DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2011–0091; MO 92210–0–0008]

Endangered and Threatened Wildlife and Plants; Partial 90-Day Finding on a Petition To List 404 Species in the Southeastern United States as Threatened or Endangered With Critical Habitat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of 90-day petition finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a partial 90-day finding on a petition to list 404 species in the southeastern United States as threatened or endangered under the Endangered Species Act of 1973, as amended (Act) and to designate critical habitat. Based on our review, we find that for 11 of the 404 species: Sarah's hydroptila caddisfly (*Hydroptila sarahae*), Rogue Creek hydroptila caddisfly (*Hydroptila okaloosa*), Florida brown checkered summer sedge (*Polycentropus floridensis*), Florida fairy shrimp (*Dexteria floridana*), South Florida rainbow snake (*Farancia erytrogramma seminola*), Ouachita creekshell (*Villosa arkansasensis*), crystal darter (*Crystallaria asprella*), spotted darter (*Etheostoma maculatum*), Florida bog frog (*Rana okaloosae*), Greensboro burrowing crayfish (*Cambarus catagius*), and Blood River crayfish (*Orconectes burri*), the petition does not present substantial scientific or commercial information indicating that listing may be warranted at this time. Therefore, we are not initiating a status review for these 11 species. However, we ask the public to submit to us any new information that becomes available concerning the status of, or threats to, these 11 species or their habitat at any time.

DATES: The finding announced in this document was made on October 6, 2011.

ADDRESSES: This finding is available on the Internet at *http://www.regulations.gov* at Docket Number [FWS–R4–ES–2011–0091]. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, 1875 Century Blvd., Atlanta, GA 30345. Please submit any new information, materials, comments, or questions concerning this finding to the above street address.

FOR FURTHER INFORMATION CONTACT: Janet Mizzi, Chief, Division of Endangered Species, Ecological Services, Southeast Regional Office, U.S. Fish and Wildlife Service (see **ADDRESSES**) by telephone at 404–679–7169; or by facsimile at 404–679–7081. If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(A) of the Act requires that we make a finding on whether a petition to list, delist, or reclassify a species presents substantial scientific or commercial information indicating that a petitioned action may be warranted. We are to base this finding on information found in the petition, supporting information submitted with the petition, and information otherwise available in our files. The Act requires that, to the maximum extent practicable, we are to make this finding within 90 days of our receipt of the petition, and publish our notice of this finding promptly in the **Federal Register.**

Our standard for substantial scientific or commercial information within the Code of Federal Regulations (CFR) with regard to a 90-day petition finding is ''that amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted'' (50 CFR 424.14(b)). If we find that substantial scientific or commercial information was presented, the Act requires that we promptly review the status of the species (status review), which is subsequently summarized in our 12-month finding.

Petition History

On April 20, 2010, we received, via electronic mail, a petition from the Center for Biological Diversity (CBD), Alabama Rivers Alliance, Clinch Coalition, Dogwood Alliance, Gulf Restoration Network, Tennessee Forests Council, West Virginia Highlands Conservancy, Tierra Curry, and Noah Greenwald to list 404 aquatic, riparian, and wetland species from the southeastern United States as threatened or endangered species and to designate critical habitat concurrent with listing under the Endangered Species Act. The petition clearly identified itself as such, and included the requisite identification information as required by 50 CFR 424.14(a). On April 21, 2010, via electronic mail to Noah Greenwald at CBD, we acknowledged receipt of the Petition. On May 10, 2010, we provided additional formal written acknowledgement of receipt.

Petitioners developed an initial list of species by searching NatureServe for species that ''occur in the twelve states typically considered the southeast, occur in aquatic, riparian, or wetland habitats and appeared to be imperiled.'' Species were considered imperiled if they were classified as G1 or G2 by NatureServe, near threatened or worse by the International Union for Conservation of Nature (IUCN), or a species of concern, threatened or endangered by the American Fisheries Society.

NatureServe conservation status ranks range from critically imperiled (G1) to imperiled (G2) to vulnerable (G3) to apparently secure (G4) to demonstrably secure (G5). Status is assessed and documented at three distinct geographic scales: Global (G), national (N), and subnational (S) (*i.e.,* state/province/municipal). Subspecies are similarly assessed with a subspecific (T) numerical assignment. Assessment by NatureServe of any species as being critically imperiled (G1), imperiled (G2), or vulnerable (G3) does not constitute a recommendation by NatureServe for listing under the Act. NatureServe status assessment procedures have different criteria, evidence requirements, purposes, and taxonomic coverage than government lists of endangered and threatened species, and, therefore, these two types of lists should not be expected to coincide. For example, an important factor in many legal listing processes is the extent to which a species is already receiving protection of some type—a consideration not included in the NatureServe conservation status ranks. Similarly, the IUCN and American Fisheries Society do not apply the same criteria to their ranking determinations as those encompassed in the Act and its implementing regulations.

On May 7, 2010, the Service received correspondence from the Southeastern Fishes Council, dated May 2, 2010, with an explanation of their involvement in formulation of the petition. The Council was contacted by CBD, which solicited its involvement in the preparation of the subject petition. Southeastern Fishes Council members provided expertise in review of the CBD list of fishes in the draft petition.

On May 27, 2010, the Freshwater Mollusk Conservation Society submitted a letter to the Regional Director, Fish and Wildlife Service, Southeast Region, in support of the CBD petitions' inclusion of a large number of freshwater mollusks, including the

Ouachita creekshell. On September 1, 2010, and again on October 1, 2010, CBD forwarded to the Regional Director, Service, Southeast Region, a letter of support for the subject petition from 35 conservation organizations.

The petition included 404 species for which the petitioners requested listing as endangered or threatened under the Act, and designation of critical habitat concurrent with the listing. It is our practice to evaluate all species petitioned for listing for the potential need to emergency list the species under the emergency provisions of the Act at section 4(b)(7) and as outlined at 50 CFR 424.20. We have carefully considered the information provided in the petition and in our files and have determined that emergency listing is not indicated for any of the 404 species in the petition.

We published a partial 90-day finding in the **Federal Register** on September 27, 2011 (76 FR 59836), making substantial findings for 374 species and noting that 19 species had already been addressed through previous Federal actions by either the Service or the National Marine Fisheries Service. This partial 90-day finding covers the remaining 11 species.

Previous Federal Actions

A complete summary of the previous Federal actions regarding these 11 species can be found in table 1.

TABLE 1—PREVIOUS FEDERAL REGISTER (FR) NOTICES ADDRESSING THE PETITIONED SPECIES

FR Citation	Publication date	Action	Species
59 FR 58982	11/15/1994	Endangered and Threatened Wildlife and Plants (ETWP); Animal Candidate Review for Listing as Endangered or Threatened Species; Notice of Review.	Spotted frog; Rogue Creek hydroptila caddisfly; Florida bog frog; Greensboro burrowing crayfish.
56 FR 58804	11/21/1991	ETWP; Animal Candidate Review for Listing as Endangered or Threatened Species.	Florida bog frog; Greensboro burrowing crayfish.
54 FR 554	01/06/1989	ETWP; Animal Notice of Review	Florida bog frog; Greensboro burrowing crayfish.
49 FR 21664	05/22/1984	ETWP; Review of Invertebrate Wildlife for Listing as Endangered or Threatened Species.	Greensboro burrowing crayfish.

Species Information

The petition identified 404 aquatic, riparian, or wetland species from the southeastern United States as needing protection under the Act. This list included 15 amphibians, 6 amphipods, 18 beetles, 3 birds, 4 butterflies, 9 caddisflies, 83 crayfish, 14 dragonflies, 48 fish, 1 springfly, 1 fairy shrimp, 2 isopods, 4 mammals, 1 moth, 48 mussels, 6 nonvascular plants, 13 reptiles, 44 snails, 8 stoneflies, and 76 vascular plants. Of these 404 species, 11 species are addressed in this finding including: Sarah's hydroptila caddisfly (*Hydroptila sarahae*), Rogue Creek hydroptila caddisfly (*Hydroptila okaloosa*), Florida brown checkered summer sedge (*Polycentropus floridensis*), Florida fairy shrimp (*Dexteria floridana*), South Florida rainbow snake (*Farancia erytrogramma seminola*), Ouachita creekshell (*Villosa arkansasensis*), crystal darter (*Crystallaria asprella*), spotted darter (*Etheostoma maculatum*), Florida bog frog (*Rana okaloosae*), Greensboro burrowing crayfish (*Cambarus catagius*), and Blood River crayfish (*Orconectes burri*).

Sarah's Hydroptila Caddisfly (*Hydroptila sarahae*)

The genus *Hydroptila* is likely the most common genus of microcaddisflies in Florida, as is the case in North America. The genus inhabits a wide variety of habitats from small streams to large rivers and most lentic (slow-moving or standing water habitats) environments. All instars feed on filamentous algae (Nielsen 1948, as cited in Pescador *et al.* 2004), as well as diatoms and other algae (Wiggins, 1996a, as cited in Pescador *et al.* 2004). Most microcaddisflies complete development in a year or less.

The petition states that this species of caddisfly is known only from four locations on Eglin Air Force Base (EAFB) in northwestern Florida (NatureServe 2008, as cited in the petition (p. 612)). However, we are aware of at least 11 locations on EAFB (St. Aubin, Service, pers. comm. 2010). The petition (p. 612) states that this species is dependent on ''clean creeks.'' The species is apparently restricted to EAFB, and occurs in ''steepheads'' (springheads in sandhill areas), spring runs, and clear creeks where aquatic vegetation is present. NatureServe ranks the species as critically imperiled.

Rogue Creek Hydroptila Caddisfly (*Hydroptila okaloosa*)

The genus *Hydroptila* is likely the most speciose (rich in number of species) genus of microcaddisflies in Florida, as is the case in North America. The genus inhabits a wide variety of habitats from small streams to large rivers and most lentic environments. All instars feed on filamentous algae (Nielsen 1948, as cited in Pescador *et al.* 2004), as well as diatoms and other algae (Wiggins, 1996a, as cited in Pescador *et al.* 2004). Most microcaddisflies complete development in a year or less.

The petition states that this species of caddisfly is known from only three creeks on EAFB (NatureServe 2008, as cited in the petition (p. 611). However, we are aware of the species' presence at eight locations on the Base (St. Aubin, pers. comm., 2010). The petition (p. 611) states that this species is dependent on ''clean creeks.'' This species, like Sarah's hydroptila caddisfly, is apparently restricted to EAFB, and occurs in similar steep head and small stream habitats where clean water and aquatic macrophytes are present, and is sympatric with Sarah's hydroptila at five sites. NatureServe (2008) ranks the species as critically imperiled.

Florida Brown Checkered Summer Sedge (*Polycentropus floridensis*)

NatureServe (2008) estimates the range of the Florida brown checkered summer sedge (*Polycentropus floridensis*) as 100 to 250 square kilometers (sq km) (about 40 to 100 square miles (sq mi)). According to the Petition (p. 883) and NatureServe (2008), this caddisfly is found in small, clear streams with moderate flow in sandhills with a pine-oak canopy that is fairly heavy. It is known from only three occurrences: One in Alabama (Baldwin County) and two in Florida (Walton County; headwaters of Rocky Creek 6.4 km (3.8 mi) southwest of Mossy Head and Hamilton County), although the Hamilton County occurrence is

disputed. The species is believed to be relatively stable, ''as long as stream habitats supporting populations on EAFB are protected (Rasmussen *et al.* 2008, p. 38), and also found to be widespread, though not common on EAFB (Rasmussen 2004, p. 45). NatureServe (2008) ranks the species as critically imperiled in Florida, and the State of Florida recognizes it as a 'Species of Greatest Conservation Need.'

Florida Fairy Shrimp (*Dexteria floridana*)

The Florida fairy shrimp (*Dexteria floridana*) was originally described by Dexter (1953) as a species of *Eubranchipus.* However, it is now classified in the family *Linderiella,* with four recognized species, and the monotypic Dexteria (Belk and Brtek 1995, 1997). The Florida fairy shrimp is known only from the type locality, a ''temporary pool approximately 6 km south of Gainesville,'' Florida. The total range is quantified as less than 100 square km (about 40 square miles). This species was only ever found in a temporary pool (NatureServe 2008). The petition did not provide any information on the life history of this species. However, other fairy shrimp in the order Anostraca inhabit temporary ponds and pools, have stalked compound eyes, 11 pairs of swimming legs (in American species), and no carapace (Pennak 1989 p. 344). Fairy shrimp glide or swim gracefully by means of complex beating movements of the legs. Sometimes they drift along slowly, other times they dart rapidly or come to rest on the bottom (Pennak 1989 p. 346).

Fairy shrimp diets consist mostly of algae, bacteria, Protozoa, rotifers, and bits of detritus gathering food items through movements of the legs. As inhabitants of temporary ponds and pools, which dry up completely in the dry warm months, fairy shrimp resting eggs are capable of withstanding desiccation and freezing. The eggs hatch into the typical nauplius (a larval form with three pairs of appendages and a single median eye) or to the more advanced metanauplius (a stage following the nauplius, and having about seven pairs of appendages) larvae, after which there is a long series of instars, each following a complete shedding of the exoskeleton. Changes in size from one instar to the next are gradual, and there is progressive appearance of more segments, more appendages, and increasing complexity of appendages. The number of instars may be variable depending on temperatures and food conditions. The active portion of the life cycle may be completed in as few as 15 days or as many as 9 months (Pennak 1989, pp. 353–354).

