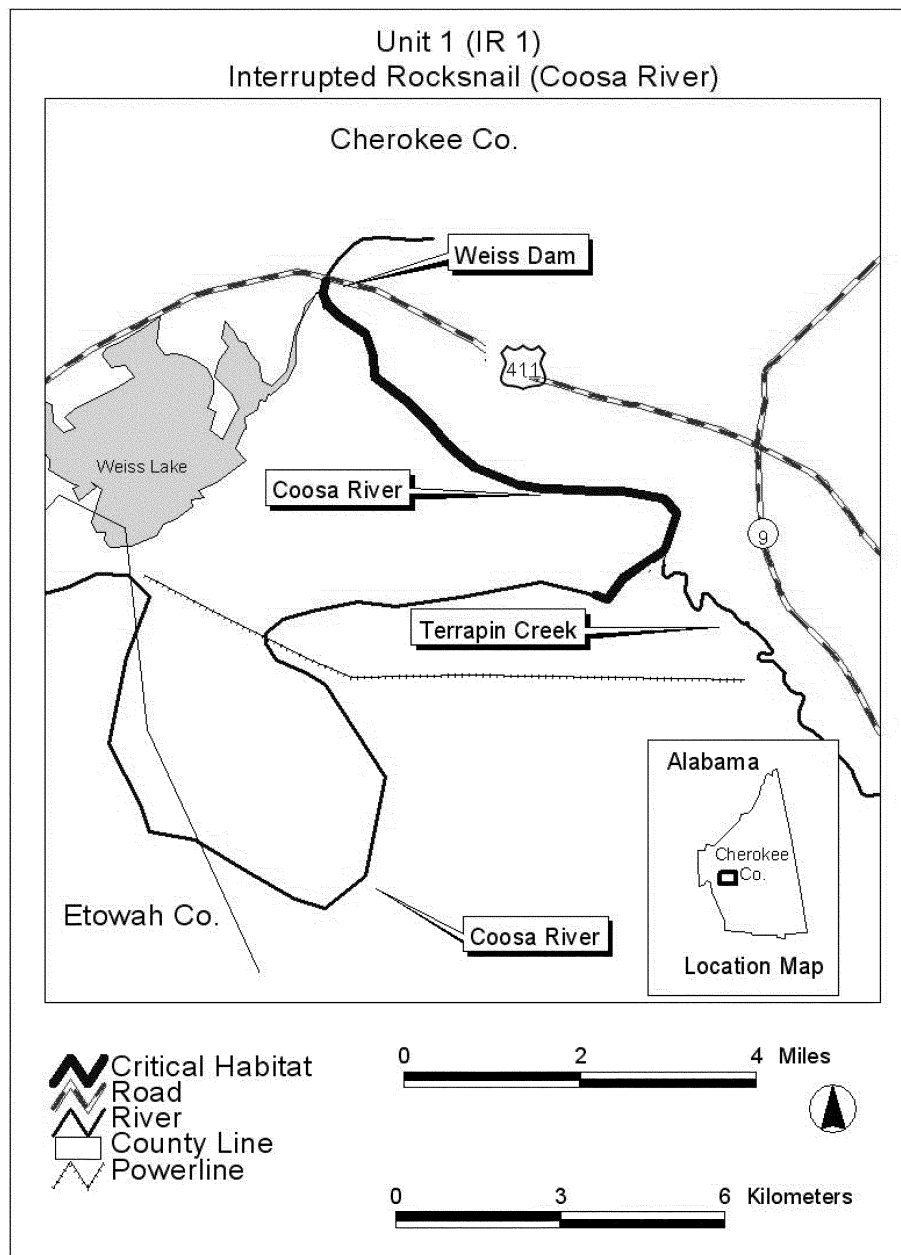


(6) Unit 1 for interrupted rocksnail (IR 1): Coosa River, Cherokee County, Alabama.

(i) Unit IR 1 includes the Coosa River channel from Weiss Dam (614866.53E,

3781969.15N), downstream to a point 1.6 km (1 mi) below the confluence of Terrapin Creek (619751.694E, 3776654.79N), Cherokee County, Alabama.

