TABLE 2 OF § 165.T01–0688—Continued

• This Safety Zone includes all waters within a 100-yard radius of each participating swimmer.

Dated: July 25, 2011.

G.P. Hitchen,

Captain, U.S. Coast Guard, Captain of the Port New York (Acting).

[FR Doc. 2011–20093 Filed 8–8–11; 8:45 am]

BILLING CODE 9110–04–P

POSTAL SERVICE

39 CFR PART 111

Domestic Mail Manual; Incorporation by Reference

AGENCY: Postal Service™.

ACTION: Final rule.

SUMMARY: The Postal Service announces the issuance of DMM 300, dated July 5, 2011, of the *Mailing Standards of the United States Postal Service, Domestic Mail Manual (DMM®)*, and its incorporation by reference in the *Code of Federal Regulations.*

DATES: *Effective Date:* This final rule is effective on August 9, 2011. The incorporation by reference of Issue 300, July 5, 2011, of the DMM is approved by the Director of the Federal Register as of August 9, 2011.

FOR FURTHER INFORMATION CONTACT: Lizbeth Dobbins (202) 268–3789.

SUPPLEMENTARY INFORMATION: The most recent Issue 300 of the *Domestic Mail Manual* (DMM) was issued on July 5, 2011. This Issue of the DMM contains all Postal Service domestic mailing standards. This issue continues to: (1) Increase the user's ability to find information; (2) increase confidence that users have found all the information they need; and (3) reduce the need to consult multiple chapters of the Manual to locate necessary information. Issue 300, dated July 5, 2011, set forth specific changes, such as new standards throughout the DMM to support the standards and mail preparation changes implemented since the May 11, 2009 version.

Changes to mailing standards will continue to be published through **Federal Register** notices and the Postal Bulletin, and will appear in the next online version available via the Postal Explorer® Web site at: *http://pe.usps.com.*

List of Subjects in 39 CFR Part 111

Administrative practice and procedure, Incorporation by reference.

In view of the considerations discussed above, the Postal Service hereby amends 39 CFR Part 111 as follows:

PART 111—GENERAL INFORMATION ON POSTAL SERVICE

■ 1. The authority citation for 39 CFR Part 111 continues to read as follows:

Authority: 5 U.S.C. 552(a); 13 U.S.C. 301–307; 18 U.S.C. 1692–1737; 39 U.S.C. 101, 401, 403, 404, 414, 416, 3001–3011, 3201–3219, 3403–3406, 3621, 3622, 3626, 3632, 3633, and 5001.

■ 2. Amend § 111.3(f) by adding the following new entry at the end of the table: § 111.3 Amendments to the Mailing Standards of the United States Postal Service, Domestic Mail Manual.

* * * * *

(f) * * *

Transmittal letter for issue	Dated	**Federal Register** publication
* * *	* *	* *
Issue 300	May 7, 2008	73 FR 25508
Issue 300	May 11, 2009	75 FR 31702
DMM 300	July 5, 2011	[Insert FR citation for this Final Rule].

■ 3. Amend § 111.4 by removing ''June 4, 2010'' and adding ''August 9, 2011.''

Stanley F. Mires,

Chief Counsel, Legislative.

[FR Doc. 2011–20078 Filed 8–8–11; 8:45 am]

BILLING CODE 7710–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2011–0027; MO 92210–0–0008 B2]

RIN 1018–AV85

Endangered and Threatened Wildlife and Plants; Endangered Status for the Cumberland Darter, Rush Darter, Yellowcheek Darter, Chucky Madtom, and Laurel Dace

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), determine endangered status for the Cumberland darter (*Etheostoma susanae*), rush darter (*Etheostoma phytophilum*), yellowcheek darter (*Etheostoma moorei*), chucky madtom (*Noturus crypticus*), and laurel dace (*Chrosomus saylori*) under the Endangered Species Act of 1973, as amended (Act). This final rule implements the Federal protections provided by the Act for these species throughout their ranges, including Cumberland darter in Kentucky and Tennessee, rush darter in Alabama, yellowcheek darter in Arkansas, and chucky madtom and laurel dace in Tennessee. We intend to propose critical habitat in an upcoming rulemaking, which is expected within the next few months.

DATES: This rule becomes effective September 8, 2011.

ADDRESSES: This final rule is available on the Internet at *http://www.regulations.gov* at Docket No. FWS–R4–ES–2010–0027. Comments and materials received, as well as supporting documentation used in the preparation of this rule, will be available for public inspection, by appointment, during normal business hours at: U.S. Fish and Wildlife Service, Tennessee Ecological Services Field Office, 446 Neal Street, Cookeville, TN 38501; telephone 931–528–6481; facsimile 931–528–7075.

FOR FURTHER INFORMATION CONTACT: For information regarding the Cumberland darter, contact Lee Andrews, Field Supervisor, U.S. Fish and Wildlife Service, Kentucky Ecological Services Field Office, J.C. Watts Federal Building, 330 W. Broadway Rm. 265, Frankfort, KY 40601; telephone 502–695–0468; facsimile 502–695–1024.

For information regarding the rush darter, contact Stephen Ricks, Field Supervisor, U.S. Fish and Wildlife Service, Mississippi Ecological Services Field Office, 6578 Dogwood View Parkway, Suite A, Jackson, MS 39213; telephone 601–965–4900; facsimile 601–965–4340 or Bill Pearson, Field Supervisor, U.S. Fish and Wildlife Service, Alabama Ecological Services Field Office, 1208–B Main Street, Daphne, AL 36526; telephone 251–441–5181; fax 251–441–6222.

For information regarding the yellowcheek darter, contact Jim Boggs, Field Supervisor, U.S. Fish and Wildlife Service, Arkansas Ecological Services Field Office, 110 South Amity Road, Suite 300, Conway, AR 72032; telephone 501–513–4470; facsimile 501–513–4480.

For information regarding the chucky madtom and laurel dace, contact Mary Jennings, Field Supervisor, U.S. Fish and Wildlife Service, Tennessee Ecological Services Field Office, 446 Neal Street, Cookeville, TN 38501; telephone 931–528–6481; facsimile 931–528–7075.

If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Background

This document consists of a final rule to list the Cumberland darter (*Etheostoma susanae*), rush darter (*Etheostoma phytophilum*), yellowcheek darter (*Etheostoma moorei*), chucky madtom (*Noturus crypticus*), and laurel dace (*Chrosomus saylori*) as endangered under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act). The Act requires that we identify species of wildlife and plants that are endangered or threatened, based on the best available scientific and commercial information. As defined in section 3 of the Act, an endangered species is any species which is in danger of extinction throughout all or a significant portion of its range, and a threatened species is any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Through the Federal rulemaking process, we add species that meet these definitions to the List of Endangered and Threatened Wildlife at 50 CFR 17.11 or the List of Endangered and Threatened Plants at 50 CFR 17.12. As part of this program, we maintain a list of species that we regard as candidates for listing. We call this list the Candidate Notice of Review (CNOR). A candidate species is one for which we have on file sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened, but for which preparation and publication of a proposal is precluded by higher priority listing actions. We may identify a species as a candidate for listing based on an evaluation of its status that we conducted on our own initiative, or as a result of making a finding on a petition to list a species that listing is warranted but precluded by other higher priority listing action. Table 1 includes the citation information for the CNORs mentioned in the following paragraphs, which discuss the previous candidate status of each of the five species being listed as endangered in this rule.

TABLE 1—FEDERAL REGISTER CITATION INFORMATION FOR CERTAIN CANDIDATE NOTICES OF REVIEW ISSUED BY THE U.S. FISH AND WILDLIFE SERVICE SINCE 1985

Year	**Federal Register** volume and page number	Date of publication in the **Federal Register**
1985	50 FR 37958	September 18, 1985.
1989	54 FR 554	January 6, 1989.
1991	56 FR 58804	November 21, 1991.
1994	59 FR 58982	November 15, 1994.
1996	61 FR 7596	February 28, 1996.
1999	64 FR 57533	October 25, 1999.
2001	66 FR 54807	October 30, 2001.
2002	67 FR 40657	June 13, 2002.
2004	69 FR 24875	May 4, 2004.
2005	70 FR 24869	May 11, 2005.
2006	71 FR 53755	September 12, 2006.
2007	72 FR 69034	December 6, 2007.
2008	73 FR 75176	December 10, 2008.
2009	74 FR 57804	November 9, 2009.
2010	75 FR 69222	November 10, 2010.

Previous Federal Action

Cumberland Darter

The Cumberland darter was first identified as a candidate for listing in the 1985 CNOR. It was assigned a Category 2 status, which was given to those species for which the Service possessed information indicating that proposing to list as endangered or threatened was possibly appropriate, but for which conclusive data on biological vulnerability and threat was not currently available to support proposed rules. The Cumberland darter retained the Category 2 status in the 1989, 1991, and 1994 CNORs.

Assigning categories to candidate species was discontinued in 1996, and only species for which the Service had sufficient information on biological vulnerability and threats to support issuance of a proposed rule were regarded as candidate species. Candidate species were also assigned listing priority numbers based on immediacy and the magnitude of threat, as well as their taxonomic status. In the 1999, 2001, 2002, and 2004 CNORs, the Cumberland darter was identified as a listing priority 6 candidate species. We published a petition finding for Cumberland darter in the 2005 CNOR in response to a petition received on May 11, 2004, stating the darter would retain a listing priority of 6.

In the 2006 CNOR, we changed the listing priority number for Cumberland darter from 6 to 5, because it was formally described as a distinct species. Based on new molecular evidence, the subspecies *Etheostoma nigrum susanae* was elevated to specific status, *Etheostoma susanae.* In the 2007, 2008, 2009, and 2010 CNORs, the Cumberland darter retained a listing priority of 5. On June 24, 2010 (75 FR 36035) we published a proposed rule to list the Cumberland darter as endangered.

Rush Darter

We first identified the rush darter as a candidate for listing in the 2002 CNOR. The rush darter was assigned a listing priority number of 5. In the 2004 CNOR, the rush darter retained a listing priority number of 5. We published a petition finding for rush darter in the 2005 CNOR in response to a petition received on May 11, 2004, stating the darter would retain a listing priority of 5.

In 2006, we changed the listing priority number of the rush darter from 5 to 2 based on the imminent threat of water quality deterioration (i.e., increased sedimentation due to urbanization, road maintenance, and silviculture practices). In the 2007, 2008, 2009, and 2010 CNORs, the rush darter retained a listing priority of 2. We proposed to list the rush darter as endangered on June 24, 2010 (75 FR 36035).

Yellowcheek Darter

We first identified the yellowcheek darter as a candidate for listing in the 2001 CNOR with a listing priority of 2. The yellowcheek darter retained a listing priority number of 2 in the 2002 and 2004 CNORs. We published a petition finding for yellowcheek darter in the 2005 CNOR in response to a petition received on May 11, 2004, stating the darter would retain a listing priority of 2.

In the 2006, 2007, 2008, 2009, and 2010 CNORs, the yellowcheek darter retained a listing priority of 2. The yellowcheek darter is covered by a 2007 programmatic Candidate Conservation Agreement with Assurances (71 FR 53129) that covers the entire range of the species. We proposed to list the yellowcheek darter as endangered on June 24, 2010 (75 FR 36035).

Chucky Madtom

We first identified the chucky madtom as a candidate for listing in the 1994 CNOR with a Category 2 status. In the 2002 and 2004 CNORs, the chucky madtom was identified as a listing priority 2 candidate species. We published a petition finding for chucky madtom in the 2005 CNOR in response to a petition received on May 11, 2004, stating the madtom would retain a listing priority of 2. In the 2006, 2007, 2008, 2009, and 2010 CNORs, the chucky madtom retained a listing priority of 2.

In 1994, the chucky madtom was first added to the candidate list as *Noturus* sp. Subsequently, and based on morphological and molecular evidence, the chucky madtom was formally described as a distinct species, *Noturus crypticus* (Burr *et al.* 2005). We included this new information in the 2006 CNOR. We proposed to list the chucky madtom as endangered on June 24, 2010 (75 FR 36035).

Laurel Dace

We first identified the laurel dace as a new candidate for listing in the 2007 CNOR. New candidates are those taxa for which we have sufficient information on biological vulnerability and threats to support preparation of a listing proposal, but for which development of a listing regulation is precluded by other higher priority listing activities.