The type locality of Florida fairy shrimp was lost to development, and the species is not known from other locations (Rogers 2002). It has not been reported in any collections since it was described. Petitioners allow that ''unless this species is discovered in new areas, it may already be extinct.'' Rogers (2002) also reports that ''It is possible that *D. floridanus* is extinct, however, it may still exist in some undeveloped portions of Florida or other regions of the United States or possibly Cuba.'' NatureServe (2008) lists the species as ''possibly extinct,'' and IUCN lists the species as critically endangered, though this status was last assessed in 1996.

The petition presented brief information suggesting that the species was threatened by two of the five listing factors (Factors A and D) in section 4 of the Act in an effort to identify threats that may be leading or have led to the decline of the Florida fairy shrimp. However, these factors are pertinent only in cases where the organism being proposed for listing is present and thus capable of being affected by any threats. Because the information presented by petitioners and in our files suggests the species is already extinct, it does not meet the definition of an endangered species or a threatened species under the Act (section 3(6) and 3(20), respectively). Therefore, an analysis of the five threat factors is not appropriate.

South Florida Rainbow Snake (*Farancia erytrogramma seminola*)

Rainbow snakes are iridescent, glossy black above, with three red stripes. The ventor is red and/or yellow with three rows of black spots. In the South Florida rainbow snake, the ventral black spots coalesce to render the ventor predominantly black, except on the throat, and the middorsal red stripe is reduced to a dotted line due to invasion of black pigment. The largest of the three South Florida rainbow snakes ever reported was 131centitmeters (cm) (51.5 inches (in)) (Molar 1992, p. 251).

Rainbow snakes are strongly aquatic in habit, seldom wandering far from water. The two South Florida rainbow snakes for which data are available were both collected in the water at night. The South Florida rainbow snake is known from one population in Fisheating Creek, which flows into the west side of Lake Okeechobee in Glades County, Florida, which lies approximately 250 km (150 mi) south of the nearest area known to support other species of rainbow snakes. This is an aquatic snake that has only been found in a freshwater stream with substantial aquatic vegetation. Fisheating Creek, its only known location, is a sluggish, small to moderate sized stream flowing through a cypress stand. During drought Fisheating Creek is reduced to a series of disconnected lakes (Molar 1992). Though the South Florida rainbow snake has only been found in creeks, it could possibly inhabit areas similar to other rainbow snakes (Florida Museum of Natural History 2000).

Rainbow snakes are oviparous (egg-laying) and have been reported to lay clutches of 22 to 50 eggs. Adults feed primarily on eels (*Anguilla rostrata*) but aquatic amphibians may also be eaten. Nothing is known about the specific ecology of the South Florida rainbow snake (Molar 1992, pp. 251–252).

Only three specimens of the South Florida rainbow snake have ever been reported (one in 1949 and two in 1952), and only one of these specimens has been preserved. The Florida Museum of Natural History reports that several unsuccessful searches have been conducted for this snake since the 1950s (Florida Museum of Natural History 2000). Intensive collecting at Rainey Slough, a western tributary of Fisheating Creek, did not produce any rainbow snakes (S. Godley, personal communication). Molar (1992) classified the status of the species as ''undetermined.'' NatureServe (2008) classifies the subspecies as critically imperiled because of its very restricted geographic range, if it even exists, and because it is known from only one site without recent confirmation (most recent collection, 1952).

The petition presented brief information suggesting that the subspecies was threatened by three of the five listing factors (Factors A, B, and D) in section 4 of the Act in an effort to identify threats that may be leading or have led to the decline of the South Florida rainbow snake. However, these factors are pertinent only in cases where the organism being proposed for listing is present and thus capable of being affected by any threats. Because the information presented by petitioners and in our files suggests the species is already extinct, it does not meet the definition of an endangered species or a threatened species under the Act (section 3(6) and 3(20), respectively). Therefore, an analysis of the five threat factors is not appropriate.

Ouachita Creekshell (*Villosa arkansasensis*)

The Ouachita creekshell is a small mussel that seldom exceeds 50 mm (2 in) in length. Its' outline is ovate (egg shaped) or obovate (egg shaped with the

narrow end at the base). The valves are subinflated and solid. It is rounded anteriorly and somewhat pointed posteriorly. The ventral margin is curved, while the dorsal margin is rather rounded. The posterior ridge is low and rounded. The hinge ligament is short, and the umbos is not much swollen, and only slightly projected above the hingeline. The periostracum (the external, chitinlike covering of the shell) is dull to satiny, yellowish to brownish (but most often darker) with fine green rays over the entire surface. The left valve has two heavy, triangular pseudocardinal teeth about equal in size and two short lateral teeth. The right valve has two pseudocardinals, the posterior one chunky and the anterior one vestigial. The nacre (mother-of-pearl) is silvery white, and bluish, and iridescent posteriorly. Male shells are somewhat pointed with female shells more broadly rounded and truncated below the medial line. Mature females have a distinct constriction in the middle of the truncation (Arkansas Wildlife Action Plan 2005). Host fish include the rainbow darter (*Etheostoma caeruleum*) and shadow bass (*Ambloplites ariommus*).

The petition states that there are an estimated 6 to 20 populations of this mussel (NatureServe 2008). In Arkansas, this species is extant in the Poteau, Ouachita, and Saline River systems (Harris *et. al.* 1997). In Oklahoma, this mussel occurs in the headwaters of the Little River (C. Mather pers. comm. cited in NatureServe 2008, Vaughn and Taylor 1999, Vaughn 2000, Galbraith *et al.* 2008), eight sites in the Glover River (Vaughn, 2000, 2003), eight sites in the Mountain Fork River (Spooner and Vaughn 2007), and potentially in the Kiamichi River.

Historically, Ouachita creekshell was known from 23 streams and rivers in 2 States draining the Ouachita Mountains in the Red and Arkansas River basins (Davidson 2007, p. 9). Information in our files indicates the Ouachita creekshell is currently known to occur in 15 streams and may occur in an additional 5 streams in the Ozark region (Johnson 1980; Davidson 2007), with sizable populations with ample evidence of recent recruitment and considered viable for several decades to come, occurring on the Little River, Glover River, Mountain Fork Little River, Irons Fork Ouachita River, Alum Fork Saline River, and the North Fork Saline River (Davidson 2007, pp. 28–29). Small populations are known to occur in the Ouachita River, Little Missouri River, and the Saline River in the Ouachita River drainage (Davidson 2007, p. 29). Marginal populations are known to occur in the Kiamichi River, Fourche LaFave River, Poteau River, Middle Fork Saline River, Chances Creek, and Brushy Creek (Davidson 2007, p. 29). Due to limited survey data it is unknown whether Ouachita creekshell occur in five additional streams: (Big) Cedar Creek, Buffalo Creek, Cossatot River, Saline River in the Little River drainage and Terre Noire Creek. The Ouachita creekshell has been extirpated from three streams: South Fork Ouachita River, Caddo River, and South Fork Saline River.

Historically, the Ouachita creekshell was widespread, but never locally abundant in many Ouachita Mountain streams (Davidson 2007, p. 10). Quantitative historical abundance data for Ouachita creekshell are unknown, and a review of online museum collections seems to indicate that most collectors only kept representative voucher material (*e.g.,* one or two specimens). The absence of substantial museum collections may be an artifact of infrequent encounters resulting from naturally low relative abundance or the difficulty associated with locating small mussels (Davidson 2007, p. 10).

This regional endemic (species found only in the region) is restricted to headwater streams. It is considered critically imperiled in Oklahoma (S1S2) and imperiled in Arkansas (NatureServe 2008). It is ranked as special concern/vulnerable by the American Fisheries Society (Williams *et al.* 1993, 2010 draft, in review). There is some question as to the taxonomic status of this species based on recent phylogenetic analysis (McKay *et al.* 2009, Inoue 2009). The results suggest that, based on genetic similarities, *V. arkansasensis* may be a synonymous species with *O. jacksoniana* (southern hickorynut mussel) (Inoue 2009). The Service published a not substantial finding on a petition to list O. jacksoniana on March 23, 2010 (75 FR 13717), prior to receipt of the petition.

Crystal Darter (*Crystallaria asprella*)

The crystal darter is a slender, cigar-shaped member of the perch family. It has a distinctly forked tail and pronounced snout. As one of the largest darters, it reaches up to an average of 130 millimeters (mm) (5.1 in) standard length (SL) (Kuehne and Barbour 1983, Page 1983). The crystal darter is mostly translucent, although some cryptic coloration is present in the form of dark saddles along the back and mottling along the sides.

Crystal darter habitat is described by Page (1983) as comprising large creeks and rivers with extensive clean sand and gravel raceways. Individuals generally inhabit waters deeper than 60 cm (23.6 in) with strong currents (Page 1983). The species is rarely collected when current velocities are lower than 32 cm/second (George *et al.* 1996), and its preference for fast-moving water makes sampling difficult. The species diet ranges from fly and caddisfly larvae to water mites and small crustaceans (Forbes 1880, Hatch 1998).

Historically, the crystal darter was found within the Mississippi River basin from Wisconsin and Minnesota east to Ohio and south to Oklahoma, Louisiana, and Florida (Page 1983) and the Gulf slope in the Escambia, Mobile Bay, and Pearl River drainages (Page and Burr 1991). Crystal darters are considered rare, but the specific reasons for their rarity are poorly understood. Past approaches for sampling crystal darter populations in mid to large rivers have been relatively ineffective, leading to low catch rates that are generally not useful in producing population estimates, and little effort has been expended to specifically sample the species. Rather, gears have been deployed in habitats to generally characterize fish communities where crystal darters are coincidentally collected. Recently, new methodologies (*e.g.,* Missouri Trawl, Herzog *et al.* 2005) have been developed to sample species such as crystal darters in large rivers that show promise for quantitatively assessing population status and demonstrating the species may be more common than previously thought (FWS 2009, p. 38).

The species is presently known from large creeks and rivers in 15 States. The population from the Elk River in West Virginia is sufficiently genetically and morphologically distinct that it has now been separated from the crystal darter group and is referred to as the diamond darter (*Crystallaria cincotta*) (Welsh and Wood 2008). The diamond darter is a candidate species (75 FR 69287) and has been found to be warranted for listing, but precluded by higher priority listing actions. For the purposes of this finding, we assess only the remainder of the crystal darter group.

Spotted Darter (*Etheostoma maculatum*)

The spotted darter is a member of the Perch family (Percidae), a group characterized by the presence of a dorsal fin separated into two parts, one spiny and the other soft (Kuehne and Barbour 1983, p. 1). Darters are smaller and more slender than other percids. Most darters, including those in the genus *Etheostoma,* have a vestigial swim bladder, which decreases buoyancy, allowing them to remain near the bottom with little effort (Evans and Page

2003, p. 64). Distinguishing morphological characteristics of the spotted darter include: laterally compressed body, subequal jaws, sharp snout, short pectoral fins, an absent/weak suborbital bar, and a rounded posterior edge of the caudal fin (Zorach and Raney 1967, p. 300). They often exceed 60 millimeters (mm) (2.36 inches (in)) standard length (Kuehne and Barbour 1983, p. 116). The opercle and belly are scaled, the cheek is slightly scaled to unscaled, and the nape and breast are unscaled (Page 1983, p. 100). Lateral line counts are usually 56 to 65 scales, and vertebrae number 37 to 39 (Kuehne and Barbour 1983, p. 117). Spotted darters are sexually dimorphic. Males have black-edged red spots on the body and a bluish-green breast that intensifies in color at spawning time. Females have dark spots on the body that are larger and more diffuse than the males (Keuhne and Barbour 1983, p. 116). Spotted darters superficially resemble bluebreast darters (*E. camurum*), but the two can be distinguished by the latter having a black margin on its soft dorsal, caudal, and anal fins (Stauffer *et al.* 1995, p. 304). Small spotted darters can resemble Tippecanoe darters (*E. tippecanoe*), but Tippecanoe darters have an incomplete lateral line (Stauffer *et al.* 1995, p. 304).

The spotted darter was described as *Etheostoma maculata* by Kirtland (1841, pp. 276–277). Jordan and Eigenmann (1885, p. 71) amended the species epithet to *maculatum* to conform to the neuter gender of *Etheostoma.* The spotted darter was subsequently listed under the genera *Etheostoma, Nothonotus,* and *Poecilichthys* by various workers through the early 1950s. Bailey *et al.* (1954, pp. 139–141), and Bailey and Gosline (1955, pp. 6, 10) reduced the number of darter genera to three (*Ammocrypta, Etheostoma,* and *Percina*), placing the spotted darter in the subgenus *Nothonotus.* Three subspecies were subsequently recognized by Zorach and Raney (1967, p. 297): the spotted darter (*Etheostoma maculatum maculatum*) (Kirtland) in the Ohio River system including the Wabash and Green river systems, bloodfin darter (*E. m. sanguifluum*) (Cope) in the upper Cumberland River system below Cumberland Falls, and wounded darter (*E. m. vulneratum*) (Cope) in the upper Tennessee River system. These subspecies have since been elevated to distinct species within the genus *Etheostoma,* subgenus *Nothonotus: E. maculatum* (spotted darter), *E. sanguifluum* (bloodfin darter), and *E. vulneratum* (wounded darter) by Etnier and Williams (1989, p. 987).

Spotted darters are habitat specialists that take advantage of their extremely laterally compressed body to live under and among large, heterogeneous, unembedded substrates in riffles and glides (Raney and Lachner 1939, pp. 157–159; Burr and Warren 1986, p. 306; Bowers *et al.* 1992, p. 19; Osier and Welsh 2007, p. 457; Kessler and Thorp 1993, p. 1090; Kessler *et al.* 1995, p. 368). They are associated with deeper water and larger rocks than similar species (Raney and Lachner 1939, p. 158; Kessler and Thorp 1993, pp. 1087–1089; Osier and Welsh 2007, p. 456). They typically do not tolerate silt or embedded substrates (Kessler and Thorp 1993, p. 1090; Osier and Welsh 2007, p. 457).