(ii) *Note:* Map of Unit 1 (IR 1) for interrupted rocksnail (Coosa River) follows:

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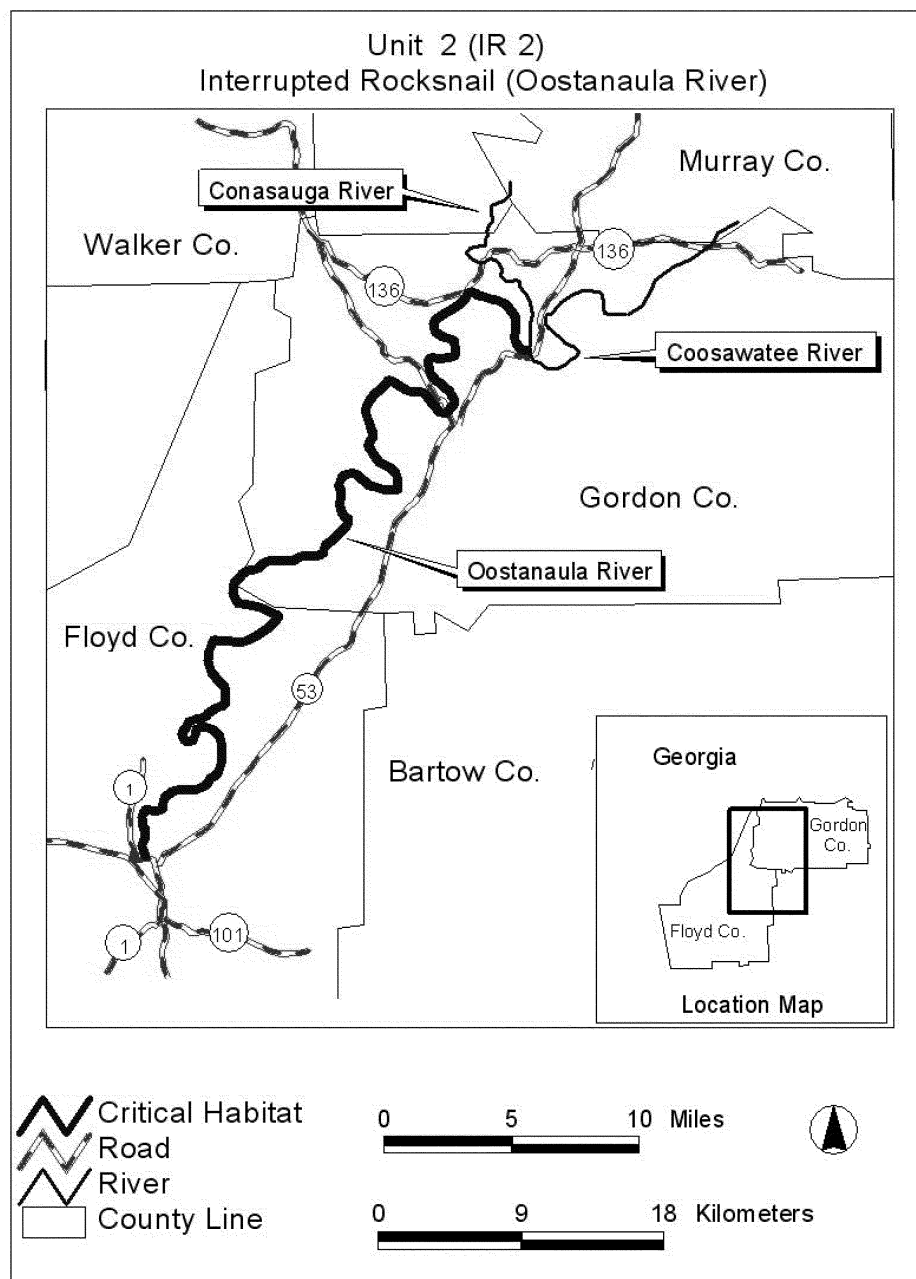
(7) Unit 2 for interrupted rocksnail (IR 2): Oostanaula River, Gordon and Floyd Counties, Georgia.

(i) Unit IR 2 includes the primary channel of the Oostanaula River from

the confluence of the Conasauga and Coosawattee Rivers (692275.90E, 3824562.96N), Gordon County, downstream to Georgia Highway 1 Loop

(668358.62E, 3792574.63N), Floyd County, Georgia.