In the 2007 CNOR, we assigned the laurel dace a listing priority of 5. The laurel dace retained a listing priority of 5 in the 2008, 2009, and 2010 CNORs. We proposed to list the laurel dace as endangered on June 24, 2010 (75 FR 36035).

Species Information

Cumberland Darter

The Cumberland darter (*Etheostoma (Boleosoma) susanae* (Jordan and Swain)) is a medium-sized member of the fish tribe Etheostomatini (family Percidae) that reaches over 5.5 centimeters (cm) (2 inches (in)) standard length (SL) (length from tip of snout to start of the caudal peduncle (slender region extending from behind the anal fin to the base of the caudal fin)) (Etnier and Starnes 1993, p. 512). The species has a straw-yellow background body color with brown markings that form six evenly spaced dorsal (back) saddles and a series of X-, C-, or W-shaped markings on its sides (Etnier and Starnes 1993, p. 510). During spawning season, the overall body color of breeding males darkens, and the side markings become obscure or appear as a series of blotches (Etnier and Starnes 1993, p. 510).

The Cumberland darter was first described as *Boleosoma susanae* by Jordan and Swain (1883, pp. 249–250) from tributaries of the Clear Fork of the Cumberland River, Kentucky. Subsequent studies by Kuhne (1939, p. 92) and Cole (1967, p. 29) formerly recognized the taxon as a subspecies (*Etheostoma nigrum susanae*) of *E. n. nigrum* (Johnny darter). Starnes and Starnes (1979, p. 427) clarified the subspecific status of the Cumberland darter, differentiating it from the Johnny darter by several diagnostic characteristics. Strange (1998, p. 101) elevated *E. n. susanae* to full species status based on analyses of mitochondrial DNA *for E. n. susanae* and *E. n. nigrum.*

The Cumberland darter inhabits pools or shallow runs of low- to moderate-gradient sections of streams with stable sand, silt, or sand-covered bedrock substrates (O'Bara 1988, pp. 10–11; O'Bara 1991, p. 10; Thomas 2007, p. 4). Thomas (2007, p. 4) did not encounter the species in high-gradient sections of streams or areas dominated by cobble or boulder substrates. Thomas (2007, p. 4) reported that streams inhabited by Cumberland darters were second to fourth order, with widths ranging from 4 to 9 meters (m) (11 to 30 feet (ft)) and depths ranging from 20 to 76 cm (8 to 30 in).

Little is known regarding the reproductive habits of the Cumberland darter. Thomas (2007, p. 4) reported the collection of males in breeding condition in April and May, with water temperatures ranging from 15 to 18 degrees Celsius (°C) (59 to 64 degrees Fahrenheit (°F)). Extensive searches by Thomas (2007, p. 4) produced no evidence of nests or eggs at these sites. Species commonly associated with the Cumberland darter during surveys by Thomas (2007, pp. 4–5) were creek chub (*Semotilus atromaculatus*), northern hogsucker (*Hypentelium nigricans*), stripetail darter (*E. kennicotti*), and Cumberland arrow darter (*E. sagitta sagitta*). Feeding habits are unknown but are likely similar to that of the closely related species, the Johnny darter (*E. nigrum*). Johnny darters are sight feeders, with prey items consisting of midge larvae, mayfly nymphs, caddisfly larvae, and microcrustaceans (Etnier and Starnes 1993, p. 511). Thomas (2007, p. 5) collected individuals of the Federally threatened blackside dace (*Chrosomus cumberlandensis*), from three streams that also supported Cumberland darters.

The Cumberland darter is endemic to the upper Cumberland River system above Cumberland Falls in Kentucky and Tennessee (O'Bara 1988, p. 1; O'Bara 1991, p. 9; Etnier and Starnes 1993, p. 511). The earliest known collections of the species were made by Jordan and Swain (1883, pp. 249–250), who recorded it as abundant in tributaries of Clear Fork of the Cumberland River, Kentucky. The species was later reported from Gum Fork, Scott County, Tennessee, by Shoup and Peyton (1940, p. 11), and seven additional tributaries of the Cumberland River by Burr and Warren (1986, p. 310). More exhaustive surveys by O'Bara (1988, p. 6; 1991, pp. 9–10) and Laudermilk and Cicerello (1998; pp. 83–233, 303–408) determined that the Cumberland darter was restricted to short reaches of 20 small streams (23 sites) in the upper Cumberland River system in Whitley and McCreary Counties, Kentucky, and Campbell and Scott Counties, Tennessee. These studies suggested the extirpation of the species from Little Wolf Creek in Whitley County, Kentucky, and Gum Fork in Scott County, Tennessee. Preliminary reports of disjunct populations in the Poor Fork Cumberland River and Martins Fork in Letcher and Harlan Counties, Kentucky (Starnes and Starnes 1979, p. 427; O'Bara 1988, p. 6; O'Bara 1991, pp. 9–10), were evaluated genetically and determined to be the Johnny darter (Strange 1998, p. 101).

Thomas (2007, p. 3) provided the most recent information on status and distribution of the species through completion of a range-wide status assessment in the upper Cumberland River drainage in Kentucky. Between June 2005 and April 2007, a total of 47 sites were sampled qualitatively in the upper Cumberland River drainage. All Kentucky sites with historic records were surveyed (20 sites), as well as 27 others having potentially suitable habitat. Surveys by Thomas (2007, p. 3) produced a total of 51 specimens from 13 localities (12 streams). Only one of the localities represented a new occurrence record for the species.

In 2008, the Kentucky Department of Fish and Wildlife Resources (KDFWR) initiated a propagation and reintroduction project for the Cumberland darter in the upper Cumberland River drainage (Thomas *et al.* 2010, p. 107). Utilizing State Wildlife Grant funds from the Service, KDFWR worked cooperatively with Conservation Fisheries, Inc. (CFI) of Knoxville, Tennessee, to develop captive propagation protocols for the species and to produce juvenile Cumberland darters that could be reintroduced within the species' historic range. Cogur Fork, a tributary to Indian Creek in McCreary County, Kentucky, was chosen by KDFWR as a suitable reintroduction site. Cumberland darters were released into Cogur Fork in August 2009 and September 2010. Surveys in November 2010 resulted in recaptures of individuals released in 2009 and 2010, as well as captures of four individuals without tags (possibly native individuals) (Thomas pers. comm. 2010). Based on these results, it appears that reintroduction efforts have been effective, with Cumberland darters persisting within Cogur Fork since 2009. Furthermore, captures of untagged individuals in 2009 and 2010 suggest that Cogur Fork also supports a small, native population of the species.

Currently, the Cumberland darter is known from 15 localities in a total of 13 streams in Kentucky (McCreary and Whitley Counties) and Tennessee (Campbell and Scott Counties). All 15 extant occurrences of the Cumberland darter are restricted to short stream reaches, with the majority believed to be restricted to less than 1.6 kilometers (km) (1 mile (mi)) of stream (O'Bara 1991, pp. 9–10; Thomas 2007, p. 3). These occurrences are thought to form six population clusters (Bunches Creek, Indian Creek, Marsh Creek, Jellico Creek, Clear Fork, and Youngs Creek), which are geographically separated from one another by an average distance of 30.5 stream km (19 stream mi) (O'Bara 1988, p. 12; O'Bara 1991, p. 10; Thomas 2007, p. 3). Based on collection efforts by O'Bara (1991, pp. 9–10), Laudermilk and Cicerello (1998; pp. 83–233, 303–408), and Thomas (2007, p. 3), the species appears to be extirpated from 11 historical collection sites and a total of 9 streams: Cumberland River mainstem, near the mouth of Bunches Creek and Cumberland Falls (Whitley County); Sanders Creek (Whitley County); Brier Creek (Whitley County); Kilburn Fork of Indian Creek (McCreary County); Bridge Fork (McCreary County); Marsh Creek, near mouth of Big Branch and Caddell Branch (McCreary County); Cal Creek (McCreary County); Little Wolf Creek (Whitley County); and Gum Fork (Scott County). No population estimates or status trends are available for the Cumberland darter; however, survey results by Thomas (2007, p. 3) suggest that the species is uncommon or occurs in low densities across its range (Thomas 2007, p. 3).

The Cumberland darter is ranked by the Kentucky State Nature Preserves Commission (KSNPC) (2009, p. 38) and the Tennessee Department of Environment and Conservation (TDEC) (2009, p. 53) as a G1G2S1 species: critically imperiled or imperiled globally and critically imperiled in Kentucky and Tennessee. The KDFWR State Wildlife Action Plan identified the Cumberland darter as a species of Greatest Conservation Need (GCN) and identified several top conservation actions for it and other species in its Aquatic Guild (Upland Headwater Streams in Pools), including: Acquisition or conservation easements for critical habitat, development of financial incentives to protect riparian (land adjacent to stream channel) corridors, development and implementation of best management practices, and restoration of degraded habitats through various State and Federal programs (KDFWR 2005, p. 2.2.2). The Cumberland darter is designated as a Tier 1 GCN species in the Tennessee Comprehensive Wildlife Conservation Strategy (CWCS) (TWRA 2005, pp. 44, 49).

Rush Darter

The rush darter (*Etheostoma phytophilum*) is a medium-sized darter in the family Percidae, tribe Etheostomatini, and subgenus *Fuscatelum.* The species reaches an average size of 5 cm (2 in) SL (Bart and Taylor 1999, p. 28; Johnston and Kleiner 2001, p. 3). The rush darter was described by Bart and Taylor in 1999 (pp. 27–33), and is closely related to the goldstripe darter (*E. parvipinne*), a drab-colored species with a thin golden stripe along the lateral line (canal along the side of a fish with sensory capabilities) that is surrounded by heavily mottled or stippled sides (Shaw 1996, p. 85). However, the distinct golden stripe characteristic of goldstripe darters is not well developed in rush darters (Bart and Taylor 1999, p. 29). Also, the brown pigment on the sides of the rush darter is usually not as intense as in the goldstripe darter. Other characteristics of the rush darter are described in Bart and Taylor (1999, p. 28).

Rush darters have been collected from various habitats (Stiles and Mills 2008, pp. 1–4; Bart 2002, p. 1; Johnston and Kleiner 2001, pp. 3–4; Stiles and Blanchard 2001, pp. 1–4; Bart and Taylor 1999, p. 32), including root masses of emergent vegetation along the margins of spring-fed streams in very shallow, clear, cool, and flowing water; and from both small clumps and dense stands of bur reed (*Sparganium* sp.), coontail (*Ceratophyllum* sp.), watercress (*Nasturtium officinale*), and rush (*Juncus* sp.) in streams with substrates of silt, sand, sand and silt, muck and sand or some gravel with sand, and bedrock. Rush darters appear to prefer springs and spring-fed reaches of relatively low-gradient small streams, which are generally influenced by springs (Stiles and Mills 2008, pp. 1–4; Fluker *et al.* 2007, p. 1; Bart 2002, p. 1; Johnston and Kleiner 2001, pp. 3–4; Stiles and Blanchard 2001, pp. 1–4; Bart and Taylor 1999, p. 32). Rush darters have also been collected in wetland pools (Stiles and Mills 2008; pp. 2–3). Water depth at collection sites ranged from 3.0 cm to 0.5 m (0.1 ft to 1.6 ft), with moderate water velocity in riffles and no flow or low flow in pools. Rush darters have not been found in higher gradient streams with bedrock substrates and sparse vegetation (Stiles and Mills 2008, pp. 1–4; Bart 2002, p. 1; Johnston and Kleiner 2001, pp. 3–4; Stiles and Blanchard 2001, pp. 1–4; Bart and Taylor 1999, p. 32).

Stiles and Mills (2008, p. 2) found gravid rush darter females in February and fry (newly hatched larval fish) in late April from a wetland pool in the Mill Creek watershed (Winston County, Alabama). These pools act as nursery areas for the fry (Stiles and Mills 2008, p. 5). While little is known specifically about the life history of the rush darter, this information is available for the goldstripe darter, a related species in the *Etheostoma* genus. Spawning of the goldstripe darter in Alabama occurs from mid-March through June (Mettee *et al.* 1996, p. 655). Preferred food items for the goldstripe darter include midge larvae, mayfly nymphs, blackfly larvae, beetles, and microcrustaceans (Mettee *et al.* 1996, p. 655). The lifespan of the goldstripe darter is estimated to be 2 to 3 years.