Spotted darters typically spawn in May and June (Raney and Lachner 1939, p. 160; Weddle and Kessler 2008, p. 21; Ruble *et al.* 2008, Appendix 2). Raney and Lachner (1939, p. 159) found that spawning sites were spaced at least 120 centimeters (cm) (47.24 in) apart in the head of a riffle in water 15–60 cm (5.9–23.62 in) deep. Up to 350 adhesive pale yellow 2 mm (0.079 in) diameter eggs were deposited in tight wedge-shaped masses on the undersides of 90–275 cm (35.43–108.27 in) diameter flat rocks (Raney and Lachner 1939, p. 161). Weddle and Kessler (2008, p. 22) found that egg clump dimensions averaged 20 mm (0.79 in) long by 13 mm (0.51 in) wide and were deposited under rocks averaging 24.7 cm (9.72 in.) long and 18.2 cm (7.17 in) wide. Observations of up to five distinct egg size classes in females indicate that spotted darters spawn multiple times in a single season (Raney and Lachner 1939, p. 162; Weddle and Kessler 2008, p. 24). Male spotted darters guard the eggs while remaining mostly under or adjacent to the nest rock (Raney and Lachner 1939, p. 162). First spawning activity is reported to occur at 2 years for both males and females; males spawn through year 4 and females through year 5 (Raney and Lachner 1939, p. 164).

The species' extremely pointed snout makes them well-adapted for picking macroinvertebrate prey from underneath rocks (Kessler *et al.* 1995, p. 368). Macroinvertebrates, especially larval insects, comprise a large portion of their diet. Larval midges (Diptera, family Chironomidae), stoneflies (Plecoptera), caddisflies (Trichoptera), mayflies (Ephemeroptera), and beetles (Coleoptera), as well as adult water mites (Hydracarina) are important food items (Raney and Lachner 1939, p. 162; Hansen 1983, Appendix B; Kessler 1994, p. 29). Spotted darter eggs have been found in the stomachs of spotted darter adults (Raney and Lachner 1939, p. 162).

The spotted darter historically occurred in the Ohio River drainage in New York, Pennsylvania, Ohio, Indiana, Kentucky and West Virginia. Spotted darters probably also occurred in other streams in the Ohio River basin with suitable habitat. Raney and Lachner (1939, p. 158) speculated that its presence had likely been overlooked by many collectors who had not thoroughly worked deeper riffles. In addition, small benthic fishes are difficult to collect in deeper water (Ohio Environmental Protection Agency (OEPA) 1988, pp. 4–10). Troutman (1981, p. 670) noted that there may be considerable variation in the numbers of spotted darters in individual populations from one year to another, although he did not discuss a cause for this phenomenon. These factors may help explain why spotted darters went undetected in the Elk, Blue, East Fork White, lower Allegheny, and Ohio Rivers until after 1975. Considering that many larger parent streams in the Ohio River Basin were extensively impounded and polluted beginning in the 1800's, degrading or eliminating spotted darter habitat (Ortmann 1909, pp. 90–110; U.S. Army Corps of Engineers (USACE) 1981; Trautman 1981, pp. 17–24), it is reasonable to believe that the species also inhabited some of these parent streams historically but were extirpated prior to detection.

Rangewide status assessments in the literature indicate that spotted darters are localized and uncommon (Kuehne and Barbour 1983, p. 117; Page 1983, p. 100; Page and Burr 1991, p. 305). Although there is no rangewide systematic sampling to monitor distribution and status, a number of riverwide surveys have been conducted in some basins in some years.

The spotted darter is considered extant in the mainstem Ohio River (PA) and in the Allegheny (NY, PA), Muskingum (OH), Scioto (OH), Blue (IN), Wabash (IN), Green (KY), and Kanawha (WV) river systems. Of the 37 known streams that historically supported or currently support spotted darters, the species is likely extant in 24, likely extirpated in 12, and potentially extirpated in 1. Of the 24 streams that currently support spotted darters, populations are likely stable or expanding in 9 and declining or vulnerable in 4. Recent trends are unknown in the remaining 11 streams with extant populations. Fourteen of the 24 extant populations were discovered after 1975, and 9 of these 14 were discovered after 1990. Given the recent discoveries of new populations of

spotted darters, and considering the potential difficulties in collecting them, it is reasonable to believe that they may also be present, but have gone unrecorded, in other streams within the aforementioned river systems.

Florida Bog Frog (*Rana okaloosae*)

The Florida bog frog is a small ranid frog endemic to three counties in western Florida. It is the smallest member of its genus in North America. The bog frog is restricted to a variety of seepage habitats, relatively stable streams and seeps that receive their water via percolation through adjacent, deep sandy uplands. It is associated with black titi, beds of sphagnum moss, and Atlantic white cedar. Breeding occurs from April to August, and the species is syntopic (sharing the same habitat within the same geographic range) with *Rana clamitans, Acris grylus,* and sometimes *Hyla andersonii.* Eggs are laid in thin masses at the water surface in the same habitat occupied by adults, with some tadpoles overwintering (Molar 1985, 1992, 1993). The species has been observed eating moths at night and likely predators include cottonmouths (*Agkistrodon piscivorus*) and southern water snakes (*Nerodia fasciata*).

The species was not discovered until 1982 and was formally described in 1985 (Molar 1985 as cited in Jackson 2004, p. ii). Of approximately 57 known sites, all but 5 are located in roughly the western third of EAFB, Santa Rosa and Okaloosa Counties, Florida. Two highly disjunct sites occur in the northeastern part of EAFB, in Walton County, in Titi Creek, a tributary of the Yellow River via the Shoal River. The remaining three sites are on private lands on the north side of the Yellow River, across from EAFB (Jackson 2004, p. ii).

The species is included in Eglin's Threatened and Endangered Species Component Plan to the Integrated Natural Resource Management Plan (2006). Eglin's overall ecosystem management benefits the species. All mission activities are required to avoid disturbing wetlands, including the creeks inhabited by bog frogs.

The petition cites NatureServe (2008) as listing the species as imperiled in Florida, and IUCN considers the species ''Vulnerable''.

Greensboro Burrowing Crayfish (*Cambarus catagius*)

According to information in our files, this species is a North Carolina endemic known from Davidson, Guilford, Montgomery, and Randolph Counties. In total 16 localities are known, including 11 in the Haw River subdrainage of the Cape Fear River basin and 5 localities in the central Yadkin-Pee Dee River drainage (McGrath 1994, pp. 346–347). This species is a primary burrower found in damp, open areas, which are sometimes far removed from surface moisture or standing water. In fact, most locations for this species have been recorded in urban and suburban yards, which are usually grassed areas that were cleared at some point in the past (McGrath 1994, p. 346). Little is currently known about population densities or habitat requirements of this narrow endemic, but McGrath (1994, p. 348) noted, ''given the types of habitats that support the species, the numerous locations in which the species was found, the abundance of burrowing activity at those locations, and the potential for the species to be present in uninvestigated sites, the species may be doing well.''

The State of North Carolina considers this crayfish to be a Species of Special Concern. It was a Federal category 2 candidate species until that list was abolished in 1996. It is ranked as vulnerable by the IUCN and as threatened by the American Fisheries Society. NatureServe (2008) ranks the species as imperiled and believes that in the short term, this species has a stable population.

Blood River Crayfish (*Orconectes burri*)

Taylor and Schuster (2004, pp. 143–145) provided a detailed description of the morphological characters and life appearance of the Blood River crayfish. The base color of the dorsal and lateral surfaces of the chelae (claws), carapace (platelike covering of the head and anterior half of the body), and abdomen is light brown to tan, with light to dark brown mottling (spots). The dorsal surface of the carapace has a wide, dark-brown patch anterior to the cervical groove (semicircular groove that generally divides the carapace in half) and a wide, U-shaped dark saddle centered at the caudal (posterior) margin that extends anteriorly along the lateral surface of the carapace. The fingers of the chelae (claws) have orange tips bordered by wide subdistal black bands. The large knobs at the base of the dactyl (mesal or thumblike part of the claw) are dark blue to black. The maximum known size for the species is 64.5 millimeters (2.54 inches).

The Blood River crayfish was not officially described until 1998 (Taylor and Sabaj 1998, pp. 645–652). Similar species include *O. bisectus* (Crittenden crayfish), *O. jeffersoni* (Louisville crayfish), *O. margorectus* (Livingston crayfish), *O. rafinesquei* (Rough River crayfish), *O. sanbornii* (Sanborn's crayfish), and *O. tricuspis* (Western Highland crayfish); though the distribution of these species is not known to overlap that of the Blood River crayfish. The Blood River crayfish differs from all of these species in possessing a central projection (typically the longest terminal projection of the gonopod) with a tip bent at a 90° angle to the main shaft of the gonopod and which overhangs the mesial process (terminal process of the gonopod, typically shorter than the central projection). The strongly mottled appearance is also atypical for most other Kentucky species of *Orconectes* (Taylor and Schuster 2004, p. 145).

According to Taylor and Schuster (2004, pp. 145–146), the Blood River crayfish occurs in small to medium-sized creeks ranging in width from 3 to 10 meters (m) (5 to 33 feet (ft)) with substrates consisting of sand and gravel. The species typically inhabits woody debris piles or woody vegetation root masses along stream margins, especially in areas with current. According to Taylor and Schuster (2004), very little is known about the life history of *O. burri.* Form I males have been collected in March, April, May, and October. Ovigerous (egg-carrying) females were observed for the first time in April 2008 (Ryan Evans, Kentucky State Nature Preserves Commission [KSNPC], personal communication, 2008). Most collections of *O. burri* have contained two distinct year classes, suggesting that the species has a 2-year life cycle (Taylor and Sabaj 1998, pp. 645–652). The Blood River crayfish has been found sympatrically with two other crayfish species, *Cambarus diogenes* (devil crayfish) and *Procambarus acutus* (White River crayfish) (Taylor and Schuster 2004, p. 146; Ryan Evans, KSNPC, personal communication, 2008). Detailed biological information is unavailable for *O. burri,* but the species is likely similar to most other Kentucky crayfishes with respect to longevity (usually 2 to 3 years), diet (opportunistic omnivores), and life cycle.

The species is endemic to the Blood River drainage, a Tennessee River tributary in western Kentucky and northwest Tennessee (Taylor and Schuster 2004, p. 145). Little is known regarding the historical distribution of the species, but is assumed that the species occupied the same stream drainages in which it now occurs (Guenter Schuster, Eastern Kentucky University (EKU), personal communication, 2008). The Blood River originates in Henry County, Tennessee, and flows northeasterly into Kentucky where it empties into Kentucky Lake

(Tennessee River). Within Kentucky, the range of *O. burri* is contained entirely within the boundaries of Calloway County, where the species is known from the Blood River mainstem and seven of its tributaries: Wildcat Creek (the type locality), Panther Creek, McCullough Fork, Goose Creek, Beechy Creek, Grindstone Creek, and Lax Creek (Taylor and Schuster 2004, p. 145; Ryan Evans, KSNPC, personal communication, 2008). Within Tennessee, the species has been recorded from the North Fork Blood River and Middle Fork Blood River. Exhaustive collecting in the lower Tennessee River system of western Tennessee and Kentucky by Taylor and Sabaj (1998, p. 649) and a search of holdings in the National Museum of Natural History failed to document the presence of the species outside of the Blood River drainage.

Surveys conducted by Taylor and Sabaj (1998) in 1996 revealed that *O. burri* was moderately abundant in the Blood River and several of its tributaries in western Tennessee and Kentucky. Recent surveys by KSNPC during April, May, and June of 2008 confirmed the species' presence at the four previously reported Kentucky sites and recorded *O. burri* from six new Kentucky sites: (1) Blood River at the KY 121 bridge crossing; (2) Panther Creek at the KY 280 bridge crossing; (3) Goose Creek at the KY 280 bridge crossing; (4) Grindstone Creek at the KY 444 bridge crossing; (5) Wildcat Creek at the Ralph Wright Road bridge crossing; and (6) Lax Creek at the State Line Road bridge crossing (Ryan Evans, KSNPC, personal communication, 2008; M. Floyd, USFWS, personal observation, 2008). Collections were made using a standard seine (3.4 x 1.8 m (11 x 6 ft) with 0.3 cm (0.1 in) mesh), and approximately 15–20 seine hauls or kicks were made at each site in areas with suitable habitat (primarily woody debris piles or submerged tree roots). The species was observed at 12 of 14 sites (the species was not observed at 2 sites in the Sugar Creek basin), and catch rates ranged from a low of 0.176 individuals per seine effort at Lax Creek to a high of 2.73 individuals per effort at Grindstone Creek. The Blood River crayfish was the dominant crayfish at all sites, averaging 82.5 percent (range = 62.5 to 100 percent) of all crayfish individuals at each site. The species is currently listed as Threatened in Kentucky by KSNPC (KSNPC 2005), but this designation may be modified based on the species' current abundance and discovery of new populations (Ryan Evans, KSNPC, pers. comm. 2008).

Evaluation of Information for This Finding

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations at 50 CFR 424 set forth the procedures for adding a species to, or removing a species from, the Federal Lists of Endanged and Threatened Wildlife and Plants. A species may be determined to be endangered or threatened due to one or more of the five factors described in section 4(a)(1) of the Act:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

In considering what factors might constitute threats, we must look beyond the mere exposure of the species to the factor to determine whether the species responds to the factor in a way that causes actual impacts to the species. If there is exposure to a factor, but no response, or only a positive response, that factor is not a threat. If there is exposure and the species responds negatively, the factor may be a threat and we then attempt to determine how significant a threat it is. If the threat is significant, it may drive or contribute to the risk of extinction of the species such that the species may warrant listing as threatened or endangered as those terms are defined by the Act. This does not necessarily require empirical proof of a threat. The combination of exposure and some corroborating evidence of how the species is likely affected could suffice. The mere identification of factors that could affect a species negatively may not be sufficient to compel a finding that listing may be warranted. The information must contain evidence sufficient to suggest that these factors may be operative threats that act on the species to the point that the species may meet the definition of a ''threatened species:'' or an ''endangered species'' under the Act.