(ii) *Note:* Map of Unit 2 (IR 2) for interrupted rocksnail (Oostanaula River) follows:



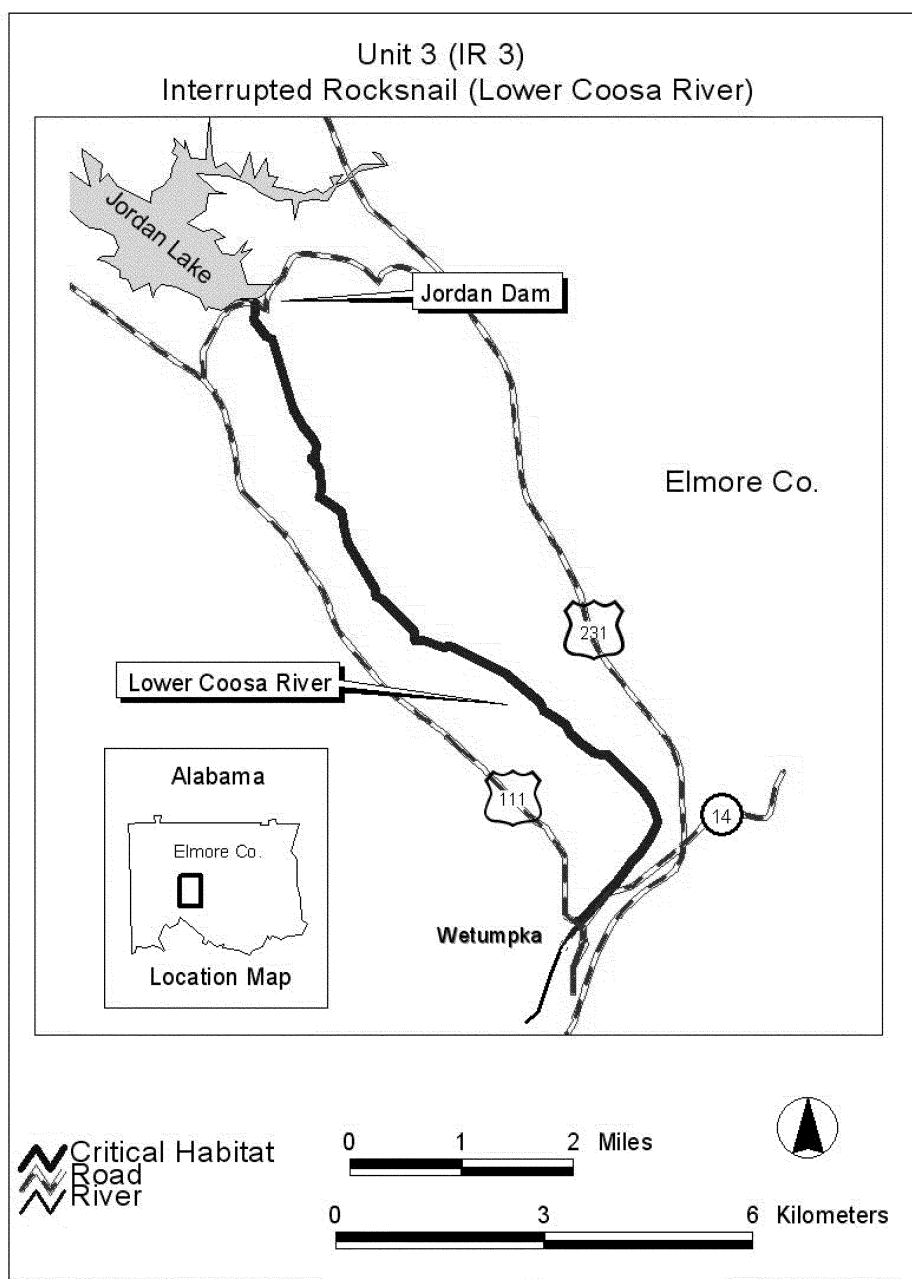
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(8) Unit 3 for interrupted rocksnail (IR 3): Lower Coosa River, Elmore County, Alabama.

(i) Unit IR 3 includes the Coosa River channel from Jordan Dam (569930.28E, 3609212.67N), downstream to Alabama Highway 111 Bridge (574324.83E,

3600042.81N), Elmore County, Alabama.

(ii) *Note:* Map of Unit 3 (IR 3) for interrupted rocksnail (Lower Coosa River) follows:



Rough Hornsnail (*Pleurocera foremani*)

(1) Critical habitat units are depicted for Elmore and Shelby Counties, Alabama, on the maps below.

(2) The primary constituent elements (PCEs) of critical habitat for the rough hornsnail are the habitat components that provide:

(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) A hydrologic flow regime (the magnitude, frequency, duration, and seasonality of discharge over time) necessary to maintain benthic habitats

where the species is found. Unless other information becomes available, existing conditions at locations where the species occurs will be considered as minimal flow requirements for survival.