The rush darter currently has a restricted distribution (Johnston and Kleiner 2001, p. 1). All rush darter populations are located above the Fall Line (the inland boundary of the Coastal Plain physiographic region) and in other ''highland regions'' where topography and elevation changes are observed presenting a barrier for fish movement (Boshung and Mayden 2004, p. 18) in the Black Warrior River drainage in portions of the Appalachian Plateau and Valley and Ridge physiographic provinces of Alabama (Boshung and Mayden 2004, pp. 16–17; Warren *et al.* 2000, pp. 9, 10, 24). The closely related goldstripe darter in Alabama occurs essentially below the Fall Line in all major systems except the Coosa system (Boshung and Mayden 2004, p. 550). Reports of goldstripe darters from the 1960s and 1970s in Winston and Jefferson Counties, Alabama (Caldwell 1965, pp. 13–14; Barclay 1971, p. 38; Dycus and Howell 1974, pp. 21–24; Mettee *et al.* 1989, pp. 13, 61, 64), which are above the Fall Line, were made prior to the description of the rush darter, but are now considered to be rush darters (Kuhajda pers. comm. 2008).

Historically, rush darters have been found in three distinct watersheds in Alabama: Doe Branch, Wildcat Branch, and Mill Creek of the Clear Creek drainage in Winston County; an unnamed spring run of Beaver Creek and Penny Springs of the Turkey Creek drainage in Jefferson County; and Cove Spring (Little Cove Creek system) and Bristow Creek of the Locust Fork drainage in Etowah County. Fluker *et al.* (2007, p. 10) suggests that the unique topographic and geologic influences in the three distinct population groups likely produced different selective pressures, genetic isolation, genetic drift, and divergence during the species' evolution.

Currently, the three rush darter populations occur in the same watersheds but in a more limited distribution. One population is located in Wildcat Branch and Mill Creek in the Clear Creek drainage in Winston County (Johnston and Kleiner 2001, p. 4; Stiles and Mills 2008, pp. 1–3); the second is located in an unnamed spring run to Beaver Creek, portions of Beaver Creek, and an unnamed tributary to Turkey Creek in the Turkey Creek drainage in Jefferson County (Stiles and Blanchard 2001, p. 2; Drennen pers. obsv. 2006–2010; Kuhajda pers. comm. 2009); and the third is in the Little Cove Creek drainage (Bart and Taylor 1999, p. 28; Bart 2002, p. 7; Kuhajda pers. comm. 2008–2009; Spadgenski pers. comm. 2008–2009).

Rush darter populations are separated from each other geographically, and individual rush darters are only sporadically collected at a particular site within their range. Where it occurs, the rush darter is apparently an uncommon species that is usually collected in low numbers (compiled from Bart and Taylor 1999, pp. 31–32; Johnston and Kleiner 2001, pp. 2–4; Stiles and Blanchard 2001, pp. 1–4; Johnston 2003, pp. 1–3; Stiles and Mills 2008, pp. 1–3; Rakes pers. comm. 2010; Drennen pers. obsv. 2006–2010; Kuhajda pers. comm. 2009); however, there are no population estimates at this time.

Cumulatively, the rush darter is only known from localized collection sites within approximately 14.5 km (9 mi) of streams in the Clear Creek; Little Cove and Bristow Creek; and Turkey Creek drainages in Winston, Etowah, and Jefferson Counties, respectively. Currently, about 3 km (2 mi) of stream, or about 22 percent of the rush darter's known range, is not occupied.

Within the Clear Creek drainage, the rush darter has been collected in Wildcat Branch, Mill Creek, and Doe Creek, which represents about 13 km (9 mi) of stream or about 89 percent of the species' total cumulative range. Recent surveys (Stiles and Mills 2008, pp. 1–4; Johnston and Kleiner 2001, p. 3) have failed to document the absence of the rush darter in Doe Creek, indicating a potential reduction of the species' known range within the Clear Creek drainage by about 3 km (2 mi) of stream or 22 percent. However, rush darters were collected in 2005, 2008, and 2009 in the Little Cove Creek drainage (Cove Spring run), after a 30 year period of not finding the species. This rediscovery of the species confirms the continued existence of the species in Etowah County and Cove Spring. However, the Little Cove Creek drainage constitutes an increase of only 0.05 km (0.02 mi) of occupied stream habitat or a 0.22 percent addition to the total range of the species. No collections of the species have occurred at Bristow Creek since 1997. Bristow Creek has since been channelized (straightened and deepened to increase water velocity). In the Turkey Creek drainage, rush darters have been collected sporadically within Penny Springs and at the type locality for the species (an unnamed spring run in Jefferson County, Alabama) (Bart and Taylor 1999, pp. 28, 33). However, the rush darter is likely extirpated from Penny and Tapawingo Springs due to introductions of the watercress darter (*E. nuchale*) (George *et al.* 2009, p. 532). The species can still be found in portions of an unnamed tributary of Beaver Creek and an unnamed spring to Beaver Creek (Kuhajda pers. comm. 2009). This area contains about 1.6 km (1 mi) of occupied stream habitat or approximately 11 percent of the rush darter's total range.

The rush darter is ranked by the Alabama Department of Conservation and Natural Resources (ADCNR) (Wildlife and Freshwater Fisheries Division, ADCNR 2005) as a P1G1S1 species signifying its rarity in Alabama and its status as critically imperiled globally. It is also considered a species of GCN by the State (Bart 2004, p. 193). The rush darter has a High Priority Conservation Actions Needed and Key Partnership Opportunities ranking of ''CA 6,'' the highest of any fish species listed. The State Wildlife Action Plan states that the species consists of disjoint populations and information is needed to determine genetic structuring within the populations (Wildlife and Freshwater Fisheries Division, ADCNR 2005). Conservation Actions for the species may require population augmentation or reintroduction of the species to suitable habitats to maintain viability.

Yellowcheek Darter

The yellowcheek darter (*Etheostoma moorei*) is a small and laterally-compressed fish that attains a maximum SL of about 6.4 cm (2.5 in), and has a moderately sharp snout, deep body, and deep caudal peduncle (Raney and Suttkus 1964, p. 130). The back and sides are grayish brown, often with darker brown saddles and lateral bars. Breeding males are brightly colored with a bright blue or brilliant turquoise throat and breast and a light-green belly, while breeding females possess orange and red-orange spots but are not brightly colored (Robison and Buchanan 1988, pp. 427–429).

First collected in 1959 from the Devils Fork Little Red River, Cleburne County, Arkansas, this species was eventually described by Raney and Suttkus in 1964, using 228 specimens from the Middle, South, and Devils Forks of the Little Red River (Devils Fork, Turkey Fork, and Beech Fork represent one stream with three different names and are subsequently referred to in this rule as ''Devils Fork''). Wood (1996, p. 305) verified the taxonomic status of the yellowcheek darter within the subgenus *Nothonotus.* Complete taxonomy for the species is family Percidae, subfamily Percinae, tribe *Etheostomatini,* genus *Etheostoma,* subgenus *Nothonotus* and *E. tippecanoe* species group (Wood 1996, p. 307). The yellowcheek darter is one of only two members of the subgenus *Nothonotus* known to occur west of the Mississippi River.

The yellowcheek darter inhabits high-gradient headwater tributaries with clear water; permanent flow; moderate to strong riffles; and gravel, rubble, and boulder substrates (Robison and Buchanan 1988, p. 429). Yellowcheek darter prey items include aquatic fly larvae, stonefly larvae, mayfly nymphs, and caddisfly larvae (McDaniel 1984, p. 56).

Male and female yellowcheek darters reach sexual maturity at 1 year of age, and maximum lifespan is around 5 years (McDaniel 1984, pp. 25, 76). Spawning occurs from late May through June in the swift to moderately swift portions of riffles, often around or under the largest substrate particles (McDaniel 1984, p. 82), although brooding females have been found at the head of riffles in smaller gravel substrate (Wine *et al.* 2000, p. 3). During nonspawning months, there is a general movement to portions of the riffle with smaller substrate, such as gravel or cobble, and less turbulence (Robison and Harp 1981, p. 3). Weston and Johnson (2005, p. 24) observed that the yellowcheek darter moved very little during a 1-year migration study. It was noted that the yellowcheek darter appears to be a relatively nonmobile species, with 19 of 22 recaptured darters found within 9 m (29.5 ft) of their original capture position after periods of several months. A number of life-history characteristics including courtship patterns, specific spawning behaviors, egg deposition sites, number of eggs per nest, degree of nest protection by males, and degree of territoriality are unknown at this time; however, researchers have suggested that the yellowcheek darter deposits eggs on the undersides of large rubble in swift water (McDaniel 1984, p. 82). Wine and Blumenshine (2002, p. 10) noted that, during laboratory spawning, female yellowcheek darters bury themselves in fine gravel or sand substrates (often behind large cobble or boulders) with only their heads and caudal fin exposed. A male yellowcheek darter will then position upstream of the buried female and fertilize her eggs as she releases them in a vibrating motion. Clutch size and nest defense behavior were not observed.

The yellowcheek darter is endemic to the Devils, Middle, South, and Archey Forks of the Little Red River and mainstem Little Red River in Cleburne, Searcy, Stone, and Van Buren Counties, Arkansas (Robison and Buchanan 1988, p. 429). In 1962, the construction of a dam on the Little Red River to create Greers Ferry Reservoir impounded much of the range of this species, including the lower reaches of Devils Fork, Middle Fork, South Fork, and portions of the mainstem Little Red River, thus extirpating the species from these reaches. Yellowcheek darter was also extirpated from the Little Red River downstream of Greers Ferry Reservoir due to cold tailwater releases. The lake flooded optimal habitat for the species, and caused the genetic isolation of populations (McDaniel 1984, p. 1). The yellowcheek darter was known to historically occur in portions of these streams that maintained permanent year-round flows.

In the 1978–1981 study by Robison and Harp (1981, pp. 15–16), yellowcheek darter occurred in greatest numbers in the Middle and South Forks of the Little Red River, with populations estimated at 36,000 and 13,500 individuals, respectively, while populations in both Devils Fork and Archey Fork were estimated at approximately 10,000 individuals (Robison and Harp 1981, pp. 5–11). During this study, the four forks of the Little Red River supported an estimated yellowcheek darter population of 60,000 individuals, and the species was considered the most abundant riffle fish present (Robison and Harp 1981, p. 14). Extensive sampling of the first two tributaries of the Little Red River below Greers Ferry Dam (both named Big Creek) failed to find any yellowcheek darters, and no darters were found in immediately adjacent watersheds (Robison and Harp 1981, p. 5).

Two subsequent studies have failed to observe yellowcheek darters in the Turkey Fork reach of the Devils Fork Little Red River (Wine *et al.* 2000, p. 9; Wine and Blumenshine 2002, p. 11), since four individuals were last collected by Arkansas State University (ASU) researchers in 1999 (Mitchell *et al.* 2002, p. 129). They have been observed downstream within that system in the Beech Fork reach, where flows are more permanent. The reach downstream of Raccoon Creek is influenced by inundation from Greers Ferry Reservoir and no longer supports yellowcheek darter. The U.S. Army Corps of Engineers channelized approximately 5.6 km (3.5 mi) of the lower Archey and South Forks Little Red River within the city limits of Clinton, Arkansas, in 1985 for flood control purposes. Yellowcheek darter has not been collected within this reach since channelization. The yellowcheek darter inhabits most of its historical range not currently affected by Greers Ferry Lake, although in greatly reduced numbers in the Middle, South, Archey, and Devils Forks of the Little Red River.