In making this 90-day finding we evaluated whether information regarding threats to the nine species that we consider listable entities (*i.e.,* taxonomically valid and not considered extinct), as presented in the petition and other information available in our files is substantial, thereby indicating that listing any of the species in the petitioned action may be warranted. Our evaluation of this information is presented below. The intensity of our review of the species varied depending on the amount of information presented in the petition and that amount of information available in our files.

Sarah's Hydroptila Caddisfly (*Hydroptila sarahae*)

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Information Provided in the Petition

The petition (p. 612) cites NatureServe (2008) stating ''anything that adversely affects water quality, such as pollution, siltation or degradation of surrounding habitat would be a threat to this species.'' However, it provides no information on actual threats to the species under this factor.

Evaluation of Information Provided in the Petition and Available in Service Files

We have no evidence in our files that this species is facing threats under this factor. The petition (p. 612) states that the species is known from 4 locations on EAFB, but information in our files shows that it is actually extant at 11 locations on the installation. EAFB is managed under an Integrated Natural Resource Plan (INRMP) (Science Applications International Corporation (SAIC) 2006) that was reviewed by and approved by the Service and the Florida Fish and Wildlife Conservation Commission and that is protective of water quality, and the steepheads, spring runs, and creeks where this species occurs. Eglin's overall ecosystem management benefits the species. All mission activities are required to avoid disturbing wetlands, including the creeks inhabited by this species. In addition, the Service has partnered with EAFB and conducts routine biological, chemical, and physical habitat assessments of aquatic environments in order to assist with conservation efforts (SAIC 2006, p. 1–5). Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the present or threatened destruction, modification, or curtailment of the species' habitat or range may present a threat to Sarah's hydroptila caddisfly such that the petitioned action may be warranted.

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

The petition does not provide any information on this factor, and does not

assert it is a threat. We have no information in our files to indicate this is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that overutilization for commercial, recreational, scientific, or educational purposes may present a threat to Sarah's hydroptila caddisfly such that the petitioned action may be warranted.

Factor C. Disease or Predation

The petition does not provide any information on this factor, and does not assert it is a threat. We have no information in our files to indicate this is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that disease or predation may present a threat to Sarah's hydroptila caddisfly such that the petitioned action may be warranted.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Information Provided in the Petition

The petition (p. 612) states, ''It is unknown if it is appropriately protected from activities that would degrade water quality and eliminate the species.''

Evaluation of Information Provided in the Petition and Available in Service Files

We have no information in our files indicating the species is threatened by the inadequacy of existing regulatory mechanisms. Water quality on EAFB is protected in part through an approved INRMP (SAIC 2010, pp. 7–55 through 7–60). EAFB is also subject to the Federal Clean Water Act of 1972 and State water quality regulations. The Service has partnered with EAFB and conducts routine biological, chemical, and physical habitat assessments of aquatic environments in order to assist with conservation efforts (SAIC 2010, pp. 1–5). The protections in place through the INRMP, Clean Water Act, and State regulations appear to be adequately protecing Sarah's hydroptila caddisfly from poor water quality. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the inadequacy of existing regulatory mechanisms may present a threat to Sarah's hydroptila caddisfly such that the petitioned action may be warranted.

Factor E. Other Naturalor Manmade Factors Affecting the Species' Continued Existence

The petition does not provide any information on this factor, and does not assert it is a threat. We have no information in our files to indicate this is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that other natural or manmade factors affecting the species' continued existence may present a threat to Sarah's hydroptila caddisfly such that the petitioned action may be warranted.

Rogue Creek Hydroptila Caddisfly (*Hydroptila okaloosa*)

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Information Provided in the Petition

The petition (p. 611), citing NatureServe (2008), states, ''Because it is dependent on clean water, this caddisfly is threatened by any form of pollution, siltation or degradation of surrounding habitat.'' However, the petition fails to cite any specific instance of habitat degradation within the range of the Rogue Creek hydroptila caddisfly, or provide any information that the caddisfly is negatively affected by hatitat degredation.

Evaluation of Information Provided in Petition and Available in Service Files

As with Sarah's hydroptila caddisfly, we have no evidence in our files that this species is facing threats under this factor. This species is known from eight locations on EAFB, all of which are managed under the installation's INRMP (SAIC 2006). In addition, the Service has partnered with EAFB and conducts routine biological, chemical, and physical habitat assessments of aquatic environments in order to assist with conservation efforts (SAIC 2010, pp. 1–5). Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the present or threatened destruction, modification, or curtailment of the species' habitat or range may present a threat to the Rogue Creek hydroptila caddisfly such that the petitioned action may be warranted.

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

The petition does not provide any information on this factor, and does not assert it is a threat. We have no information in our files to indicate this is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that overutilization for commercial, recreational, scientific, or educational purposes may present a threat to the Rogue Creek hydroptila caddisfly such that the petitioned action may be warranted.

Factor C. Disease or Predation

The petition does not provide any information on this factor, and does not assert it is a threat. We have no information in our files to indicate this is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that disease or predation may present a threat to the Rogue Creek hydroptila caddisfly such that the petitioned action may be warranted.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Information Provided in the Petition

The petition (p. 611) states that the species is found only on EAFB, and that it is ''unknown if it is appropriately protected from activities that would degrade water quality and eliminate the species.''

Evaluation of Information Provided in Petition and Available in Service Files

We have no information in our files indicating the species is threatened by the inadequacy of existing regulatory mechanisms. The INRMP and Federal and State water quality laws and regulations are protective of water quality, and the steepheads, spring runs, and creeks where this species occurs. EAFB's overall ecosystem management benefits the species. All mission activities are required to avoid disturbing wetlands, including the creeks inhabited by this species. Water quality on EAFB is also protected in part through an approved INRMP (SAIC 2006, pp. 7–55 through 7–60). EAFB is also subject to the Federal Clean Water Act of 1972 and State water quality regulations. The Service has partnered with EAFB and conducts routine biological, chemical, and physical habitat assessments of aquatic environments in order to assist with conservation efforts (SAIC 2006, pp. 1–5). The protections in place through the INRMP, Clean Water Act, and State regulations appear to be adequately

protecting the Rogue Creek hydroptila caddisfly from poor water quality. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the inadequacy of existing regulatory mechanisms may present a threat to the Rogue Creek hydroptila caddisfly such that the petitioned action may be warranted.

Factor E. Other Natural or Manmade Factors Affecting the Species' Continued Existence

The petition does not provide any information on this factor, and does not assert it is a threat. We have no information in our files to indicate this is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that other natural or manmade factors affecting the species' continued existence may present a threat to the Rogue Creek hydroptila caddisfly such that the petitioned action may be warranted.

Florida Brown Checkered Summer Sedge (*Polycentropus floridensis*)

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Information Provided in the Petition

The petition states according to NatureServe (2008), the habitat of this species is ''subject to pollution, siltation, and other forms of environmental degradation.'' However, the Petition also notes, based on Rasmussen *et al.* (2008) that the species is believed to be relatively stable 'as long as stream habitats supporting populations on EAFB are protected.''

Evaluation of Information Provided in the Petition and Available in Service Files

We have no information in our files that this species is facing threats under this factor. This species' locations on EAFB are managed under the installation's INRMP (SAIC 2006). In addition, the Service has partnered with EAFB and conducts routine biological, chemical, and physical habitat assessments of aquatic environments in order to assist with conservation efforts (SAIC 2006, pp. 1–5). Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the present or threatened destruction, modification, or curtailment of the species' habitat or range may present a threat to the Florida brown checkered summer sedge such that the petitioned action may be warranted.

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

The petition does not provide any information on this factor, and does not assert it is a threat. We have no information in our files to indicate this is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that overutilization for commercial, recreational, scientific, or educational purposes may present a threat to the Florida brown checkered summer sedge such that the petitioned action may be warranted.

Factor C. Disease or Predation

The petition does not provide any information on this factor, and does not assert it is a threat. We have no information in our files to indicate this is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that disease or predation may present a threat to the Florida brown checkered summer sedge such that the petitioned action may be warranted.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Information Provided in the Petition

The petition states that no existing regulatory mechanisms protect this species, and despite its stability on EAFB, that issues of national security are prioritized over species protection.

Evaluation of Information Provided in the Petition and Available in Service Files

We have no information in our files that issues of national security are negatively affecting the species or will do so in the foreseeable future. In addition, water quality on EAFB is protected in part through an approved INRMP (SAIC 2010, pp. 7–55 through 7–60). The INRMP and Federal and State water quality laws and regulations are protective of water quality and the stream habitats where this species occurs. EAFB's overall ecosystem management benefits the species. All mission activities are required to avoid disturbing wetlands, including the creeks inhabited by this species. EAFB is also subject to the Federal Clean Water Act of 1972 and State water quality regulations. The protections in place through the INRMP, Clean Water Act, and State regulations appear to be adequately protecting the species from poor water quality. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the inadequacy of existing regulatory mechanisms may present a threat to the Florida brown checkered summer sedge such that the petitioned action may be warranted.

Factor E. Other Natural or Manmade Factors Affecting the Species' Continued Existence

The petition does not provide any information on this factor, and does not assert it is a threat. We have no information in our files to indicate this is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that other natural or manmade factors affecting the species' continued existence may present a threat to the Florida brown checkered summer sedge such that the petitioned action may be warranted.

Ouachita Creekshell (*Villosa arkansasensis*)

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Information Provided in the Petition

The petition (p. 1125) asserts that the species is threatened by habitat degradation and fragmentation in the Glover River drainage (Vaughan 2003) due to gravel mining, by proposed reservoirs (Galbraith *et al.* 2008), by siltation from forestry and agricultural activities, and from second home development (Spooner and Vaughan 2007); and from ''pollution from municipal and industrial point sources, by recreation, development, nutrient loading, confined animal feeding operations, grazing, sedimentation, and road construction'' (Arkansas Game and Fish Commission 2005). The petition fails to identify any specific details showing these potential threats actually affect the Ouachita creekshell, or identify the significance of these threats to the status of the Ouachita creekshell.

Evaluation of Information Provided in the Petition and Available in Service Files

In 2007, the Service concluded a status assessment of the Ouachita creekshell (Davidson 2007), in which

we assessed the status and threats based on the five listing factors. We concluded that an absence of comprehensive mussel surveys within the Ouachita creekshell historic range has resulted in difficulty assessing long term population trends (Davidson 2007, p. 30). Limited information is available on the species prior to the 1980s and prior to most anthropogenic (human-caused) impacts that may have affected populations when the area was industrialized and urbanized.

We further concluded in the assessment that construction of 12 major dams and impoundments probably contributed to the historic decline of the Ouachita creekshell as the species does not occur in reservoirs lacking riverine characteristics and is unable to successfully reproduce and recruit under reservoir or tailwater conditions (Davidson 2007, pp. 31–32). We have no information in our files indicating that any new reservoirs are proposed or that the existing reservoirs currently threaten the Ouachita creekshell.

Similarly, the demise of the mussel population in the lower Poteau River system has been attributed, at least in part, to sedimentation and farming chemicals (Davidson 2007, pp. 32–33). In the early 1990's the upper Mountain Fork and Glover Rivers may have been impaired by clearcutting and conversion of surrounding lands to pasture and confined animal feeding operations (R. Standage, U.S. Forest Service, pers. comm. 2007). DeClerk *et al.* (2006) assessed the threats and stressors to the upper Saline River (Ouachita River basin) headwaters and concluded that stressors are likely to be localized and moderately degrade aquatic biota and habitat over a portion of the watershed if conditions remain unchanged over the next 10 years. Lastly, we concluded in the assessment that the impacts of mining should be localized and have a minimum effect on the species rangewide (Davidson 2007, p. 33).

Sedimentation, including siltation, resulting from such activities as grazing, home development, and road construction is a pervasive problem across the United States, including the range of the Ouachita creekshell. As the Ouachita creekshell relies on visual-feeding host fishes for reproduction, clear silt-free water is essential for successful recruitment. However, use of best management practices, which in some cases are mandatory and others voluntary, significantly reduces sediment and erosion from construction and development, timber, and agricultural practices. Additionally, approximately 85 percent of the Ouachita River basin upstream of Lake Ouachita is within Ouachita National Forest. Therefore, populations of this species are substantially protected from habitat destruction and alteration from sedimentation.

The Service's Partners for Fish and Wildlife program (PFW) has identified priority watersheds in the Ouachita Mountains for habitat restoration. The PFW has funded one project to enhance riparian habitat on the Middle Fork Saline River. Other PFW projects are scattered throughout priority watersheds (M. Tobin, USFWS, pers. Comm., 2006). Additionally, resource managers are teaming together to develop strategies to restore mussel populations in various watersheds. These efforts have been largely focused on the Upper Saline River watershed (Ouachita River basin) in the Ouachita creekshell range. These strategies have emphasized actions to aid in the restoration of mussel populations.

In summary, the threats alleged in the Petition are largely historical and not currently acting on the species or are not a threat of sufficient magnitude such that they affect the species continued existence.

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

The petition does not provide any information on this factor, and does not assert it is a threat. Information in our files (Davidson 2007, p. 36) indicates this species has never been valuable in the commercial pearl button or cultured pearl industry. Similarly, there is no other information in our files that would suggest overutilization for recreational, scientific or education purposes is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that overutilization for commercial, recreational, scientific, or educational purposes may present a threat to the Ouachita creekshell such that the petitioned action may be warranted.