(iii) Water quality (including temperature, pH, hardness, turbidity, oxygen content, and chemical constituents) that meets or exceeds the current aquatic life criteria established under the Clean Water Act (33 U.S.C. 1251–1387).

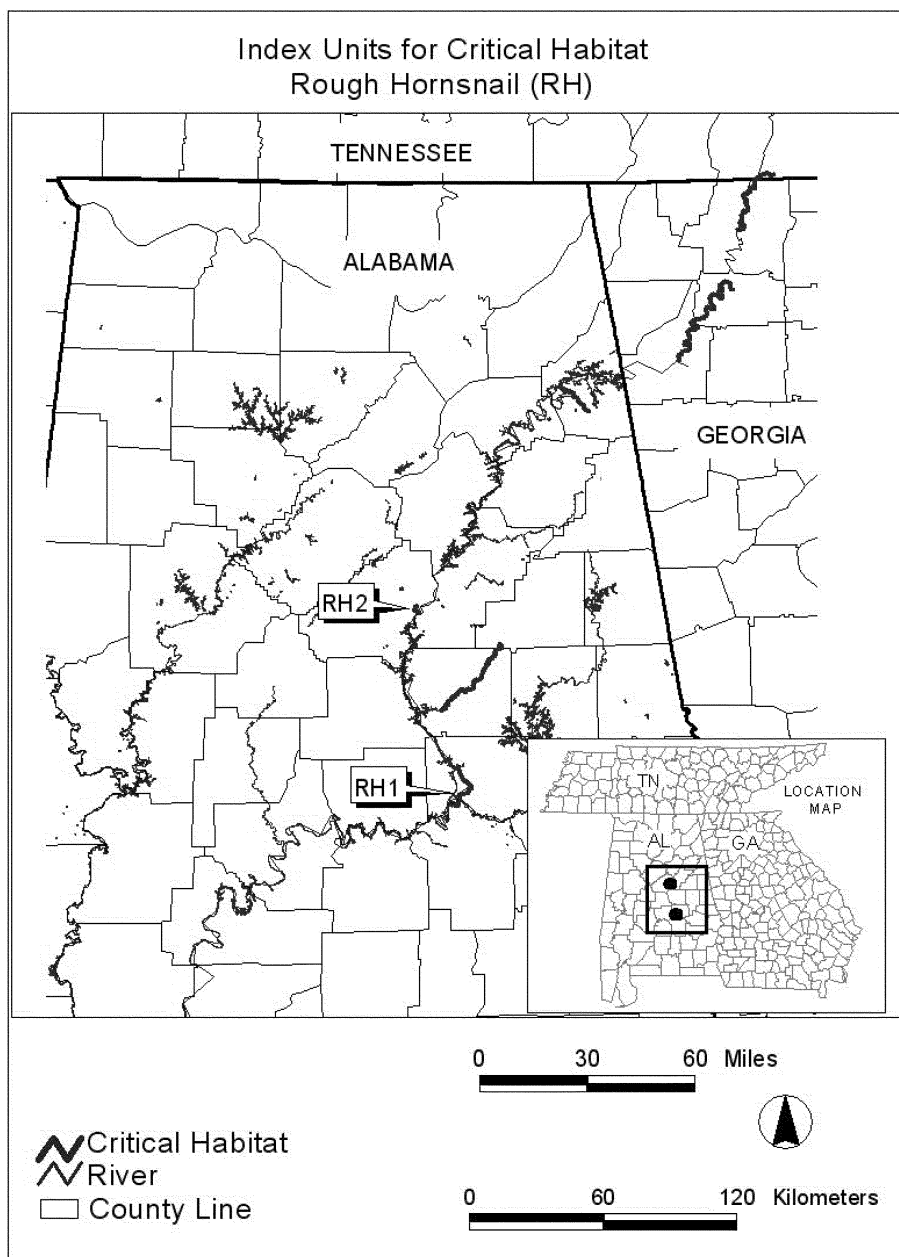
(iv) Sand, gravel, cobble, boulder, bedrock, or mud substrates with low to moderate amounts of fine sediment and attached filamentous algae.

(3) Critical habitat does not include manmade structures existing on the

effective date of this rule and not containing one or more of the primary constituent elements, such as buildings, bridges, aqueducts, airports, and roads, and the land on which such structures are located.