While collecting specimens for the 1999 genetic study, ASU researchers discovered that the yellowcheek darter was no longer the most abundant riffle fish and was more difficult to find throughout its historical range (Wine *et al.* 2000, p. 2). Because optimal habitat had been destroyed by the creation of Greers Ferry Lake, yellowcheek darters were confined to upper stream reaches with lower summer flow, smaller substrate particle size, and reduced gradient. A thorough status survey conducted in 2000 found the yellowcheek darter in three of four historically occupied forks in greatly reduced numbers (Wine *et al.* 2000, p. 9). Populations in the Middle Fork were estimated at approximately 6,000 individuals, the South Fork at 2,300, and the Archey Fork at 2,000. Yellowcheek darter was not collected from the Devils Fork. Fish community composition was similar from 1978–1981 and 2000 studies, but the proportion of yellowcheek darter declined from approximately 28 percent to 6 percent of the overall composition. Fish known to coexist with yellowcheek darter include the rainbow darter (*E.*

caeruleum) and greenside darter (*E. blennioides*), which can use pool habitats during periods of low flow, as evidenced by the collection of these two species from pools during electroshocking activities. Electroshocking has not revealed yellowcheek darter in pools, suggesting perhaps that they are unable to tolerate pool conditions (deep, slow-moving water usually devoid of cobble substrate). An inability to use pools during low flows would make them much more vulnerable to seasonal fluctuations in flows that reduce riffle habitat. As a result, researchers have suggested that yellowcheek darter declines are more likely a species rather than community phenomenon (Wine *et al.* 2000, p. 11).

Weston and Johnson (2005, p. 22) estimated yellowcheek darter populations within the Middle Fork to be between 15,000 and 40,000 individuals, and between 13,000 and 17,000 individuals in the South Fork. Such increases since the 2000 status survey would indicate remarkable adaptability to changing environmental conditions. However, it should be noted that estimates were based upon mark/recapture estimates using the Jolly-Seber method, which requires high numbers of recaptured specimens for accurate estimations. Recaptures were extremely low during that study; therefore, population estimates were highly variable and confidence in the resulting estimates is low.

The yellowcheek darter is ranked by the Arkansas Natural Heritage Commission (ANHC) (2007, pp. 2–118) as an S1G1 species: extremely rare in Arkansas, and critically imperiled globally. The Arkansas Game and Fish Commission's (AGFC) Wildlife Action Plan describes the yellowcheek darter as a critically imperiled species with declining populations (AGFC 2005, pp. 452–454).

Chucky Madtom

The chucky madtom (*Noturus crypticus*) is a small catfish (family Ictaluridae), with the largest specimen measuring 6.5 cm (2.6 in) SL (Burr *et al.* 2005, p. 795). Burr *et al.* (2005) described the chucky madtom, confirming previous analyses (Burr and Eisenhour 1994), which indicated that the chucky madtom is a unique species, a member of the *Rabida* subgenus (i.e., the ''mottled'' or ''saddled'' madtoms), and a member of the *Noturus elegans* species complex (i.e., *N. elegans, N. albater, N. fasciatus,* and *N. trautmani*) outlined by Taylor (1969 in Grady and LeGrande 1992). A robust madtom, the chucky madtom body is wide at the pectoral fin origins, greater than 23 percent of the SL. The back contains three dark, nearly black blotches ending abruptly above the lateral midline of the body, with a moderately contrasting, oval, pale saddle in front of each blotch (Burr *et al.* 2005, p. 795).

The chucky madtom is a rare catfish known from only 15 specimens collected from two Tennessee streams. A lone individual was collected in 1940 from Dunn Creek (a Little Pigeon River tributary) in Sevier County, and 14 specimens have been encountered since 1991 in Little Chucky Creek (a Nolichucky River tributary) in Greene County, Tennessee. Only 3 chucky madtom individuals have been encountered since 2000; 1 in 2000 (Lang *et al.* 2001, p. 2) and 2 in 2004 (CFI 2008, unpublished data), despite surveys that have been conducted in both historical localities at least twice a year since 2000 (Rakes and Shute 2004, pp. 2–3; Weber and Layzer 2007, p. 4; CFI 2008, unpublished data). In addition, several streams in the Nolichucky, Holston, and French Broad River watersheds of the upper Tennessee River basin, which are similar in size and character to Little Chucky Creek, have been surveyed with no success (Burr and Eisenhour 1994, pp. 1–2; Shute *et al.* 1997, p. 5; Lang *et al.* 2001, pp. 2–3; Rakes and Shute 2004, p. 1). Conservation Fisheries, Inc. did not find chucky madtoms in 2007 after attempting new sampling techniques (e.g., PVC ''jug'' traps) (CFI 2008, unpublished data).

Originally, museum specimens collected from the Roaring River in Tennessee (Cumberland River drainage) and from Piney Creek, West Fork Flint River, and the Paint Rock River system in Alabama (Tennessee River drainage) were first identified and catalogued as *Noturus elegans* species complex and thought to be chucky madtoms. The Roaring River, Piney Creek, and West Fork Flint River specimens are now considered to be a member of the *N. elegans* group, but have not been assigned to a species. While the specimens from the Paint Rock River system share typical anal ray counts with the chucky madtom, they lack the distinctive cheek characteristics, differ in pelvic ray counts, and are intermediately shaped between the chucky and saddled madtoms (*N. fasciatus*) with respect to body width as a proportion of SL (Burr *et al.* 2005, p. 796). Thus, the Little Chucky and Dunn Creek forms are the only forms that are recognized as chucky madtoms.

All of the specimens collected in Little Chucky Creek have been found in stream runs with slow to moderate current over pea gravel, cobble, or slab-rock substrates (Burr and Eisenhour 1994, p. 2). Habitat of these types is sparse in Little Chucky Creek, and the stream affords little loose, rocky cover suitable for madtoms (Shute *et al.* 1997, p. 8). It is notable that intact riparian buffers are present in the locations where chucky madtoms have been found (Shute *et al.* 1997, p. 9).

No studies to determine the life history and behavior of this species have been conducted. While nothing is known specifically about chucky madtom reproductive biology, recruitment, growth and longevity, food habits, or mobility, this information is available for other similar members of the *Noturus* group. The least madtom (*N. hildebrandi*) may reach sexual maturity at 1 or more years of age (*i.e.,* during their second summer) (Mayden and Walsh 1984, p. 351). Only the largest females of Ozark madtom (*N. albater*) were found to be sexually mature, and males were found to be sexually mature primarily within the second age class (Mayden *et al.* 1980, p. 339), though, a single large male of the first age class showed evidence of sexual maturity (Mayden *et al.* 1980, p. 339). The breeding season of the least and smoky madtoms (*N. baileyi*) is primarily during June through July, though development of breeding condition is initiated as early as April in least madtom and May in smoky madtom (Mayden and Walsh 1984, p. 353; Dinkins and Shute 1996, p. 56). Fecundity varied among the species for which data were available; however, it should be noted that fecundity in madtoms is generally lower in comparison to other North American freshwater fishes (Breder and Rosen 1966 *in* Dinkins and Shute 1996, p. 58). Dinkins and Shute (1996, p. 58) commented that for smoky madtom the combination of relatively large egg size and high level of parental care given to the fertilized eggs and larvae reduce early mortality and, therefore, the need to produce a large number of young.

Both smoky and elegant madtoms (*N. elegans*) were found to nest under flat rocks at or near the head of riffles (Dinkins and Shute 1996, p. 56; Burr and Dimmick 1981, p. 116). Shallow pools were also used by the smoky madtom, which was observed to select rocks of larger dimension for nesting than were used for shelter during other times of year (Dinkins and Shute 1996, p. 56). Single madtoms were found to guard nests in smoky and elegant madtoms, a behavior also exhibited by Ozark and least madtoms (Dinkins and Shute 1996, p. 56; Burr and Dimmick 1981, p. 116; Mayden *et al.* 1980, p. 337;

Mayden and Walsh 1984, p. 357). Males of these species were the nest guardians and many were found to have empty stomachs suggesting that they do not feed during nest guarding, which can last as long as 3 weeks.

Conservation Fisheries, Inc. had one male chucky madtom in captivity from 2004 through 2008. However, based on information from other members of this genus for which longevity data are available, least and smoky madtoms, it is unlikely that chucky madtoms can survive this long in the wild. The shorter lived of these, least madtom, reached a maximum age of 18 months, though most individuals lived little more than 12 months, dying soon after reproducing (Mayden and Walsh 1984, p. 351). Based on length-frequency distributions, smoky madtoms exhibited a lifespan of 2 years, with two cohorts present in a given year (Dinkins and Shute 1996, p. 53). Collection of two age classes together provided evidence that life expectancy exceeds 1 year in the pygmy madtom (*N. stanauli*) (Etnier and Jenkins 1980, p. 20). The Ozark madtom lives as long as 3 years (Mayden *et al.* 1980, p. 337).

Chucky madtom prey items are unknown; however, least madtom prey items include midge larvae, caddisfly larvae, stonefly larvae, and mayfly nymphs (Mayden and Walsh 1984, p. 339). In smoky madtoms, mayfly nymphs comprised 70.7 percent of stomach contents analyzed; fly, mosquitoe, midge, and gnat larvae 2.4 percent; caddisfly larvae 4.4 percent; and stonefly larvae 1.0 percent (Dinkins and Shute 1996, p. 61). Significant daytime feeding was observed in smoky madtoms.

Dinkins and Shute (1996, p. 50) found smoky madtoms underneath slabrocks in swift to moderate current during May to early November. Habitat use shifted to shallow pools over the course of a 1-week period, coinciding with a drop in water temperature to 7 or 8 °C (45 to 46 °F), and persisted from early November to May. Eisenhour *et al.* (1996, p. 43) collected saddled madtoms in gravel, cobble, and slab-rock substrates in riffle habitats with depths ranging from 0.1 to 0.3 m (0.3 to 1.0 ft). Based on their limited number of observations, Eisenhour et al. (1996, p. 43) hypothesized that saddled madtoms occupy riffles and runs in the daylight hours and then move to pools at night and during crepuscular hours (dawn and dusk) to feed.

The current range of the chucky madtom is believed to be restricted to an approximately 3-km (1.8-mi) reach of Little Chucky Creek in Greene County, Tennessee. Because this species was also collected from Dunn Creek, a stream that is in a different watershed and physiographic province than Little Chucky Creek, it is likely that the historic range of the chucky madtom encompassed a wider area in the Ridge and Valley and the Blue Ridge physiographic provinces in Tennessee than is demonstrated by its current distribution. A survey for the chucky madtom in Dunn Creek in 1996 was not successful at locating the species (Shute *et al.* 1997, p. 8). The Dunn Creek population may be extirpated (Shute *et al.* 1997, p. 6; Burr *et al.* 2005, p. 797), because adequate habitat and a diverse fish community were present at the time of the surveys, but no chucky madtoms were found. There are no population size estimates or status trends for the chucky madtom due to low numbers and only sporadic collections of specimens.

The chucky madtom is ranked by the TDEC (2009, p. 58) as an S1G1 species: extremely rare in Tennessee, and critically imperiled globally. The chucky madtom is designated as a Tier 1 GCN species in the Tennessee CWCS (TWRA 2005, pp. 44, 49).

Laurel Dace

The laurel dace (*Chrosomus saylori*), family Cyprinidae and subfamily Leuciscinae, has two continuous black lateral stripes and black pigment covering the breast and underside of the head of nuptial (breeding) males (Skelton 2001, p. 120). The maximum SL observed is 5.1 cm (2 in) (Skelton 2001, p. 124). While the belly, breast, and lower half of the head are typically a whitish-silvery color, at any time of the year laurel dace may develop red coloration below the lateral stripe that extends from the base of the pectoral fins to the base of the caudal fin (Skelton 2001, p. 121).

Nuptial males often acquire brilliant coloration during the breeding season, as the two lateral stripes, breast, and underside of head turn intensely black and the entire ventral (lower/abdominal) portion of the body, contiguous with the lower black stripe and black breast, becomes an intense scarlet color. All of the fins acquire a yellow color, which is most intense in the paired fins and less intense in the dorsal, anal, and caudal fins. Females also develop most of these colors, though of lesser intensity (Skelton 2001, p. 121). Broadly rounded pectoral fins of males are easily discerned from the broadly pointed fins of females at any time during the year.

Laurel dace have been most often collected from pools or slow runs from undercut banks or beneath slab boulders, typically in first or second order, clear, cool (maximum temperature 26 °C or 78.8 °F) streams. Substrates in streams where laurel dace are found typically consist of a mixture of cobble, rubble, and boulders, and the streams tend to have a dense riparian zone consisting largely of mountain laurel (Skelton 2001, pp. 125–126).