Factor C. Disease or Predation

The petition does not provide any information on this factor, and does not assert it is a threat. Information in our files indicates that there are several natural predators of mussels, including the muskrat, raccoon, mink, otter, hogs, turtles and aquatic birds. However, threats from these species are not currently deemed significant (Davidson 2007, p. 37). Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that disease or predation may present a threat to the Ouachita creekshell such that the petitioned action may be warranted.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Information Provided in the Petition

The petition (p. 1126) states, ''There are no existing regulatory mechanisms that protect the Ouachita Creekshell.'' However, the petition fails to provide any substantial information detailing the significance of this potential threat or how it may be acting on the species.

Evaluation of Information Provided in the Petition and Available in Service Files

In contrast to the above statement in the petition, there are several regulatory mechanisms in place to protect the Ouachita creekshell. The Arkansas Game and Fish Commission prohibits taking of Ouachita creekshell without a State collecting permit (Davidson 2007). The Clean Water Act prohibits water quality degradation, and administration of this authority has improved over the last several years in AR and OK (Davidson 2007). Hydropower Dams are regulated by the Federal Energy Regulatory Commission (FERC) under the Federal Power Act (FPA). The FPA provides for cooperation between FERC and other Federal and State agencies, including resource agencies, in licensing and relicensing power projects, including the authority to alter flow regimes such that they might reduce or avoid adverse effects to mussels downstream.

Many Ouachita creekshell extant and historical populations occur on public lands (*e.g.,* Ouachita National Forest, State parks, and wildlife management areas). Approximately 85 percent of the Ouachita River basin upstream of Lake Ouachita is within Ouachita National Forest. Accordingly, populations of this species are substantially protected from habitat destruction and alteration. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that disease or predation may present a threat to the Ouachita creekshell such that the petitioned action may be warranted.

Factor E. Other Natural or Manmade Factors Affecting the Species' Continued Existence

Information Provided in the Petition

The petition (p. 1126), citing Harris *et al.* (1997) states that zebra mussel (*Dreissena polymorpha*) invasion is a

threat to the native mussels of the Arkansas and White Rivers. However, it does not provide any specific information on the significance of the threat or extent of the invasion into Ouachita creekshell habitat.

Evaluation of Information Provided in the Petition and Available in Service Files

Davidson (2007, pp. 38–39) evaluated the existing threats to the Ouachita creekshell using the five listing factors and, while he discusses the exotic Asian clam as firmly entrenched in the Ouachita creekshell range, he also finds that the Asian clam may not cause native mussels in dense beds to decline when it invades their habitat. Davidson (2007) does not mention the zebra mussel as a possible threat. As noted previously, phylogenetic analysis suggests that Ouachita creekshell (*Villosa arkansasensis*) may be the same species as the southern hickorynut mussel, considerably increasing the range and population numbers of the Ouachita creekshell. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that other natural or manmade factors affecting the species' continued existence may present a threat to the Ouachita creekshell such that the petitioned action may be warranted.

Crystal darter (*Crystallaria asprella*)

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Information Provided in the Petition

The petition (p. 286), citing numerous sources, states that habitat destruction is a primary threat to the crystal darter. On page 286 the Petition states, ''The crystal darter now occurs as declining, fragmented populations that are highly vulnerable to extirpation from habitat loss and degradation.'' NatureServe (2008) reports that this fish is threatened by ''siltation and other forms of pollution from urbanization, strip-mining, logging, natural gas exploration, and improper agricultural practices, as well as stream alteration projects, such as damming, dredging, and channelization.'' Dredging for navigation is believed to be a major threat in the upper Mississippi River system.

Reasons outlined for habitat loss include siltation and other water-quality concerns in streams and rivers (Boschung and Mayden 2004, NatureServe 2008, Jelks *et al.* 2008, Arkansas Game and Fish Commission (AGFC) 2005 as cited in the Petition, pp. 285–286), dams and impoundments (Boschung & Mayden 2004, NatureServe 2008, and AGFC 2005, as cited in the Petition, p. 286), and mountaintop removal coal mining (Boschung & Mayden 2004, Wood 2009, and Wood and Raley 2000 as referenced in the Petition, p. 286).

Evaluation of Information Provided in the Petition and Available in Service Files

In the Service's crystal darter status assessment (2009), we acknowledge that extensive human disturbance over the past 100 years has contributed to the extirpation of the crystal darter from portions of its former range including Ohio, Indiana, Illinois, Tennessee, Kentucky, and Iowa (Etnier and Starnes 1993 as reported in FWS 2009). It has long been recognized that siltation alters aquatic habitats by reducing light penetration, changing heat radiation, covering the stream bottom, and retaining organic material and other debris (Ellis 1936). This translates into the disruption of reproductive behavior and alteration of food resources utilized by stream fish communities (Ellis 1936).

The crystal darter was broadly distributed in tributaries of the Ohio River until high silt loading and the subsequent smothering of sandy substrates occurred (Trautman 1981). Impoundment and channelization were thought to have caused the extirpation of crystal darter populations from the Tombigbee River, a part of the Mobile River system (Stewart 1992). According to Etnier and Starnes (1993), as reported in FWS (2009), impoundments at Lake Cumberland, Cordell Hull, and Dale Hollow reservoirs in Tennessee have caused the apparent extirpation of the crystal darter by altering big-river habitat in the region. Schmidt (1995) lists dredging for commercial navigation as the greatest threat to crystal darter populations in the Mississippi River. On the other hand, Schmidt (1995) also notes that collections made in a pool designated as a dredge disposal site may provide suitable substrates to accommodate the crystal darter's burying behavior. The positive and negative impacts have yet to be fully sorted out. Hatch (1998) suggests that the rarity of crystal darters in the Upper Mississippi River could be a result of the velocity reduction and particle deposition associated with navigation controls. However, Schmidt (1995) notes that crystal darters have been repeatedly detected in association with wing dam structures, which are abundant throughout the Mississippi River system.

While habitat modification and destruction have occurred in the past, the Petition fails to present new substantial information that this factor continues to affect the crystal darter or would in the future. Similarly, while dredging, dams, stripmining, and mountaintop mining represent generalized threats to the species as stated in the Petition as well as in our own status assessment (2009), neither the Petition nor information in our files present substantial information detailing the significance of these threats to the species. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the present or threatened destruction, modification, or curtailment of the species' habitat or range may present a threat to the crystal darter such that the petitioned action may be warranted.

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

Information Provided in the Petition

The petition does not provide any information on this factor, and does not assert it is a threat.

Evaluation of Information Provided in the Petition and Available in Service Files

Although the crystal darter has no commercial value, live specimens may be collected for the aquarium trade (Walsh *et al.* 2003). However, Schmidt (2003) asserted that current inefficiencies in collection techniques preclude overutilization from becoming a major threat to crystal darter populations. Inadvertent collection of crystal darters while sampling for other fish species could occur, but is unlikely considering the low encounter rate for this species. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that overutilization for commercial, recreational, scientific, or educational purposes may present a threat to the crystal darter such that the petitioned action may be warranted.

Factor C. Disease or Predation

Information Provided in the Petition

The petition does not provide any information on this factor, and does not assert it is a threat.

Evaluation of Information Provided in the Petition and Available in Service Files

Viral hemorrhagic septicemia (VHS) is an infectious disease of fish that was diagnosed in 2005 in fish in the Great Lakes, and was confirmed as the cause of fish kills in Lakes Huron, St. Clair, Erie, and Ontario and the St. Lawrence River in 2005 and 2006. VHS was detected for the first time in 2007 in fish from Wisconsin waters, and fish biologists believe the virus may soon be in fish from the upper Mississippi River and their tributaries or may already be present.

The Great Lakes strain of VHS is genetically different than the strains from Europe and the Pacific Northwest, in that it seems to affect a wider range of freshwater species over a broader range of water temperatures. Some percid (perch) species are known to be susceptible to VHS; however, it has been noted only in the sport fish, and no darters have been reported with VHS so far.

Natural predation by piscivorous fish and wildlife likely occurs (Page 1983). Newly introduced species may act as predators and/or competitors of native fish, including the varieties of nonnative, invasive Asian carp now occurring and reproducing in the Mississippi River and some of its tributaries, including the grass carp, silver carp, bighead carp, and black carp. Asian carp are becoming abundant and persistent residents of the lower reaches of the Upper Mississippi River System (UMRS; Koel *et al.* 2000). However, we have no information that Asian carp are adversely affecting the crystal darter.

Gobies are another invasive fish species that could adversely affect crystal darter. As a benthic species, they might compete with darters for food and space, and their high reproductive rate could overwhelm the natural recruitment of the crystal darter. However, at this time gobies appear to be restricted to the Great Lakes. Whether gobies would occur in the swift waters preferred by the crystal darter is not known.

The zebra mussel has invaded the Mississippi River and can be quite abundant at certain locations. When abundant, zebra mussels can significantly alter the water quality of the river by filtering out the food in the water column that larval fish and other organisms depend on. They can also deplete the river of oxygen, both while alive (for respiration) or once dead (from decomposition). They can completely alter the structure of the bottom of the river, making it a solid mass of live zebra mussels or their shells. Crystal darters prefer stable sand gravel bars in fast-flowing reaches, where zebra mussels are not as abundant. It is, therefore, unlikely that zebra mussels will have a significant direct impact on these kinds of habitats. We have no information to indicate they represent a threat to the crystal darter at this time.

Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that disease or predation may present a threat to the crystal darter such that the petitioned action may be warranted.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

The petition (p. 286) states that ''no existing regulatory mechanisms adequately protect this species or its habitat,'' and citing NatureServe (2008) explains that few populations are ''appropriately managed and protected.'' NatureServe (2008) reports that few (1 to 3) occurrences of this species are appropriately protected and managed, stating: ''At least one site is known to be protected, the lower Bayou Pierre complex in Claiborne and Copiah Counties, Mississippi. For the most part, the species is protected from harvest, but generally there is no protection from upstream siltation or pollution sources.

Evaluation of Information Provided in the Petition and Available in Service Files

In contrast to the above statement in the Petition, there are a number of regulatory mechanisms in place to protect the crystal darter. In 11 of the 15 States where the species is known to occur, the crystal darter receives special designated protective status as a species of concern, threatened or endangered within the State. While the specific designation in each State provides slightly different protections, they generally protect the species from direct harm, but do not protect its habitat. However, habitat protections across the range of the species are provided through section 404 of the Clean Water Act. The Clean Water Act prohibits water-quality degradation, and administration of this authority has improved over the last several years in AR and OK (Davidson 2007). Hydropower dams are regulated by FERC under the FPA. The FPA provides for cooperation between FERC and other Federal and state agencies, including resource agencies, in licensing and relicensing power projects, including the authority to alter flow regimes such that they might reduce or avoid adverse effects to aquatic biota downstream. Sedimentation and siltation from construction, development, and timber practices are effectively minimized and or avoided through the implementation of best management practices, which are variably required or voluntary in nature. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that inadequacy of existing regulatory mechanisms is a threat to the crystal darter such that the petitioned action may be warranted.

Factor E. Other Natural or Manmade Factors Affecting the Species' Continued Existence

Information Provided in the Petition

The petition (p. 286), citing Bauer and Clemmer (1983) and NatureServe (2008), states that the species could be affected by the introduction of nonnative fish species, and across its range is threatened by water pollution from a variety of sources. However, no specific evidence of these threats, or of the crystal darter's response to them, is given. The Petition (p. 286), citing NatureServe 2008, also claims that the crystal darter is ''vulnerable to stochastic genetic and environmental events because of its distribution in localized populations.''

Evaluation of Information Provided in the Petition and Available in Service Files

We have no specific information on the crystal darter's response to various introduced nonnative fish species or to the general threat of water pollution. However, Alabama established a rule in 2003 that makes it unlawful to intentionally stock or release any fish, mussel, snail, crayfish or their embryos, including baitfish, into the public waters of Alabama under the jurisdiction of the Division of Wildlife and Freshwater Fisheries. This rule, if enforced, could bolster protection of crystal darters and other imperiled biota.

We next considered information in our files concerning other potential Factor E threats to the crystal darter. Loss of genetic variation through population bottlenecks, genetic drift, and inbreeding can result in increased homozygosity (sameness of genes), loss of additive variance, and increased expression of deleterious recessive alleles (Meffe 1986). Through these processes, loss of genetic variance leads to a decrease in fitness. Small and increasingly isolated crystal darter

populations may continue to suffer from decreasing within-population diversity as inbreeding among close relatives, which can lead to problems such as reduced fertility and fitness, increases in likelihood (Noss and Cooperrider 1994). Similarly, the random loss of adaptive genes through genetic drift may function to limit the ability of crystal darters to respond to changes in their environment (Noss and Cooperrider 1994). Small population sizes and inhibited gene flow between crystal darter populations caused by habitat fragmentation may increase the likelihood of local extinction (Gilpin and Soulé 1986). Unique genetic lines such as those from the Elk River population in West Virginia (Wood and Raley 2000) are of great importance for the long-term goals of maintaining genetic diversity and allowing future adaptation to changing conditions (Meffe 1986). These unique gene pools allow for the maintenance of between-population variance and can be sources of genetic stock for future management efforts (Meffe 1986) and adaptive potential in response to environmental change (Meffe 1987).