(4) *Critical habitat unit maps.* Maps were developed from USGS 7.5' quadrangles. Critical habitat unit upstream and downstream limits were then identified by longitude and latitude using decimal degrees and converted to Universal Transverse Mercator (UTM) zone 16, coordinates.

(5) *Note:* Index map of critical habitat units for the rough hornsnail follows:

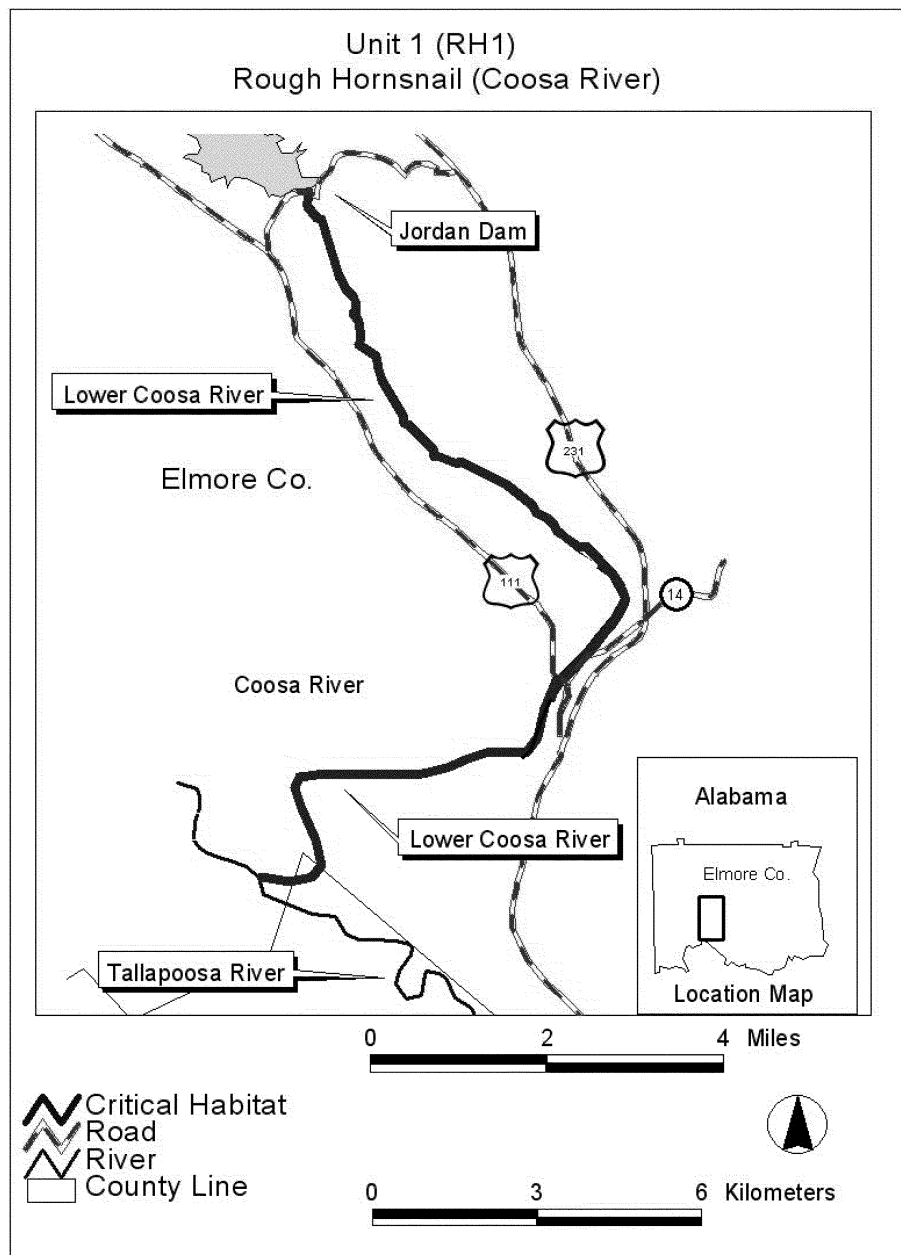


(6) Unit 1 for rough hornsnail (RH 1):
Lower Coosa River, Elmore County,
Alabama.

(i) Unit RH 1 includes the Coosa River
channel from Jordan Dam (569930.28E,
3609212.67N), downstream to the
confluence of the Tallapoosa River

(568995.14E, 3597805.93N), Elmore
County, Alabama.