Skelton (2001, p. 126) reported having collected nuptial individuals from late March until mid-June, though Call (pers. obs. 2004) observed males in waning nuptial color during surveys on July 22, 2004. Laurel dace may be a spawning nest associate where syntopic (sharing the same habitat) with nest-building minnow species, as has been documented in blackside dace (Starnes and Starnes 1981, p. 366). Soddy Creek is the only location in which Skelton (2001, p. 126) has collected a nest-building minnow with laurel dace. Skelton (2001, p. 126) reports finding as many as three year classes in some collections of laurel dace, though young-of-year fish are uncommon in collections. Observations of three year classes indicate that laurel dace live as long as 3 years.

Laurel dace preferred prey items include fly larvae, stonefly larvae, and caddisfly larvae (Skelton 2001, p. 126). Skelton observed that the morphological feeding traits of laurel dace, including large mouth, short digestive tract, reduced number of pharyngeal (located within the throat) teeth, and primitively shaped basioccipital bone (bone that articulates the vertebra), all of which are consistent with a diet consisting largely of animal material.

Laurel dace are known historically from seven streams on the Walden Ridge portion of the Cumberland Plateau, where drainages generally meander eastward before dropping abruptly down the plateau escarpment and draining into the Tennessee River. Specifically, these seven streams occur in three independent systems: Soddy Creek; three streams that are part of the Sale Creek system (the Horn and Laurel branch tributaries to Rock Creek, and the Cupp Creek tributary to Roaring Creek); and three streams that are part of the Piney River system (Young's, Moccasin, and Bumbee creeks). Strange and Skelton (2005, p. 8) assessed the genetic structure within populations of laurel dace and, based on distribution of genetic diversity among populations, they recognized two genetically distinct management units; (1) The southern populations in Sale and Soddy Creeks, and (2) the northern population in the Piney River system.

Skelton (2001, p. 126) considered collections by the Tennessee Valley

Authority (TVA) during a rotenone survey of Laurel Branch in 1976 to represent laurel dace that were misidentified as southern redbelly dace (*Chrosomus erythrogaster*), as was found to be true for specimens collected by TVA from Horn Branch in 1976, but no specimens are available for confirmation. In 1991, and in four other surveys (two in 1995, one in 1996, and one in 2004), laurel dace were not collected in Laurel Branch, leading Skelton to the conclusion that laurel dace have been extirpated from this stream (Skelton 1997, p. 13; Skelton 2001, p. 126; Skelton pers. comm. 2009). Skelton (pers. comm. 2009) also noted that the site was impacted by silt.

The current distribution of laurel dace comprises six of the seven streams that were historically occupied; the species is considered extirpated from Laurel Branch (see above). In these six streams, they are known to occupy reaches of approximately 0.3 to 8 km (0.2 to 5 mi) in length. The laurel dace is known from a single reach in Soddy Creek, and surveys in 2004 produced only a single, juvenile laurel dace (Strange and Skelton 2005, pp. 5–6 and Appendices 1 and 2). In Horn Branch, laurel dace are known from approximately 900 m (2,953 ft), but have become increasingly difficult to collect (Skelton 1997, pp. 13–14). Skelton (1997, p. 14) reports that minnow traps have been the most successful method for collecting live laurel dace from Horn Branch, as it is difficult to electroshock the fish due to in-stream rock formations and fallen trees. Only a single juvenile was caught in 2004 (Strange and Skelton 2005, p. 6). A total of 19 laurel dace were collected from Cupp Creek during 1995 and 1996 using an electroshocker (Skelton 1996, p. 14). However, Skelton found no laurel dace in this stream in 2004, despite attempts to collect throughout an approximately 700-m (2,297-ft) reach (Strange and Skelton 2005, p. 6).

Laurel dace were initially found in Young's, Moccasin, and Bumbee creeks in the Piney River system in 1996 (Skelton 1997, pp. 14–15). Sampling in 2004 led to the discovery of additional laurel dace localities in Young's and Moccasin creeks, but the locality where laurel dace were found in Young's Creek in 1996 was inaccessible due to the presence of a locked gate (Strange and Skelton 2005, p. 6–7). The new localities were in the headwaters of these two streams. Persistence of laurel dace at the Bumbee Creek locality was confirmed in 2004 by surveying from a nearby road using binoculars. Direct surveys were not possible because the land had been leased to a hunt club for which contact information was not available, and, therefore, survey permission could not be obtained (Strange and Skelton 2005, p. 7). Nuptial males are easily identified from other species present in Bumbee Creek due to their brilliant coloration during the breeding season, as the two lateral stripes, breast, and underside of head turn intensely black and the entire ventral (lower/abdominal) portion of the body, contiguous with the lower black stripe and black breast, becomes an intense scarlet color. This brilliant coloration is easily seen through binoculars at short distances by trained individuals.

No population estimates are available for laurel dace. However, based on trends observed in surveys and collections since 1991, Strange and Skelton (2005, p. 8) concluded that this species is persisting in Young's, Moccasin, and Bumbee creeks in the Piney River watershed, but is at risk of extirpation from the southern part of Walden Ridge in Soddy Creek, and in the Horn Branch and Cupp Creek areas that are tributaries to Sale Creek. As noted above, the species is considered to be extirpated from Laurel Branch, which is part of the Sale Creek system.

The laurel dace is ranked by the TDEC (2009, p. 60) as an S1G1 species: extremely rare in Tennessee, and critically imperiled globally. The laurel dace is designated as a Tier 1 GCN species in the Tennessee CWCS (TWRA 2005, pp. 44, 49).

Summary of Comments and Recommendations

In the proposed rule published on June 24, 2010, we requested that all interested parties submit written comments on the proposed rule to list the Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace by August 23, 2010. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal. Newspaper notices inviting general public comment were published in newspapers covering all affected counties in Kentucky, Tennessee, Alabama, and Arkansas. We did not receive any requests for a public hearing.

During the comment period for the proposed rule, we received ten comment letters in response to the proposed rule: four from peer reviewers, one from a State agency, and five from organizations or individuals. All of the ten commenters supported the proposed rule to list these five fishes as endangered. All substantive information provided during the comment period has either been incorporated directly into this final determination or is addressed below.

Peer Review

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited expert opinion from 12 knowledgeable individuals with scientific expertise that included familiarity with the 5 species and their habitats, biological needs, and threats. We received responses from four of the peer reviewers.

We reviewed all comments received from the peer reviewers for substantive issues and new information regarding the listing of the five fishes. The peer reviewers generally concurred with our conclusions and provided additional information on taxonomic classification, life-history, and distribution; technical clarifications; and suggestions to improve the final rule. Peer reviewer comments are addressed in the ''Summary of Changes from Proposed Rule'' and incorporated into the final rule as appropriate.

Public Comments

(1) *Comment:* Two commenters stated that the laurel dace is threatened, particularly in Horn Branch, a tributary to the Rock Creek watershed, by timber harvest, rock harvest (collection of surface fieldstones), and coal mining of the Sewanee Coal Seam in Bledsoe and Rhea counties, Tennessee. These commenters recommended critical habitat designation in the Upper Rock Creek watershed of Bledsoe County, Tennessee, due to the threats that are imminent and of high magnitude in Horn Branch. The commenters are particularly concerned that mining of the Sewanee Coal Seem would result in acid mine drainage.

Our Response: We concur with these commenters that the laurel dace in Rock Creek watershed is threatened by timber harvest, rock harvest, and coal mining. We have incorporated further analyses regarding the threats of rock harvest and coal mining under ''Summary of Factors Affecting the Species'' for laurel dace. Further analysis with regard to critical habitat designation will be addressed in the upcoming critical habitat rule.

(2) *Comment:* One commenter stated that the Cumberland darter is threatened, particularly in Dan Branch, a tributary to the Lick Fork watershed, by degradation of water quality from mountaintop mining projects in Campbell and Claiborne counties, Tennessee. In addition to this general concern, the commenter was aware of selenium contamination within these same watersheds and feared that the

issuance of new permits would cause further degradation to fish and wildlife habitats in Campbell County.

Our Response: We concur with the commenter that mountaintop mining, and specifically selenium contamination, has the potential to degrade the water quality of Cumberland darter streams in Campbell and Claiborne counties, Tennessee. Streams associated with mountaintop mining and valley fills are characterized by increased conductivity, total dissolved solids, and concentrations of sulfate, bicarbonate ions, and metals such as manganese, iron, aluminum, and selenium. Increased levels of selenium have been shown to bioaccumulate in organisms, leading to deformities in larval fish and potentially harming birds that prey on fishes. The proposed rule provided a more detailed analysis of these and other water quality threats to the Cumberland darter under ''Summary of Factors Affecting the Species.''

Summary of Changes From Proposed Rule

As a result of the comments received during the public comment period (see above) we made the following changes to the final listing rule:

(1) We added taxonomic classification information to the species' background sections.

(2) We added life-history information to the Cumberland darter and chucky madtom background sections.

(3) We updated the distributional information for the rush darter in Alabama.

(4) We changed the genus of laurel dace from *Phoxinus* to *Chrosomus* to reflect recent taxonomic changes (Strange and Mayden 2009).

(5) We updated population estimate and threats *information for the* yellowcheek darter in Arkansas.

Summary of Factors Affecting the Species

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

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

The primary threat to the Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace is physical habitat destruction or modification resulting from a variety of human-induced impacts such as siltation, disturbance of riparian corridors, and changes in channel morphology (Waters 1995, pp. 2–3; Skelton 1997, pp. 17, 19; Thomas 2007, p. 5). The most significant of these impacts is siltation (excess sediments suspended or deposited in a stream) caused by excessive releases of sediment from activities such as resource extraction (*e.g.,* coal mining, silviculture, natural gas development), agriculture, road construction, and urban development (Waters 1995, pp. 2–3; Kentucky Division of Water (KDOW) 2006, pp. 178–185; Skelton 1997, pp. 17, 19; Thomas 2007, p. 5).

Land use practices that affect sediment and water discharges into a stream can also increase the erosion or sedimentation pattern of the stream, which can lead to the destruction or modification of in-stream habitat and riparian vegetation, stream bank collapse, and increased water turbidity and temperature. Sediment has been shown to abrade and suffocate bottom-dwelling fish and other organisms by clogging gills; reduce aquatic insect diversity and abundance; impair fish feeding behavior by altering prey base and reducing visibility of prey; impair reproduction due to burial of nests; and, ultimately, negatively impact fish growth, survival, and reproduction (Waters 1995, pp. 5–7, 55–62; Knight and Welch 2001, pp. 134–136). Wood and Armitage (1997, pp. 211–212) identified at least five impacts of sedimentation on fish, including (1) reduction of growth rate, disease tolerance, and gill function; (2) reduction of spawning habitat and egg, larvae, and juvenile development; (3) modification of migration patterns; (4) reduction of food availability through the blockage of primary production; and (5) reduction of foraging efficiency. The effects of these types of threats will likely increase as development increases in these watersheds.

Non-point source pollution from land surface runoff can originate from virtually any land use activity and may be correlated with impervious surfaces and storm water runoff. Pollutants may include sediments, fertilizers, herbicides, pesticides, animal wastes, septic tank and gray water leakage, pharmaceuticals, and petroleum products. These pollutants tend to increase concentrations of nutrients and toxins in the water and alter the chemistry of affected streams such that the habitat and food sources for species like the Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace are negatively impacted. Construction and road maintenance activities associated with urban development typically involve earth-moving activities that increase sediment loads into nearby streams. Other siltation sources, including timber harvesting, natural gas development activities, clearing of riparian vegetation, mining, and agricultural practices, allow exposed earth to enter streams during or after precipitation events. These activities result in canopy removal, elevated stream temperatures, and increased siltation, thereby degrading habitats used by fishes for both feeding and reproduction (Mattingly *et al.* 2005, p. 5). Undisturbed riparian corridors are important because they prevent elevated stream temperatures due to solar heating, serve as buffers against non-point source pollutants, provide submerged root materials for cover and feeding, and help to stabilize stream banks (Mattingly *et al.* 2005, p. 5).