Morrison *et al.* (2006) compared the genetic variation of the disjunct populations of the crystal darter from the Upper Mississippi River (Zumbro River, Minnesota), Lower Mississippi River (Saline River, Arkansas), Gulf Coast drainages (Pearl River, Louisiana and Cahaba River, Alabama), and the Ohio River Basin (Elk River, West Virginia). She compared the populations genetically using two different genetic systems and compared that to previous genetic studies of Wood and Raley (2000). She also compared the populations morphometrically (by body physical characteristics) and determined that the four populations are distinctly different. Based on her analysis, she concluded that the Elk River population constituted a distinct species. Welsh and Wood (2008) confirmed the uniqueness of the Elk River population and subsequently described that population of *Crystallaria* as *Crystallaria cincotta,* the diamond darter. They concluded the Elk River population to be the only extant population of this species and that the small size of the population makes it quite vulnerable to local extinctions. The Service has elevated the diamond darter to candidate status (75 FR 69222). So while we previously thought that loss of genetic variation represented by the Elk River population might pose a potential threat to the crystal darter, we now realize that this population is, in fact, a different species, and not the crystal darter. Further, we did not find evidence of potential loss of other genetically unique and important populations of the crystal darter that could pose a Factor E threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that other natural or manmade factors affecting the species' continued existence may present a threat to the crystal darter such that the petitioned action may be warranted.

Spotted darter (*Etheostoma maculatum*)

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Information Provided in the Petition

The petition asserts that the spotted darter is threatened by sedimentation, impoundments, and stream channelization (Mayasich *et al.* 2004, Simon 2005, as cited in Petition, p. 435). Citing Simon 2005, the Petition (p. 435) states that the species faces specific water-quality threats in many States, including Kentucky, New York, Ohio, Pennsylvania, and West Virginia. The Petition (p. 435, citing various sources) asserts that the species is threatened by water pollution stemming from ''mountaintop removal'' coal mining in West Virginia.

Evaluation of Information Provided in the Petition and Available in Service Files

Although few quantitative data have been gathered directly linking the effects of sedimentation, impoundment, chemical water quality, and other habitat modifications on spotted darter declines, the best available information strongly suggests that these factors resulted in historical extirpations of some populations (*e.g.,* Mahoning River, Deer Creek, North Fork Kentucky River) and are a contributing factor in recent declines in parts of the range (*e.g.,* Tippecanoe River, Barren River system). These threats, however, have not been linked to recent widespread declines throughout the range of the species. The effects of environmental legislation such as the Clean Water Act and Surface mining Control and Reclamation Act (SMCRA), and conservation programs including the Conservation Reserve Program and Conservation Reserve Enhancement Program have contributed to improvements in water quality and habitat quality in many stream systems with remaining extant populations of the species. In addition, the relatively intact (*i.e.,* heavily forested) composition of some watersheds helps ameliorate the effects of activities that degrade local stream quality (*e.g.,* in the Allegheny River watershed). Overall, the best available information does not indicate that the present or threatened destruction, modification, or curtailment of the spotted darter's habitat or range is a significant threat or that it will cause substantial losses of population distribution or viability in all or a significant portion of the species range. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the present or threatened destruction, modification, or curtailment of the species' habitat or range may present a threat to the spotted darter such that the petitioned action may be warranted.

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

Information Provided in the Petition

The petition does not provide any information on this factor, and does not assert it is a threat.

Evaluation of Information Provided in the Petition and Available in Service Files

We have no information to indicate that overutilization of spotted darters for commercial, recreational, scientific, or educational purposes is a threat to spotted darters. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that overutilization for commercial, recreational, scientific, or educational purposes may present a threat to the spotted darter such that the petitioned action may be warranted.

Factor C. Disease or Predation

Information Provided in the Petition

The petition (pp. 435–436), citing various sources, states that predation from domestic and introduced predatory fishes following impoundment construction, as well as the introduction and spread of the exotic invasive fish the round goby (*Neogobius melanostomus*), threaten the spotted darter. However, the petition does not provide information demonstrating predation impacts to the spotted darter and how it may affect the species' status.

Evaluation of Information Provided in the Petition and Available in Service Files

We have no information in our files that suggests or identifies predation as a threat to spotted darter. Some natural predation by piscivorous fish and wildlife occurs (Page 1983, p. 172). Commonly reported parasites of darters include metacercarial trematodes (black-spot disease) flukes, nematodes, leeches, spiny-headed worms, and copepods (Page 1983, p. 173), but none of these are a significant threat to the spotted darter. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that disease or predation may present a threat to the spotted darter such that the petitioned action may be warranted.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Information Provided in the Petition

The petition states that, ''A portion of spotted darter populations occur in streams on the Hoosier and Allegheny National Forests, where they are listed as sensitive species (Simon 2005). This designation, however, does not provide protection for the spotted darter's habitat. Instead, it requires the Forest Service to consider the impacts of their actions on the darter, but not to choose a benign alternative or to stop a project because of impacts to the species. Likewise, the darter is listed as endangered or threatened in several states, but these designations do not provide regulatory protection for the darter's habitat.'' The Petition provides no specific information indicating what threats require adequate regulation by the U.S. Forest Service or the States.

Evaluation of Information Provided in the Petition and Available in Service Files

While a U.S. Forest Service designation as a sensitive species does not by itself provide habitat protections, the U.S. Forest Service is held to the same Clean Water Act section 404 requirements as a private entity as well as additional guidelines per the Forest Service's Land and Resource Management Plans.

Except for West Virginia, all States within the range of the spotted darter have legislation that provides protections for rare animal species. The spotted darter is on the State list of protected species in New York, Pennsylvania, and Ohio. Of these three, only the New York law extends protection beyond prohibiting the possession, sale, transportation, or killing of listed species. The New York law also prohibits any alteration of occupied habitat that is likely to negatively affect one or more essential behaviors of such species (6 NYCRR, part 182). Except for in New York, State threatened and endangered species laws do not address the primary threat to spotted darters: The present or threatened destruction, modification, or curtailment of its habitat or range.

In summary, existing regulatory mechanisms, including the Clean Water Act and State endangered species regulaitons provide some protection to spotted darters. The Petition did not present more specific information as to the nature of the threats that require additional regulation, and we have no additional information in our files. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the inadequacy of existing regulatory mechanisms may present a threat to the spotted darter such that the petitioned action may be warranted.

Factor E. Other Natural or Manmade Factors Affecting the Species' Continued Existence

Information Provided in the Petition

The petition cites NatureServe (2008) that ''Remaining populations of spotted darter are small and isolated and therefore vulnerable to stochastic extinction, inbreeding depression, and other perils that face small populations with low genetic diversity.''

Evaluation of Information Provided in the Petition and Available in Service Files

A few spotted darter populations appear to be small and isolated. Individuals in small populations are more likely to suffer from decreased fitness (*i.e.,* ability to produce viable offspring) as inbreeding among close relatives occurs and results in greater expression of deleterious recessive genes (Allendorf and Luikart 2007, pp. 306, 315). Genetic drift (*i.e.,* random change in gene frequencies) is also more likely to result in reduced genetic diversity in small populations, which may cause loss of genes that could allow the population to adapt to environmental change. These factors can increase the likelihood of extirpation (Allendorf and Luikart 2007, p. 355). The specific effects of genetic isolation on population dynamics in extant spotted darter populations, however, are not clear.

Climate change is expected to result in rising average temperatures throughout the range of the spotted darter and altered precipitation patterns, likely resulting in elevated stream temperature regimes and lower summer base-flows (Karl *et al.* 2009, pp. 107, 111–112, 117–120). Higher stream temperatures may result in reduced reproductive success, and low base flows favor more tolerant stream fishes. Migration of spotted darters as an adaptation to climate changes is unlikely, due to their limited mobility, restriction to defined stream systems, and extensive impoundment throughout the Ohio River basin. According to the NatureServe Climate Change Vulnerability Index, release 2.01, spotted darters are considered moderately vulnerable to climate change, which means their abundance and/or range extent are likely to decrease by 2050 (Applegate 2010). Specific impacts to spotted darters resulting from climate change are not clear.

In summary, both limited genetic variation and the effects of climate change are potential future threats to spotted darter. However, the information provided by the Petition and readily available in our files is not adequate to determine specific impacts to the species, or to identify either as a significant threat affecting the species viability. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that other natural or manmade factors affecting the species' continued existence may present a threat to the spotted darter such that the petitioned action may be warranted.

Florida Bog frog (*Rana okaloosae*)

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Information Provided in the Petition

The Petition states: ''The greatest threats to the Florida Bog Frog are stream impoundment and habitat succession (Molar 1992). This frog is particularly vulnerable to habitat destruction and modification because of its limited range and habitat specificity (NatureServe 2008). This species' habitat has been degraded by improper watershed management, siltation stemming from poor road placement, and poor forest management in surrounding uplands (Molar 1992, NatureServe 2008).''

The petition continues ''Enge (2005) cites logging, groundwater use, siltation from dirt roads and cleared lands, impoundment, and poor management of adjacent upland habitat as threats to amphibian species in ravine habitats in the Florida Panhandle, including R. okaloosae. The Florida Fish and Wildlife Conservation Commission (2009) cites threats to the Bog Frog as siltation, pollution, and excess surface runoff where roads cross slopes above streams, damming, and altered fire regime which allows hardwood succession along streams (*http://www.fwc.state.fl.us/docs/FWCG/florida_bog_frog.pdf*). The Commission cites altered fire regime, altered hydrologic regime, groundwater withdrawal, surface water diversion, and altered community structure as threats to the Bog Frog's habitat (*http://myfwc.com/docs/WildlifeHabitats/Legacy_Shrub_Swamp.pdf*). The Florida Dept. of Environmental Protection lists the Florida Bog Frog as occurring at Rocky Bayou State Park where its habitat is threatened by potential loss of submerged and emergent vegetation due to increased residential housing along the preserve boundary, and by high use of the preserve as a water skiing area which may have an impact on the natural submerged and emergent vegetation. There are also recurring issues with high bacteria counts in the preserve waters adjacent to the state park (*http://www.dep.state.fl.us/coastal/sites/rocky/info.htm*).''

Evaluation of Information Provided in the Petition and Available in Service Files

Based on the information in our files, we disagree with the interpretation of the information in the sources cited in the Petition. For instance, while the Petition states that, ''This frog is particularly vulnerable to habitat destruction and modification because of its limited range and habitat specificity (NatureServe 2008).'' NatureServe (2008) also states that ''many to very many occurrences are appropriately protected and managed.'' Additionally, the Petition's claim that ''This species' habitat has been degraded by improper watershed management, siltation stemming from poor road placement, and poor forest management in surrounding uplands (Molar 1992, NatureServe 2008),'' is qualified by NatureServe (2008) based on Molar (1992) stating that frog populations are ''often not negatively affected by this [meaning * * * improper watershed management, siltation stemming from poor road placement, and poor forest management in surrounding uplands].'' Further, since EAFB contains upwards of 90 percent of the known range and at least 95 percent of the known sites for this species, many of the threats are most appropriately applied to the 5 percent of sites remaining that are in private ownership, as habitat management activities specific to the Florida bog frog have been ongoing on EAFB for approximately 5 years.

Monitoring and management activities are laid out in the Draft Threatened and Endangered Species Component Plan (EAFB 2006, pp. 12–20 to 12–24) guided by the recommendations of the Florida Bog Frog Management Plan (Jackson 2004), and an Integrated Natural Resources Management Plan (EAFB 2010). The Draft Threatened and Endangered Species Component Plan (2006) lays out a comprehensive strategy to monitor and manage the species on EAFB including 100 percent resurvey of known sites, resample of 25 percent of previously visited sites, and survey of 20 new sites annually. Management for the bog frog includes prescribed burning, invasive species control, and erosion control not only at known bog frog sites, but also throughout entire Conservation Management Units, as necessary (EAFB 2006, pp. 12–21 to 12–22).

In addition the State of Florida (2006) acquired substantial acreage located between EAFB and Blackwater River State Forest, which is intended to help protect the areas upstream of and located outside of EAFB. Based on the existing management and protection of these areas, the threats cited in the Petition have been largely alleviated. The persistence of the Florida bog frog is tied strongly to management actions on the base. Although funding for management of State-listed species is not mandatory, EAFB provides beneficial management actions for the Florida bog frog while managing for overall ecosystem health and Federally listed species (EAFB 2006). Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the present or threatened destruction, modification, or curtailment of the species' habitat or range may present a threat to the Florida bog frog such that the petitioned action may be warranted.

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

Information Provided in the Petition

The petition states: ''Amphibians are collected from the wild for use as food, pets, and for the biological and medicinal supply markets (AmphibiaWeb 2009: *http://amphibiaweb.org/declines/exploitation.html*). Dodd (1997) states: ''Collecting specimens for the pet trade or biological laboratories probably has had some impact on local (Southeast) amphibian populations, but few data are available'' (p. 183).''

Evaluation of Information Provided in the Petition and Available in Service Files

While we agree that amphibian collection in the southeastern United States is a potential threat to amphibians, it is unlikely that this species would receive substantial collection pressure as 90 percent of the known range is located on EAFB, and access to the Base is restricted. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the overutilization for commercial, recreational, scientific, or educational purposes may present a threat to the Florida bog frog such that the petitioned action may be warranted.

Factor C. Disease or Predation

Information Provided in the Petition

The petition states, ''New diseases and increased susceptibility of amphibians to existing diseases are known to be contributing to the decline of amphibian species (Blaustein *et al.* 1994, Laurance *et al.* 1996, Berger *et al.* 1998, Daszak 2000, Kiesecker *et al.* 2001, reviewed in AmphibiaWeb 2009, *http://amphibiaweb.org/declines/diseases.html*). Stress from factors such as habitat loss and fragmentation, chemical pollution, climate change, invasion of exotic species, increased UV–B radiation, and natural population fluctuations may increase the susceptibility of amphibians to disease (Carey 1993, Dodd 1997, Fellers *et al.* 2001, Kiesecker at al. 2001, AmphibiaWeb 2009). Pathogens known to cause infectious disease in amphibians include bacterial, fungal, viral, metazoan, water mold, and trematode agents (Wright and Whitaker 2001 in AmphibiaWeb 2009). Chytridiomycosis (chytrid fungus, Batrachochytrium dendrobatidis) has had severe impacts on amphibian

populations worldwide. Chytrid fungus is known to be present in the southeastern United States (AmphibiaWeb 2009) and potentially threatens the Florida bog frog. In addition to disease, there has been a widespread increase of amphibian deformities and malformations (*http://amphibiaweb.org/declines/deformities.html*).''