(ii) *Note:* Map of Unit 1 (RH 1) for
rough hornsnail (Coosa River) follows:

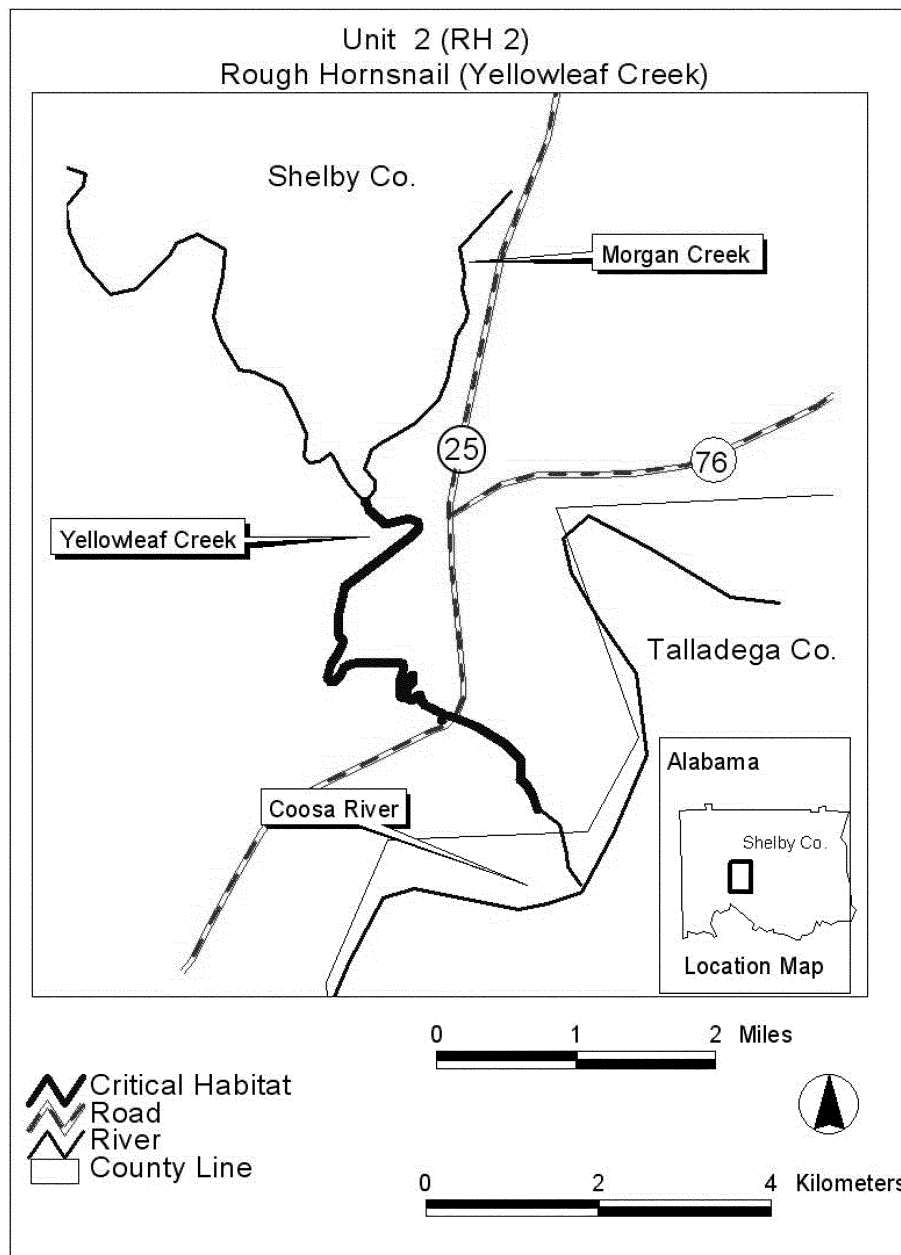


(7) Unit 2 for rough hornsnail (RH 2): Yellowleaf Creek, Shelby County, Alabama.

(i) Unit RH 2 includes the channel of Yellowleaf Creek from the confluence of

Morgan Creek (550285.41E, 3682865.13N), downstream to 1.6 km (1 mi) below Alabama Highway 25 (552296.38E, 3679287.87N), Shelby County, Alabama.

(ii) *Note:* Map of Unit 2 (RH 2) for rough hornsnail (Yellowleaf Creek) follows:



* * * * *

Authority: The authority for this section is section 4 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: October 15, 2010.

Thomas L. Strickland,
Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 2010-27417 Filed 11-1-10; 8:45 am]

BILLING CODE 4310-55-C