Cumberland Darter

The Cumberland darter's preferred habitat characteristics (*i.e.,* low- to moderate-gradient, low current velocity, backwater nature) make it extremely susceptible to the effects of siltation (O'Bara 1991, p. 11). Sediment (siltation) has been listed repeatedly by KDOW as the most common stressor of aquatic communities in the upper Cumberland River basin (KDOW 1996, pp. 50–53, 71–75; KDOW 2002, pp. 39–40; KDOW 2006, pp. 178–185). The primary source of sediment was identified as resource extraction (*e.g.,* coal mining, logging). The streams within the Cumberland darter's current range that are identified as impaired (due to siltation from mining, logging, and agricultural activities) and have been included on Kentucky's 303(d) list of impaired waters (KDOW 2007, pp. 155–166) include Jenneys Branch (Indian Creek basin), an unnamed tributary of Jenneys Branch (Indian Creek basin), Ryans Creek (Jellico Creek basin), Marsh Creek, and Wolf Creek (Clear Fork basin).

Siltation can also occur in the Cumberland darter's known habitat as a result of construction activities for human development. For example, during the fall of 2007, an 8.4-km (5.2-mi) reach of Barren Fork in McCreary County, Kentucky, was subjected to a severe sedimentation event (Floyd pers. obs. 2008). This event occurred despite the fact that approximately 95 percent of the Barren Fork watershed is under Federal ownership within the Daniel Boone National Forest (DBNF). Construction activities associated with the development of a 40.5-hectare (100-acre) park site caused excessive sedimentation of two unnamed headwater tributaries of Barren Fork. Successive, large rainfall events in September and October carried sediment offsite and impacted downstream areas of Barren Fork known to support Cumberland darters and the Federally threatened blackside dace. Our initial site visit on September 7, 2007, confirmed that sediment had been carried offsite, resulting in significant habitat degradation in the Barren Fork mainstem and ''adverse effects'' on the blackside dace. Several smaller sediment events have occurred despite Federal and State attempts to resolve the issue, and on July 31, 2008, another large rainfall event resulted in excessive sedimentation in two Barren Fork watershed streams.

Another significant threat to the Cumberland darter is water quality degradation caused by a variety of non-point source pollutants. Coal mining represents a major source of these pollutants (O'Bara 1991, p. 11; Thomas 2007, p. 5), because it has the potential to contribute high concentrations of dissolved metals and other solids that lower stream pH or lead to elevated levels of stream conductivity (Pond 2004, pp. 6–7, 38–41; Mattingly et al. 2005, p. 59). These impacts have been shown to negatively affect fish species, including listed species, in the Clear Fork system of the Cumberland basin (Weaver 1997, pp. 29; Hartowicz pers. comm. 2008). The direct effect of elevated stream conductivity on fishes, including the Cumberland darter, is poorly understood, but some species, such as blackside dace, have shown declines in abundance over time as conductivity increased in streams affected by mining (Hartowicz pers. comm. 2008). Studies indicate that blackside dace are generally absent when conductivity values exceed 240 microSiemens (μS) (Mattingly *et al.* 2005, p. 59; Black and Mattingly 2007, p. 12).

Other non-point source pollutants that affect the Cumberland darter include domestic sewage (through septic tank leakage or straight pipe discharges); agricultural pollutants such as fertilizers, pesticides, herbicides, and animal waste; and other chemicals associated with oil and gas development. Non-point source pollutants can cause excess nutrification (increased levels of nitrogen and phosphorus), excessive algal growth, instream oxygen deficiencies, increased acidity and conductivity, and other changes in water chemistry that can seriously impact aquatic species (KDOW 1996, pp. 48–50; KDOW 2006, pp. 70–73).

In summary, habitat loss and modification represent significant threats to the Cumberland darter. Severe degradation from sedimentation, physical habitat disturbance, and contaminants threatens the habitat and water quality on which the Cumberland darter depends. Sedimentation from coal mining, logging, agriculture, and development sites within the upper Cumberland basin negatively affect the Cumberland darter by reducing growth rates, disease tolerance, and gill function; reducing spawning habitat, reproductive success, and egg, larvae, and juvenile development; modifying migration patterns; reducing food availability through reductions in prey; and reducing foraging efficiency. Contaminants associated with coal mining (metals, other dissolved solids), domestic sewage (bacteria, nutrients), and agriculture (fertilizers, pesticides, herbicides, and animal waste) cause degradation of water quality and habitats through increased acidity and conductivity, instream oxygen deficiencies, excess nutrification, and excessive algal growths. Furthermore, these threats faced by the Cumberland darter from sources of sedimentation and contaminants are imminent, the result of ongoing projects that are expected to continue indefinitely. As a result of the imminence of these threats combined with the vulnerability of the remaining small populations to extirpation from natural and manmade threats, we have determined that the present or threatened destruction, modification, or curtailment of the Cumberland darter habitat and range represents a significant threat of high magnitude. We have no information indicating that the magnitude or imminence of this threat is likely to be appreciably reduced in the foreseeable future.

Rush Darter

Sediment is the most abundant pollutant in the Mobile River Basin (Alabama Department of Environmental Management 1996, pp. 14–15) and a major threat to the rush darter. Within the Clear Creek drainage, Johnston and Kleiner (2001, p. 4) reported that, during August 2001, the dominant land use adjacent to Doe Branch and Mill Creek appeared to be forests, and that there were no obvious threats to water quality. However, Johnston and Kleiner (2001, p. 4) reported that clearcutting in the Wildcat Branch watershed may have increased sedimentation into the stream. Approximately 84 percent (i.e., 5 km or 3 mi) of Wildcat Branch is privately owned, and recent land exchanges within the Bankhead National Forest have taken about 0.9 km (0.6 mi) of stream west of Clear Creek out of U.S. Forest Service (USFS) management and protection. In 2001, Service and USFS personnel noted heavy siltation at the County Road 329 Bridge over Doe Branch and at several other road crossings in other tributary streams in the immediate area during a modest spring rain event. Sediment in area streams is also the result of increased erosion from the scouring of roadside ditches, and erosion of the gravel County Road 329 itself adjacent to Doe and Wildcat branches (Drennen pers. obs. 2005).

Blanco (2001, p. 68) identified siltation from development projects as the greatest threat to the fauna of Turkey Creek. New subdivisions have been developed throughout the watershed, increasing the amount of impervious surfaces in the recharge areas of springs. The increase in impervious surfaces is leading to increased stormwater runoff and is reducing the amount of recharge (water storage) available to the aquifers that feed springs in the watershed. These flow alterations reduce the amount and complexity of rush darter habitat by eroding stream banks, destabilizing substrates and aquatic vegetation, and decreasing overall water quality.

There are four major soil types that occur within the Turkey Creek watershed, and all are considered highly erodible due to the steep topography (Spivey 1982, pp. 5, 7, 8, 14). Therefore, any activity that removes native vegetation on these soils can be expected to lead to increased sediment loads in Turkey Creek watershed (USFWS 2001, p. 59370), including the areas near Penny and Tapawingo Springs. Industrialization is extensive and expanding throughout the watershed, particularly near the type locality for the rush darter (Bart and Taylor 1999, p. 33; Drennen pers. obs. 2007–2010).

Point source siltation has impacted the Turkey Creek watershed, including an abundance of sites affecting Beaver Creek, a major tributary to Turkey

Creek. These sites are impaired by bridge, road, and sewer line construction; industrialized areas; road maintenance; and storm water mismanagement (Drennen pers. obs. 1999, 2004–2010). Rapid urbanization in this area renders this population extremely vulnerable during the breeding season when rush darters concentrate in wetland pools and shallow pools with aquatic vegetation in headwater streams (Stiles and Mills 2008, p. 5; Fluker *et al.* 2007, p. 10).

Springs throughout the rush darter's range, especially in Pinson Valley, flush and dilute sediments and excessive nutrients from streams by providing a constant flow of cool, clean water. However, the ongoing destruction of spring heads and wetlands throughout the species' range has significantly reduced the species' movement and colonization. Little Cove Creek and Bristow Creek spring heads have been channelized, and the head of Cove Spring has a pumping facility built on it (Fluker *et al.* 2007, p. 1). Channelization and groundwater withdrawals from spring heads might do more to impact water quality in these systems than overall spring drainage disturbances such as beaver dam construction, and road maintenance (Drennen per. obs. 2005). Alteration of spring head habitats has reduced water quality and increased sediment loads into spring-fed tributary streams throughout the range of the rush darter.

In summary, threats to rush darter include stormwater runoff and siltation, caused by an increase in urbanization and impervious surfaces in the watershed. Other threats include spring head alteration, roadside maintenance, and logging. These threats are ongoing and thus considered imminent. The magnitude of the threats is high due to the small population sizes and high levels of alterations and destruction of the springs and streams. We have no information indicating that the magnitude or imminence of these threats is likely to be appreciably reduced in the foreseeable future.

Yellowcheek Darter

Robison and Harp (1981, p. 17), McDaniel (1984, p. 92), and Robison and Buchanan (1988, p. 429) have attributed the decline in populations of yellowcheek darters in the four forks of the Little Red River and the mainstem Little Red River to habitat alteration and degradation. The suspected primary cause of the species' decline is the impoundment of the Little Red River and lower reaches of the Devils, Middle, and South Forks, areas that in the past provided optimal habitat for this species. The creation of Greers Ferry Lake, in 1962, converted optimal yellowcheek darter habitat (clear, cool, perennial flow with large substrate particle size (Robison and Buchanan 1988, p. 429)), to a deep, standing water environment. This dramatic change in habitat flooded spawning sites and changed chemical and physical characteristics in the streams that provide habitat for the species. Impoundments profoundly alter channel characteristics, habitat availability, and flow regime with serious consequences for biota (Allan and Flecker 1993, p. 36, Ward and Stanford 1995, pp. 105–119). Some of these include converting flowing to still waters, increasing depths and sedimentation, decreasing dissolved oxygen, drastically altering resident fish populations (Neves *et al.* 1997, p. 63), disrupting fish migration, and destroying spawning habitat (Ligon *et al.* 1995, pp. 185–86). Channelization of the lower 5.6 km (3.5 miles) of Archey and South Forks in 1985 and subsequent, and ongoing, channel maintenance by the U.S. Army Corps of Engineers (USACE) and City of Clinton, Arkansas, degraded habitat in this reach as well as segments upstream of the project area. Based upon current knowledge and a 2004–2005 threats assessment (Davidson and Wine 2004, pp. 6–13; Davidson 2005, pp. 1–4), gravel mining, unrestricted cattle access into streams, water withdrawal for agricultural and recreational purposes (i.e., golf courses), lack of adequate riparian buffers, construction and maintenance of county roads, and non-point source pollution arising from a broad array of activities also appear to be degrading suitable habitat for the species. The threats assessment documented occurrences of the aforementioned activities and found 52 sites on the Middle Fork, 28 sites on the South Fork, 8 sites on Archey Fork (Davidson 2005, pp. 1–4), and 1 site in the Turkey/Beech/Devils Fork system that are adversely affected by these activities and are likely contributors to the decline of the species.

Ozark headwater streams typically exhibit seasonal fluctuations in flows, with flow rates highest in spring and lowest in late summer and fall. The upper reaches of these small streams are most affected by seasonally fluctuating water levels (Robison and Harp 1981, p. 17). As a result, they often lack consistent and adequate flows, and by late summer or fall are reduced to a series of isolated pools (Wine pers. comm. 2008). Expanding natural gas development activities that began in the upper Little Red River watershed in 2006 require large quantities of water (both surface water and groundwater) and pose an imminent threat to the continued existence of yellowcheek darter as these activities rapidly expand and increase in the watersheds of all four forks (Davidson pers. comm. 2008). Because the yellowcheek darter requires permanent flows with moderate to strong current (Robison and Buchanan 1988, p. 429), and because downstream refugia have been lost to impoundments and channelization, water withdraws that exacerbate seasonal stream reductions and reduce moving water (lotic) habitat are a serious threat.

Additional threats to the yellowcheek darter include habitat degradation from land use activities in the watershed, including agriculture and forestry. Traditional farming practices, feedlot operations, and associated poor land use practices contribute many pollutants to rivers. Neves *et al.* (1997, p. 65) suggest that agriculture affects 72 percent of impaired river reaches in the United States. Nutrients, bacteria, pesticides, and other organic compounds generally are found in higher concentrations in agricultural areas than forested areas. Nutrient concentrations in streams may result in increased algal growth in streams, and a related alteration in fish community composition (Petersen *et al.* 1999, p. 16). Major agricultural activities within the Little Red River watershed include poultry, dairy, swine, and beef cattle operations.