Evaluation of Information Provided in the Petition and Available in Service Files

The petition, while identifying potential threats to amphibians in the Southeast under this factor, does not cite to any specific known threat to the Florida bog frog, and we have no information in our files to indicate that disease or predation are presently affecting the species. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that disease or predation may present a threat to the Florida bog frog such that the petitioned action may be warranted.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Information Provided in the Petition

The petition states: ''The Florida Bog Frog is considered a Species of Special Concern in Florida, but this designation does not provide any regulatory protection for its declining habitat. Approximately 90 percent of the total range may be within Eglin Air Force Base, but national security concerns take precedence over wildlife management (NatureServe 2008).''

Evaluation of Information Provided in the Petition and Available in Service Files

Based on the continued and comprehensive management of the Florida bog frog for the last several years on EAFB, the species is being adequately protected and managed throughout approximately 90 percent of its range. In addition, State efforts have furthered the protection of the remaining three sites located outside of EAFB. We have no information in our files, nor has any specific information been provided in the Petition, to support that national security is affecting or limiting the management of this species. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the inadequacy of existing regulatory mechanisms may present a threat to the Florida bog frog such that the petitioned action may be warranted.

Factor E. Other Natural or Manmade Factors Affecting the Species' Continued Existence

Information Provided in the Petition

The petition states: ''Dodd (1997) lists rarity as a potential threat to the Florida Bog Frog. *Rana okaloosae* is potentially threatened by hybridization with *R. clamitans clamitans* (Gorman *et al.* 2009). Enge (2005) cites water pollution, recreation, and trash dumping as threats to amphibians in the Florida Panhandle. The Florida Wildlife Conservation Commission cites water pollution and invasive species as threats to the Bog Frog (*http://myfwc.com/docs/WildlifeHabitats/Legacy_Shrub_Swamp.pdf*). Enge (2005) cites feral hogs as a threat to amphibians in the Florida Panhandle.

The petition continues ''Other factors which threaten imperiled amphibian populations in the Southeast include water pollution from acidification, toxins, and endocrine disrupting chemicals, reduced prey availability, climate change, UV–B radiation, invasive species, and synergistic effects from these and other threats. Acidification of soils and water bodies is detrimental for amphibians. Acidification of amphibian habitat can result from acid precipitation and from acid mine drainage. Acid disrupts ion balance in both terrestrial and aquatic life stages of amphibians, impairs chemosensory reception, and inhibits larval feeding (Dodd 1997). Embryos and larvae are particularly sensitive to decreased pH.

Terrestrial salamanders avoid acidified soils. Acidification also has indirect effects which can kill embryos, larvae, and adults by interfering with egg development, disrupting trophic interactions, and inducing chronic environmental stress. Low pH also makes amphibians more susceptible to deleterious effects from heavy metals and increased UV–B radiation (Dodd 1997).''

The petition further states that ''Environmental toxins pose a threat to amphibians in the Southeast due to lethal and sub-lethal effects which can include mortality, decreased growth rate, behavioral and developmental abnormalities, lowered reproductive success, weakened immunity, and hermaphroditism (see *http://amphibiaweb.org/declines/ChemCon.html*). Amphibians are particularly vulnerable to toxic substances because of the permeable nature of their skin. A wide range of chemical stressors are known to negatively affect amphibians including heavy metals, pesticides, phenols, carbon tetrachloride, nitrogen based fertilizers, and road salt (Dodd 1997, AmphibiaWeb 2009). The presence of toxins can also make amphibians more susceptible to disease (Dodd 1997). Amphibians are also threatened by endocrine-disrupting chemicals in the environment (Hayes *et al.* 2006). Dodd (1997) states: ''Amphibians are likely to be especially sensitive to the action of endocrine mimics because they are in close direct contact with chemicals in their environment, and the amphibian skin and egg capsule are highly permeable. Because hormones normally function in minute quantities and are vital to normal development, susceptibility to xenobiotics could be devastating during the complex changes that occur during hormonally-induced amphibian metamorphosis (p. 182).'' Toxins and other chemicals can also harm amphibians by reducing food availability. Dodd (1997) states: ''If species that are preyed upon by amphibians decline or disappear, amphibian populations may be expected to follow suit. The use of pesticides and the influence of toxics, pH, and habitat alteration may be expected to affect amphibian prey populations (p. 184).''

The petition continues ''Climate change poses a threat for amphibians because it will alter rainfall and temperature patterns and affect soil moisture (Dodd 1997, Field *et al.* 2007). Amphibians are particularly sensitive to minute changes in moisture and temperature, and changes in climate can affect breeding behavior, reproductive success, and immune function (see *http://amphibiaweb.org/declines/ClimateChange.html*). Amphibians which breed in temporary ponds or in water bodies that are sensitive to changes in groundwater level are particularly susceptible to climate change effects. Drought can lead to localized extirpation, which combined with habitat fragmentation and impaired dispersal, can contribute to extinction (Dodd 1997). During the past few decades, levels of UV–B radiation in the atmosphere have significantly increased. For amphibians, UV–B radiation can cause direct mortality as well as sublethal effects including decreased hatching success, decreased growth rate, developmental abnormalities, and immune dysfunction (Dodd 1997, AmphibiaWeb 2009: *http://amphibiaweb.org/declines/UVB.html*).

Southeastern amphibians are also threatened by the invasion of nonnative species which prey on or compete with

native amphibians. Nonnative fishes can negatively affect amphibian populations through predation, competition, and disease introduction. Introduced nonnative amphibians such as the marine toad (*Bufo marinus*) and Cuban tree frog (*Osteopilus septentrionalis*) are potentially harmful for native amphibians in the Southeast. Rossi (1981) found that anuran species richness was reduced in an area where B. marinus was established (in Dodd 1997). Introduced mammals, such as armadillos and wild hogs, and introduced birds like cattle egrets ''may exact a substantial toll on amphibian populations'' (Dodd 1997). Invasive fire ants (*Solenopsis invicta*) are also a potential threat for Southeastern amphibians. Dodd (1997) states: ''Ground dwelling vertebrates are especially sensitive to this ravenous predator, and fire ants have been reported to kill endangered Houston toads (*Bufo houstonensis*) as they metamorphose. Fire ants are especially abundant in the moist perimeter surrounding ponds and lakes, and they can float in mats across ponds from vegetation clump to vegetation clump. Fire ants have few predators and have expanded their range throughout the Southeast'' (p. 183). See: *http://amphibiaweb.org/declines/IntroSp.html*. Synergisms between multiple threats could contribute to the extinction of Southeast amphibians. Multiple factors acting together have both lethal and sublethal effects (*http://amphibiaweb.org/declines/synergisms.html*). For example, increased UV–B radiation increases the susceptibility of amphibians to the effects of contaminants, pathogens and climate change. Dodd (1997): ''The amphibians of this area (the Southeast), and particularly the fully aquatic species, face a multitude of threats to their long-term existence. These threats generally do not act independently, but instead act in concert to have potentially serious long-term effects (p. 185).''

Evaluation of Information Provided in the Petition and Available in Service Files

While the petition lists a multitude of potential threats to amphibians in the Southeast, many of these likely have limited relevance to the Florida bog frog. For instance, the only nonnative species that have been reported as problematic for this species are feral hogs, Chinese tallow, and other invasive plants. With respect to 90 percent of the range, ongoing management for these species is already occurring on EAFB. Acidification, effects from UV–B radiation, endocrine-disrupting chemicals, reduced prey availability, climate change, and drought have not been reported as problems for this species. We have no specific evidence, nor does the Petition provide any, that any of these factors are affecting populations of the Florida bog frog. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that other natural or manmade factors affecting the species' continued existence may present a threat to the Florida bog frog such that the petitioned action may be warranted.

Greensboro Burrowing Crayfish (*Cambarus catagius*)

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Information Provided in the Petition

The petition (p. 170) states ''*Cambarus catagius* occurs in Abbotts Creek and Pounders Fork which flow into High Rock Reservoir. Both streams are part of the Yadkin-Pee Dee River Drainage that is impounded by dams of Alcoa Power Generating, Inc. The on-going effects of these impoundments are unknown.'' The petition also states that the known range of this species is restricted and affected by urban development, based on McGrath (1994).

Evaluation of Information Provided in the Petition and Available in Service Files

Based on the information in our files, this species has never been found in surface waters (*e.g.,* streams, creeks) and instead prefers 'grassed areas which have been cleared at some point in the past. In a few suburban areas the yards graded into woods and burrows could be found continuing into the woods.' Therefore, instream impoundments should not constitute a threat to this species. While McGrath (1994) did suggest urban development is a threat, he also conceded that parks and utility corridors in urbanized settings could support populations. We also already know they have been found largely in previously disturbed areas (*e.g.,* yards in urban and suburban areas). Further, NatureServe (2008) notes that, while decline in habitat quality is occurring, no decline has been noted in populations or occurrences, at least in the short term. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the present or threatened destruction, modification, or curtailment of the species' habitat or range may present a threat to the Greensboro burrowing crayfish such that the petitioned action may be warranted.

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

The petition does not provide any information on this factor, and does not assert it is a threat. We have no information in our files to indicate this is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that overutilization for commercial, recreational, scientific, or educational purposes may present a threat to Greensboro burrowing crayfish such that the petitioned action may be warranted.

Factor C. Disease or Predation

The petition does not provide any information on this factor, and does not assert it is a threat. We have no information in our files to indicate this is a threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that disease or predation may present a threat to Greensboro burrowing crayfish such that the petitioned action may be warranted.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Information Provided in the Petition

The petition asserts that while the species occurs in Uwharrie National Forest in North Carolina, this does not confer regulatory protection to the species or habitat. Additionally, the Petition states that no existing regulatory mechanisms adequately protect the species.

Evaluation of Information Provided in the Petition and Available in Service Files

Based on information in our files, the majority of the locations where the species is found are areas that have been disturbed. It is likely that there are many urbanized areas that can support populations (*e.g.,* parks and utility corridors), as long as the entire area is not converted to impervious surface. It does not appear that there is a lack of or inadequacy of necessary regulations protecting this species, because the species seems to thrive in these seemingly less than ideal areas. While

the petition asserts the species occurance in the Uwharrie National Forest in North Carolina does not confer regulatory protection to the species or habitat, the petition did not provide any evidence that a lack of regulatory mechanisms on the Forest has resulted in impacts to the species or its habitat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the inadequacy of existing regulatory mechanisms may present a threat to the Greensboro burrowing crayfish such that the petitioned action may be warranted.

Factor E. Other Natural or Manmade Factors Affecting the Species' Continued Existence

Information Provided in the Petition

The petition lists generalized threats presented by nonnative species of crayfish in North Carolina, but does not provide any specific examples of impacts to this species.

Evaluation of Information Provided in the Petition and Available in Service Files

The petition does point to an observance of *Procambrus clarkii* in High Rock Reservoir near the mouth of South Potts Creek, but as we have pointed out previously, we have no records of this species occurring in surface waters and find it unlikely that these species would co-occur. Further, we do not have any information in our files indicating that impacts from nonnative crayfish are occurring or likely to become so for this species. Therefore, we do not believe a threat exists for this factor specific to this species. We find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that other natural or manmade factors affecting the species' continued existence may present a threat to the Greensboro burrowing crayfish such that the petitioned action may be warranted.

Blood River Crayfish (*Orconectes burri*)

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Information Provided in the Petition

The petition, citing NatureServe (2008), states that impoundment in the lower part of the drainage has contributed to the loss of suitable habitat. It also lists other threats to habitat including recreational fishing pressure and rechannelization of the drainage.

Evaluation of Information Provided in the Petition and Available in Service Files

Information in our files indicates that the species occupies streams in rural watersheds that are not subjected to significant point-source pollution or other contaminants associated with urban runoff. However, these basins are influenced by general nonpoint-source storm water pollutants, primarily from agricultural sources, that affect the majority of stream basins in Kentucky. Potential pollutants include sediment (siltation), organic waste (from livestock or failing septic systems), pesticides, herbicides, lawn fertilizers, and other pollutants associated with roadways (*e.g.,* gasoline, oil, antifreeze, road salt). Streams in these basins are also physically impaired as evidenced by narrow riparian zones and poor canopy cover (causing elevated stream temperatures and reduced energy inputs), entrenched and straightened channels (limiting the amount of instream habitat), eroded stream banks (causing increased bank scour and increased sedimentation), and widely fluctuating stream hydrographs (resulting in reduced base flows and more elevated and frequent flood events). Some of these physical impairments are caused by poor agricultural practices, but others are likely caused by improperly sized bridges and/or culverts, especially on county or unpaved roads.

Despite these general threats, the Kentucky Division of Water has not included any streams from the Blood River basin on their 303d list of impaired waters (KDOW 2008, pp. 179–188). In fact, assessments conducted on four *O. burri* streams, Beechy Creek, Panther Creek, Wildcat Creek (the type locality), and the Blood River mainstem, revealed that all of these streams were fully supporting of the Warm Water Aquatic Habitat use designation (KDOW 2002, p. 168). Two of these streams, Panther Creek and Blood River (at Grubbs Lane), are routinely used by KDOW as reference reach streams (KDOW 2006, p. 33).