The Arkansas Natural Resources Conservation Service (NRCS) has identified animal wastes, nutrients, excessive erosion, loss of plant diversity, and loss of species as water quality concerns associated with agricultural land use activities in the upper Little Red River watershed (NRCS 1999). Large poultry and dairy operations increase nutrient inputs to streams when producers apply animal waste to pastures to stimulate vegetation growth for grazing and hay production. Continuous grazing methods in the watershed allow unrestricted animal access to grazing areas, and on steeper slopes this results in increased runoff and erosion (NRCS 1999). Since pastures often extend directly to the edge of the stream, and lack a riparian zone with native vegetation, runoff from pastures carries pollutants directly into streams. Eroding stream banks also result in alterations to stream hydrology and geomorphology, degrading habitat. Livestock spend a disproportionate amount of time in riparian areas during hot summer months. Trampling and grazing can change and reduce vegetation and eliminate riparian areas by channel widening, channel aggradation, or lowering of the water table (Armour *et al.* 1991, pp. 7–11).

Additionally, earthen dams were constructed across a riffle in the lower South Fork to create a pool for annual chuckwagon races for many years leading up to 2003. The Service and U.S. Army Corps of Engineers met with the responsible landowner in 2004 and suggested an alternative to dam construction that would minimize impacts to the yellowcheek darter. These recommendations were followed for several years; however, another earthen dam was constructed in 2008 using material from the South Fork to facilitate events associated with the annual chuckwagon races. This dam, like its predecessors, was unpermitted and resulted in habitat degradation and alteration for several miles upstream and downstream of the site.

The chuckwagon race event draws approximately 20,000 to 30,000 people per year to the South Fork Little Red River for a 1-week period around Labor Day. Horses and wagons traverse the river and its tributaries for miles leading to increased habitat disturbance, sedimentation, and trampling. The chuckwagon races continue to grow annually and pose a threat to the continued existence of yellowcheek darters in the South Fork Little Red River.

Timber harvesting activities involving clear-cutting entire steep hillsides were observed during 1999–2000 in the Devils Fork watershed (Wine pers. comm. 2008). The failure to implement voluntary State best management practices (BMPs) for intermittent and perennial streams during timber harvests has resulted in water quality degradation and habitat alteration in stream reaches adjacent to harvesting operations. When timber harvests involve clear cutting to the water's edge, without leaving a riparian buffer, silt and sediment enter streams lying at the bottom of steep slopes. The lack of streamside vegetation also promotes bank erosion that alters stream courses and introduces large quantities of sediment into the channel (Allan 1995, p. 321). Timber harvest operations that use roads on steep slopes to transport timber can carry silt and sediment from the road into the stream at the bottom of the slope. Logging impacts on sediment production are considerable, but often erosion of access and haul roads produces more sediment than the land harvested for timber (Brim Box and Mossa 1999, p. 102). These activities have occurred historically and continue to occur in the upper Little Red River watershed.

Natural gas exploration and development is a newly emerging threat to yellowcheek darter populations. Erosion and sedimentation issues associated with natural gas development activities, particularly pipelines (herein defined as all flow lines, gathering lines, and non-interstate pipelines), were first documented by Service biologists during 2007 in the South Fork Little Red River watershed. In June 2008, the Service began documenting significant erosion and sedimentation issues associated with natural gas pipeline construction and maintenance as natural gas development activities expanded into the watershed. Service biologists documented erosion and sedimentation at almost every new pipeline stream crossing in the South Fork and Middle Fork Little Red River watersheds, regardless of the diameter of the pipe. Channel incision was documented at numerous stream crossings that are tributaries to the South Fork Little Red River. The incision increased erosion and sedimentation, as well as altering the hydrology and geomorphology characteristics of the streams. Pipeline rights-of-way were found to have one of the following conditions: (1) No BMPs (*i.e.,* silt fences, grade breaks, non-erodible stream crossing materials) installed to prevent erosion and sedimentation; (2) ineffective erosion minimization practices in place; (3) effective erosion minimization practices that had not been maintained and, thus, had become ineffective; or (4) final reclamation of the pipeline right-of-way had not occurred for months and in some cases greater than a year after construction activities ceased, leading to prolonged periods of erosion and sedimentation. The magnitude of the impacts to the South Fork and Middle Fork Little Red River from 2007–2008 also was exacerbated due to above-average rainfall, which led to more frequent and larger pipeline erosion events.

In summary, threats to the yellowcheek darter from the present destruction, modification, or curtailment of its habitat or range negatively impact the species. Threats include such activities as impoundment, sedimentation, poor livestock grazing practices, improper timber harvest practices, nutrient enrichment, gravel mining, channelization/channel instability, and natural gas development. These threats are considered imminent and of high magnitude throughout the species' entire range. We have no information indicating that the magnitude or imminence of these threats is likely to be appreciably reduced in the foreseeable future, and in the case of pipeline disturbance, we expect this threat to become more problematic over the next several years as natural gas development continues to intensify.

Chucky Madtom

The current range of the chucky madtom is believed to be restricted to an approximately 1.8-mi (3-km) reach of Little Chucky Creek in Greene County, Tennessee. Land use data from the Southeast GAP Analysis Program (SE–GAP) show that land use within the Little Chucky Creek watershed is predominantly agricultural, with the vast majority of agricultural land being devoted to production of livestock and their forage base (Jones *et al.* 2000).

Traditional farming practices, feedlot operations, and associated land use practices contribute many pollutants to rivers. Neves *et al.* (1997, p. 65) suggest that agriculture affects 72 percent of impaired river reaches in the United States. These practices erode stream banks and result in alterations to stream hydrology and geomorphology, degrading habitat. Nutrients, bacteria, pesticides, and other organic compounds generally are found in higher concentrations in agricultural areas than forested areas. Nutrient concentrations in streams may result in increased algal growth in streams, and a related alteration in fish community composition (Petersen *et al.* 1999, p. 16).

The TVA Index of Biological Integrity results indicate that Little Chucky Creek is biologically impaired (Middle Nolichucky Watershed Alliance 2006, p. 13). Given the predominantly agricultural land use within the Little Chucky Creek watershed, non-point source sediment and agrochemical discharges may pose a threat to the chucky madtom by altering the physical characteristics of its habitat, thus potentially impeding its ability to feed, seek shelter from predators, and successfully reproduce. The Little Chucky Creek watershed also contains a portion of the City of Greeneville, providing an additional source for input of sediments and contaminants into the creek and threatening the chucky madtom. Wood and Armitage (1997, pp. 211–212) identify at least five impacts of sedimentation on fish, including (1) reduction of growth rate, disease tolerance, and gill function; (2) reduction of spawning habitat and egg, larvae, and juvenile development; (3) modification of migration patterns; (4) reduction of food availability through the blockage of primary production; and (5) reduction of foraging efficiency.

The chucky madtom is a bottom-dwelling species. Bottom-dwelling fish species are especially susceptible to sedimentation and other pollutants that degrade or eliminate habitat and food sources (Berkman and Rabeni 1987, pp. 290–292; Richter *et al.* 1997, p. 1091; Waters 1995, p. 72). Etnier and Jenkins (1980, p. 20) suggested that madtoms, which are heavily dependent on chemoreception (detection of chemicals) for survival, are susceptible to human-induced disturbances, such as chemical and sediment inputs, because the olfactory (sense of smell) ''noise'' they produce could interfere with a madtom's ability to obtain food and otherwise monitor its environment.

In summary, threats to the chucky madtom from the present destruction, modification, or curtailment of its habitat or range negatively impact the species. Degradation from sedimentation, physical habitat disturbance, and contaminants threaten the habitat and water quality on which the chucky madtom depends. Sedimentation from agricultural lands could negatively affect the chucky madtom by reducing growth rates, disease tolerance, and gill function; reducing spawning habitat, reproductive success, and egg, larvae, and juvenile development; reducing food availability through reductions in prey; and reducing foraging efficiency. Contaminants associated with agriculture (e.g., fertilizers, pesticides, herbicides, and animal waste) can cause degradation of water quality and habitats through instream oxygen deficiencies, excess nutrification, and excessive algal growths. Furthermore, these threats faced by the chucky madtom from sources of sedimentation and contaminants are imminent; the result of ongoing agricultural practices that are expected to continue indefinitely. As a result of the imminence of these threats combined with the vulnerability of the remaining small population to extirpation from natural and manmade threats, we have determined that the present or threatened destruction, modification, or curtailment of the chucky madtom habitat and range represents a significant threat of high magnitude. We have no information indicating that the magnitude or imminence of these threats is likely to be appreciably reduced in the foreseeable future.

Laurel Dace

Skelton (2001, p. 127) concluded that the laurel dace is ''presumably tolerant of some siltation.'' However, Strange and Skelton (2005, p. 7 and Appendix 2) observed levels of siltation they considered problematic during later surveys for the laurel dace and concluded this posed a threat in several localities throughout the range of the species. Sediment has been shown to abrade and or suffocate bottom-dwelling fish and other organisms by clogging gills; reducing aquatic insect diversity and abundance; impairing fish feeding behavior by altering prey base and reducing visibility of prey; impairing reproduction due to burial of nests; and, ultimately, negatively impacting fish growth, survival, and reproduction (Waters 1995, pp. 5–7, 55–62; Knight and Welch 2001, pp. 134–136). However, we do not currently know what levels of siltation laurel dace are able to withstand before populations begin to decline due to these siltation-related stressors. The apparent stability of the northern population of laurel dace in the Piney River system suggests that this species is at least moderately tolerant of siltation-related stressors. We do not know the extent to which other factors might have driven the decline of the southern populations in Sale and Soddy Creeks.

Of the streams inhabited by the southern populations recognized by Strange and Skelton (2005, p. Appendix 2), the reaches from which laurel dace have been collected in Soddy Creek and Horn Branch approach 1 km (0.6 mi) in length. In Cupp Creek, collections of this species are restricted to less than 300 m (984 ft) of stream, in spite of surveys well beyond the reach known to be inhabited. In each of the streams occupied by the southern populations, Strange and Skelton (2005, Appendix 2) identified siltation as a factor that could alter the habitat and render it unsuitable for laurel dace. The restricted distribution of laurel dace in streams inhabited by the southern populations leaves them highly vulnerable to potential deleterious effects of excessive siltation or other localized disturbances.

A newly emerging threat to laurel dace in Soddy Creek is the conversion of silvicultural lands to row crop agriculture. Two large pine plantations within the Soddy Creek Watershed were harvested and then converted to tomato farms. An irrigation impoundment was built on one Soddy Creek tributary and another is under construction. As a result of these activities, a large silt source was introduced into the Soddy Creek headwaters. In addition to contributing sediment, crop fields often allow runoff from irrigation water to flow directly into the creek. This water contains fungicides, herbicides, and fertilizers (Thurman pers. comm. 2010).

Strange and Skelton (2005, p. 7 and Appendix 2) identified siltation as a threat in all of the occupied Piney River tributaries (Young's, Moccasin, and Bumbee Creeks). The Bumbee Creek type locality for the laurel dace is located within industrial forest that has been subjected to extensive clear-cutting and road construction in close proximity to the stream. Strange and Skelton (2005, p. 7) noted a heavy sediment load at this locality and commented that conditions in Bumbee Creek in 2005 had deteriorated since the site was visited by Skelton in 2002. Strange and Skelton (2005, pp. 7 and 8 and Appendix 2) also commented on excessive siltation in localities they sampled on Young's and Moccasin Creeks, and observed localized removal of riparian vegetation around residences in the headwaters of each of these streams. They considered the removal of riparian vegetation problematic not only for the potential for increased siltation, but also for the potential thermal alteration of these small headwater streams. Skelton (2001, p. 125) reported that laurel dace occupy cool streams with a maximum recorded temperature of 26 °C (78.8 °F). The removal of riparian vegetation could potentially increase temperatures above the laurel dace's maximum tolerable limit.