Although the Blood River basin is influenced by nonpoint-source pollutants and some of its tributaries are physically impaired, there is no evidence that these problems constitute a serious threat to the Blood River crayfish. The overall threat level is low based on the scope (localized), intensity (low), and exposure (small) of these threats. While impoundments in the lower part of the drainage may have contributed to historic habitat loss, neither the Petition nor information in our files indicate this is a current or future threat to the species. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the present or threatened destruction, modification, or curtailment of the species' habitat or range may present a threat to the Blood River crayfish such that the petitioned action may be warranted.

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

Information Provided in the Petition

The petition does not directly list any threats under this factor, but cites crayfish use as fishing bait for other factors.

Evaluation of Information Provided in the Petition and Available in Service Files

Information in our files does indicate that crayfish are frequently used in Kentucky as fishing bait. Any person who has obtained a Kentucky resident or nonresident fishing license is permitted to possess up to 500 crayfish (301 KAR 1:130). This requirement pertains to any Kentucky species; no restrictions are in place for any KSNPC-listed, rare, or uncommon species. Overutilization of some species could be a problem, especially for those species that have limited distributions. The Blood River crayfish may be used occasionally as a bait species, but we have no information that overutilization for recreational purposes is a significant problem. Scientific or educational researchers wishing to collect Blood River crayfish or any other aquatic species (fish, mussels) in Kentucky for scientific purposes must obtain a Scientific or Educational Wildlife Collection Permit from the Kentucky Department of Fish and Wildlife Resources (KDFWR). These annual permits cost $10 (Educational) or $200 (Scientific) and require that the permit holder provide an annual report of their findings to KDFWR. All Kentucky crayfishes, including *O. burri,* are also threatened by an increasingly popular crayfish pet industry. Many crayfishes are highly valued due to their large size and attractive features (color, morphology). Kentucky species are being collected, transported, traded, and sold domestically and internationally under existing State regulations that

allow the capture and possession of 500 individuals. Kentucky species can be found on several Web sites of crayfish vendors.

While the Blood River crayfish could be harvested for scientific research, by collectors for sale/trade, or by fishermen, we have no information that the species is in high demand by collectors or researchers at the present time based on numbers of individuals observed by Taylor and Sabaj (1998) and recently by KSNPC (Ryan Evans, KSNPC, personal communication 2008). In general, we have no information that this listing factor represents a significant threat to the species. The overall threat level is low based on the scope (localized), immediacy (nonimminent), intensity (low), and exposure (small) of the threat. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that overutilization for commercial, recreational, scientific, or educational purposes may present a threat to the Blood River crayfish such that the petitioned action may be warranted.

Factor C. Disease or Predation

Information Provided in the Petition

The petition does not provide any information on this factor, and does not assert it is a threat.

Evaluation of Information Provided in the Petition and Available in Service Files

Information in our files indicates that disease and predation are not known to be a significant threat for this species and is, instead, a normal part of its life history. Some natural predators of the species include the raccoon (*Procyon lotor*), river otter (*Lontra canadensis*), great blue heron (*Ardea herodias*), mudpuppy (*Necturus maculosus*), queen snake (*Regina septemvittata*), water snakes (*Nerodia* spp.), bullfrog (*Rana catesbeiana*), and various sunfishes (*Micropterus* and *Lepomis* spp.). Mortality from disease or predation likely occurs but has not eliminated this and other crayfish species in the past, and we have no information that disease or predation poses a substantial threat to the species in the future. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that disease or predation may present a threat to Blood River crayfish such that the petitioned action may be warranted.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Information Provided in the Petition

The petition lists the designation of the species as threatened in Kentucky, but points out that this designation does not protect habitat for the species.

Evaluation of Information Provided in the Petition and Available in Service Files

Information in our files is summarized below. The Blood River crayfish and its habitats are afforded some protection from water quality and habitat degradation under the Clean Water Act of 1977 (33 U.S.C. 1251 *et seq.*), Kentucky's Forest Conservation Act of 1998 (KRS 149.330–355), Kentucky's Agriculture Water Quality Act of 1994 (KRS 224.71–140), additional Kentucky laws and regulations regarding natural resources and environmental protection (KRS 146.200–360; KRS 224; 401 KAR 5:026, 5:031), and Tennessee's Water Quality Control Act of 1977 (T.C.A. 69–3–101).

The Blood River crayfish is not State-listed in Tennessee, but it has been designated as a threatened species in Kentucky (KSNPC 2005, p. 11). However, this designation conveys no legal protection. The Blood River crayfish may be collected for bait or captured for use as pets (possession limit of 500) under current Kentucky law (301 KAR 1:130), and the species may also be collected for scientific or educational research reasons by obtaining an Educational or Scientific Wildlife Collection Permit from KDFWR.

Based on numbers of individuals observed by Taylor and Sabaj (1998) and recently by KSNPC (Ryan Evans, KSNPC, personal communication 2008), the species is not being significantly reduced in number by bait collecting, the pet trade, or scientific research. The overall threat level is low for this listing factor. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that the inadequacy of existing regulatory mechanisms may present a threat to the Blood River crayfish such that the petitioned action may be warranted.

Factor E. Other Natural or Manmade Factors Affecting the Species' Continued Existence

Information Provided in the Petition

The petition lists the introduction of invasive species, which are used for fishing bait as a potential threat.

Evaluation of Information Provided in the Petition and Available in Service Files

Information in our files indicates that the Blood River crayfish could be threatened by the introduction of nonnative crayfish species into its habitat. Species such as *Orconectes rusticus* (rusty crayfish) have been widely introduced across the United States because of their popularity as bait species. These species have the potential to displace native crayfishes through a variety of mechanisms such as direct competition or reproductive interference (Taylor and Schuster 2004, p. 20). At present, we have no information that *O. rusticus* occurs in the same streams as *O. burri* as no individuals were observed during the most recent surveys by KSNPC (Ryan Evans, KSNPC, personal communication, 2008). We also conclude that it is unlikely that *O. rusticus* will be introduced directly into Blood River tributaries because these streams are not heavily used for fishing. On the other hand, it is possible that *O. rusticus* could invade the Blood River system at a later date because it has the potential to be used as bait species in Kentucky Lake, thereby providing a mechanism for introduction into the Blood River and its upstream tributaries (Guenter Schuster, EKU, personal communication, 2008). At present, this listing factor is not considered to be a significant threat, but future introductions of *O. rusticus* into the Blood River basin are possible. Therefore, we find that the petition and information readily available in our files do not provide substantial scientific or commercial information to indicate that other natural or manmade factors affecting the species' continued existence may present a threat to the Blood River crayfish such that the petitioned action may be warranted.

Finding

In summary, the petition included 404 species that are primarily aquatic and found mainly in the southeastern United States. After a careful review of the Petition and information readily available in our files, we have found that the Petition does not present substantial information regarding 11 of these species.

Sarah's Hydroptila Caddisfly

The petition states that Sarah's hydroptila caddisfly faces threats under Factors A and D, but does not provide specific examples or additional information. After review of the information in our files, we find that the

species is located in more locations (11 versus 4) within EAFB than indicated in the Petition, and that the species is adequately protected from threats through EAFB's INRMP and existing State and Federal laws and regulations.

Rogue Creek Hydroptila Caddisfly

The Petition states that the Rogue Creek hydroptila caddisfly faces threats under Factors A and D, but does not provide specific examples or additional information. After review of the information in our files, we find that the species is located in eight locations within EAFB, and that the species is adequately protected from threats through EAFB's INRMP and existing State and Federal laws and regulations.

Florida Brown Checkered Summer Sedge

The petition states that the Florida brown checkered summer sedge faces threats under Factors A and D, but does not provide specific examples or additional information. After review of the information in our files, we find that the species is widespread, but not common on EAFB, and that the species is adequately protected from threats through EAFB's INRMP and existing State and Federal laws and regulations. We currently have no information on other populations outside of EAFB or any threats acting on those populations, though the occurrence in Hamilton County, Florida, is disputed.

Ouachita Creekshell

The petition claims that the Ouachita creekshell is threatened by Factors A, D and E. However, the petition, as well as the information available in our files concerning threats to the species, lacks detail on the species response to these general threats. For example, many Ouachita creekshell extant and historical populations occur on public lands (*e.g.,* Ouachita National Forest, State parks, and wildlife management areas). Approximately 85 percent of the Ouachita River basin upstream of Lake Ouachita is within Ouachita National Forest. Accordingly, populations of this species are substantially protected from habitat destruction and alteration. Furthermore, we concluded in our 2009 status assessment that stressors are likely to be localized and moderately degrade aquatic biota and habitat over a portion of the watershed and that the impacts of mining are localized and have a minimum effect on the species rangewide. We concluded in the status assessment that the species did not warrant listing, and neither the petition nor information in our files provided any substantial new information.

Crystal Darter

The petition (pp. 285–286) claims that the crystal darter faces threats under Factors A, D, and E. However, the petition, as well as the information available in our files concerning threats to crystal darter populations, lacks detail on the response of these populations to general threats. The Service conducted a species assessment of the crystal darter in 2009 and found that low threat levels do exist under Factors A and E. However, we concluded in the status assessment that these factors do not threaten the darter to the point it meets the definition of a ''threatened species'' or an ''endangered species.'' Biologists among different States have indicated that new technologies have allowed for more effective sampling of crystal darters and suggest that they are more abundant and widely distributed than originally believed. Furthermore, there exists little information that known populations have either declined or increased in their abundance. The main source of information for identifying the species as uncommon is based largely on the fact that historically specimens had been rarely collected. In the species assessment we conducted in 2009 (Service 2009), we found that, along with the current status information, the information on the threats to the species did not support a proposal to list the species and, therefore, it was not elevated to candidate status. Neither the petition nor information in our files provides any substantial new information on the threats to the crystal darter.

Spotted Darter

The petition cites threats from factors A, C, D, and E. However, many of these are only general threats and there is no information that they are acting negatively on the species, including those threats identified from inadequate regulatory mechanisms, limited genetic variation, climate change, and predation. The information provided by the petition and readily available in our files is not specific enough to determine impacts to the species from these threats, or to identify any of these as a significant threat affecting the species viability.

The petition does present information on historical habitat degradation, however, the information in our files does not indicate that the present or threatened destruction, modification, or curtailment of the spotted darter's habitat or range is a significant threat or that it will cause substantial losses of population distribution or viability in the species range.

Florida Bog Frog

The petition cites threats under Factors A, B, C, D, and E. However, threats from habitat destruction and modification and from the inadequacy of existing regulatory mechanisms are largely alleviated through existing management and protection of habitat on EAFB, while the threats listed under Factors B, C, and E are largely general threats and likely have very limited relevance to this species. In addition, EAFB management is targeting emerging threats to the species already (like those presented by invasive plants).

Greensboro Burrowing Crayfish

The petition asserts that threats from Factors A, D, and E are affecting this species but does not provide specific examples or information to demonstrate this. Based on information in our files, this species is more widespread than originally thought and seems to prefer previously disturbed areas in urban and suburban areas. Further, NatureServe (2008) notes that while decline in habitat quality is occurring, no decline has been noted in populations or occurrences, at least in the short term.

Blood River Crayfish

The petition states that the Blood River crayfish faces threats under Factors A, D, and E, but does not provide specific examples or additional information. As demonstrated by the threats analysis above, there is no known significant threat to the Blood River crayfish as a result of any of the five listing factors. The species currently occupies watersheds that are subjected to water quality impairment and physical habitat disturbance, but it does not appear that these threats are adversely affecting the species' status. The Blood River crayfish appears to be maintaining its populations and remains the dominant crayfish species in these watersheds.

Florida Fairy Shrimp and South Florida Rainbow Snake

Because the information presented by petitioners as well as information in our files suggests that the species are already extinct, they do not meet the definition of an endangered species or a threatened species under the Act (section 3(6) and 3(20), respectively). Therefore, an analysis of the five threat factors was not appropriate.

In summary, we reviewed the information presented in the petition and evaluated that information in relation to information readily available

in our files. On the basis of our determination under section 4(b)(3)(A) of the Act, we conclude that the petition does not present substantial scientific or commercial information to indicate that listing the Sarah's hydroptila caddisfly, Rogue Creek hydroptila caddisfly, Florida brown checkered summer sedge, Florida fairy shrimp, South Florida rainbow snake, Ouachita creekshell, crystal darter, spotted darter, Florida bog frog, Greensboro burrowing crayfish, and Blood River crayfish under the Act as endangered or threatened may be warranted at this time. There is no evidence either presented in the petition or available in our files, to indicate that any of these species are affected by the five factors, acting either singly or in combination, to the point that the species may meet the definition of a ''threatened species'' or an ''endangered species'' under the Act. The information does not contain evidence sufficient to suggest that these factors may be operative threats that act on these species.

Although we will not review the status of any of these species at this time, we encourage interested parties to continue to gather data and submit information that will assist with the conservation of Sarah's hydroptila caddisfly, Rogue Creek hydroptila caddisfly, Florida brown checkered summer sedge, Ouachita creekshell, crystal darter, spotted darter, Florida bog frog, Greensboro burrowing crayfish, and Blood River crayfish. We likewise encourage interested parties to submit any information they possess on the Florida fairy shrimp, and South Florida rainbow snake. You may submit your information or materials to Chief, Division of Endangered Species, Southeast Region Office (see **ADDRESSES**), at any time.

References Cited

A complete list of references cited is available on the Internet at *http://www.regulations.gov* and upon request from the Southeast Ecological Services Regional Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this document are the staff members of the Southeast Region Ecological Services Office.

Authority

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

Dated: September 26, 2011.

Rowan W. Gould,

Acting Director, U.S. Fish and Wildlife Service.

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