Water temperature may be a limiting factor in the distribution of this species (Skelton 1997, pp. 17, 19). Canopy cover of laurel dace streams often consists of eastern hemlock (Tsuga canadensis), mixed hardwoods, pines (*Pinus* spp.), and mountain laurel (Kalmia latifolia). The hemlock woolly adelgid (*Adelges tsugae*) is a nonnative insect that infests hemlocks, causing damage or death to trees. The woolly adelgid was recently found in Hamilton County, Tennessee, and could impact eastern hemlock in floodplains and riparian buffers along laurel dace streams in the future (Simmons pers. comm. 2008). Riparian buffers filter sediment and nutrients from overland runoff, allow water to soak into the ground, protect stream banks, and provide shade for streams (Waters 1995, p. 149–152). Because eastern hemlock is primarily found in riparian areas, the loss of this species adjacent to laurel dace streams would be detrimental to fish habitat.

Habitat destruction and modification also stem from existing or proposed infrastructure development in association with silvicultural activities. The presence of culverts at one or more road crossings in most of the streams inhabited by laurel dace may disrupt upstream dispersal within those systems (Chance pers. obs. 2008). Such dispersal barriers could prevent re-establishment of laurel dace populations in reaches where they suffer localized extinctions due to natural or human-caused events.

In summary, the primary threat to laurel dace throughout its range is excessive siltation resulting from agriculture and extensive silviculture involving both inadequate riparian buffers in harvest areas and the failure to use BMPs during road construction. Severe degradation from sedimentation, physical habitat disturbance, and contaminants threatens the habitat and water quality on which the laurel dace depends. Sedimentation negatively affects species (such as the laurel dace) by reducing growth rates, disease tolerance, and gill function; reducing spawning habitat, reproductive success, and egg, larvae, and juvenile development; reducing food availability through reductions in prey; and reducing foraging efficiency (Waters 1995, pp. 5–7; 55–62; Wood and Armitage 1997, pp. 211–212; Knight and Welch 2001, pp. 134–136). These threats faced by the laurel dace from sources of sedimentation and contaminants are imminent, the result of ongoing agricultural and silvicultural practices that are expected to continue. Since the identified threats substantially affect survival, growth, reproduction, and feeding, we have determined that the present or threatened destruction, modification, or curtailment of the laurel dace habitat and range represents a significant threat of high magnitude. We have no information indicating that the magnitude or imminence of these threats is likely to be appreciably reduced in the foreseeable future.

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

The Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace are not commercially utilized. Individuals have been taken for scientific and private collections in the past, but collecting is not considered a factor in the decline of these species and is not expected to be so in the future. The available information does not indicate that overutilization is likely to become a threat to any of these five fishes in the foreseeable future.

C. Disease or Predation

Disease is not considered to be a factor in the decline of the Cumberland darter, rush darter, yellowcheek darter, chucky madtom, or laurel dace. Although the Cumberland darter, rush darter, yellowcheek darter, and laurel dace are undoubtedly consumed by predators, the available information suggests that this predation is naturally occurring, or a normal aspect of the population dynamics. As a result, we do not believe that predation is considered to currently pose a threat to these species. Furthermore, the information we do have does not indicate that disease or predation is likely to become a threat to any of these five fishes in the foreseeable future.

D. The Inadequacy of Existing Regulatory Mechanisms

Cumberland Darter

The Cumberland darter 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 (TWQCA; T.C.A. 69–3–101). However, as demonstrated under Factor A, population declines and degradation of habitat for this species are ongoing despite the protection afforded by these laws and corresponding regulations. While these laws have resulted in some improvements in water quality and stream habitat for aquatic life, including the Cumberland darter, they alone have not been adequate to fully protect this species; sedimentation and non-point source pollutants continue to be a significant problem.

States maintain water-use classifications through issuance of National Pollutant Discharge Elimination System (NPDES) permits to industries, municipalities, and others. NPDES permits set maximum limits on certain pollutants or pollutant parameters. For water bodies on the 303(d) list, States are required under the Clean Water Act to establish a total maximum daily load (TMDL) for the pollutants of concern that will bring water quality into the applicable standard. Three Cumberland darter streams, Jenneys Branch, Marsh Creek, and Wolf Creek, have been identified as impaired by the KDOW and placed on the State's 303(d) list (KDOW 2008). Causes of impairment were listed as siltation/sedimentation from agriculture, coal mining, land development, and silviculture and organic enrichment/eutrophication from residential areas. TMDLs have not yet been developed for these pollutants.

The Cumberland darter has been designated as an endangered species by Tennessee (TWRA 2005, p. 240) and Kentucky (KSNPC 2005, p. 11), but the designation in Kentucky conveys no legal protection. Under the Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act of 1974 (Tennessee Code Annotated §§ 70–8–101–112), ''[I]t is unlawful for any person to take, attempt to take, possess, transport, export, process, sell or offer for sale or ship nongame wildlife, or for any common or contract carrier knowingly to transport or receive for shipment nongame wildlife.'' Further, regulations included in the Tennessee Wildlife Resources Commission Proclamation 00–15 Endangered Or Threatened Species state the following: ''Except as provided for in Tennessee Code Annotated, Section 70–8–106 (d) and (e), it shall be unlawful for any person to take, harass, or destroy wildlife listed as threatened or endangered or otherwise to violate terms of Section 70–8–105 (c) or to destroy knowingly the habitat of such species without due consideration of alternatives for the welfare of the species listed in (1) of this proclamation, or (2) the United States list of Endangered fauna.'' Under these regulations, potential collectors of this species are required to have a State collection permit, therefore protecting against potential threats under Factor B. However, in terms of project management, and potential habitat disturbance, this regulation only provides for the consideration of alternatives, and does not require the level of project review afforded by the Act.

In 7 of 12 streams where the Cumberland darter still occurs, the species receives incidental protection under the Act due to the coexistence of the Federally threatened blackside dace. These streams are in watersheds that are at least partially owned by the Federal Government (*i.e.,* DBNF). The five remaining streams supporting populations of the Cumberland darter are not afforded this protection.

In summary, population declines and degradation of habitat for the Cumberland darter are ongoing despite the protection afforded by State and Federal laws and corresponding regulations. Because of the vulnerability of the small remaining populations of the Cumberland darter and the imminence of these threats, we find the inadequacy of existing regulatory mechanisms to be a significant threat of high magnitude. Further, the information available to us at this time does not indicate that the magnitude or imminence of this threat is likely to be appreciably reduced in the foreseeable future.

Rush Darter

The rush darter and its habitats are afforded some protection from water quality and habitat degradation under the Clean Water Act and the Alabama Water Pollution Control Act, as amended, 1975 (Code of Alabama, §§ 22–22–1 to 22–22–14). However, as demonstrated under Factor A, population declines and degradation of habitat for this species are ongoing despite the protection afforded by these laws. While these laws have resulted in some improvement in water quality and stream habitat for aquatic life, including the rush darter, they alone have not been adequate to fully protect this species; stormwater mismanagement, sedimentation, and non-point source pollutants continue to be a significant problem. In addition, these laws have not adequately addressed water quantity issues that are a problem throughout the range of the species. Sediment is the most abundant pollutant in the Mobile River Basin and is among the greatest threats to the rush darter.

The State of Alabama maintains water-use classifications through issuance of NPDES permits to industries, municipalities, and others that set maximum limits on certain pollutants or pollutant parameters. For water bodies on the 303(d) list, States are required under the Clean Water Act to establish a TMDL for the pollutants of concern that will bring water quality into the applicable standard. The State of Alabama has not identified any impaired water bodies in Jefferson, Winston, and Etowah counties in the immediate or upstream portion of the rush darter range or in any watersheds in Winston or Etowah counties. However, sedimentation events are usually related to stormwater runoff episodes, and are usually not captured by routine water quality sampling.

Although stormwater events are temporary in nature, they are still harmful to aquatic species. The size and frequency of floods and stormwater events increases with urbanization (Konrad 2003, pp. 1–4). Stormwater events in urban areas decrease the storage capacity for water in urban basins compared to rural basins; and urbanization promotes more rapid runoff, higher peak discharge rates, and total volume of water (Konrad 2003, pp. 1–4). Not only does urbanization and associated runoff change the physical aspects of water resources, but also the chemical and biological conditions of waterways (AMEC Earth and Environmental 2001, p. 1). Jefferson County, Alabama (2005, pp. 2, 39) has noted that the expansion of impervious surfaces in the Turkey Creek Drainage Basin caused an increase in flood heights and water velocity during stormwater events. Due to these observations, the Storm Water Management Authority and Jefferson County Department of Health (2010, pp. 4–9) are tracking and monitoring construction and maintenance sites that impact stormwater management within the Turkey Creek and City of Pinson area. As demonstrated under Factor A, flow alterations associated with stormwater runoff reduce the amount and complexity of rush darter habitat by eroding stream banks, destabilizing substrates and aquatic vegetation, and decreasing overall water quality.

In summary, population declines and degradation of habitat for the rush darter are ongoing despite the protection afforded by State and Federal laws and corresponding regulations. Despite these laws, sedimentation, flow alterations, and non-point source pollution continue to adversely affect the species. Because of the vulnerability of the small remaining populations of the rush darter and the imminence of these threats, we find the inadequacy of existing regulatory mechanisms to be a significant threat of high magnitude. Further, the information available to us at this time does not indicate that the magnitude or imminence of this threat is likely to be appreciably reduced in the foreseeable future.

Yellowcheek Darter

The Arkansas Department of Environmental Quality (ADEQ) has established water quality standards for surface waters in Arkansas, including specific standards for those streams designated as ‘‘extraordinary resource waters’’ (ERW) based on ‘‘a combination of the chemical, physical, and biological characteristics of a waterbody and its watershed, which is characterized by scenic beauty, aesthetics, scientific values, broad scope recreation potential, and intangible social values’’ (ADEQ Regulation 2, November 25, 2007). As described in ADEQ's Regulation 2, Section 2.203, ERW ‘‘shall be protected by (1) water quality controls, (2) maintenance of natural flow regime, (3) protection of in stream habitat, and (4) pursuit of land management protective of the watershed.’’ This regulatory mechanism has precluded most large-scale commercial gravel mining in the Little Red River watershed; however, illegal gravel mining is still considered a cause of habitat degradation and a threat in this watershed. The Middle, Archey, and Devils (and its major tributaries) forks are designated as ERW. The South Fork has not been designated as an ERW. The applicable water quality standards have not protected yellowcheek darter habitat from alterations and water quality degradation from traditional land use and expanding natural gas development activities.

The Arkansas Forestry Commission is the State agency responsible for establishing BMPs for timber harvests in Arkansas. BMPs for timber harvests in Arkansas are only recommendations; there is no requirement that timber harvesters include BMPs in timber operations. The BMPs are currently under revision, but the Service does not know what effect these revisions will have on aquatic habitats within the range of the species.

Natural gas production in the upper Little Red River watershed presents a unique problem for yellowcheek darter conservation. In Arkansas, mineral rights for properties supersede the surface rights. Even where private landowners agree to implement certain BMPs or conservation measures on their lands for yellowcheek darter conservation, there is no guarantee that these BMPs or conservation measures will be implemented by natural gas companies, their subsidiaries, or contractors that lease and develop the mineral rights for landowners. For this reason, the intended benefits of conservation measures agreed to by landowners in agreements such as Candidate Conservation Agreements with Assurances may never be realized. Additionally, natural gas projects often do not contain a Federal nexus that would allow the Service to comment on proposed or ongoing projects.

The Arkansas Natural Resources Commission regulates water withdrawal in Arkansas streams. To date, they have not precluded water withdrawal for natural gas development activities in the upper Little Red River watershed. The USACE regulates instream activities under the Clean Water Act. Their policy to date has been to issue permits for instream activities associated with pipeline construction and maintenance under Nationwide Permits rather than Individual Permits that require more public involvement. The ADEQ lacks the resources necessary to enforce existing regulations under the Clean Water Act and the Arkansas Water and Air Pollution Act for activities associated with natural gas development.

The yellowcheek darter receives incidental protection under the Act due to the coexistence of the Federally endangered speckled pocketbook mussel (*Lampsilis streckeri*), which occurs throughout the upper Little Red River drainage. However, this protection has been insufficient to mitigate the threats to either species.

In summary, the threats of inadequacy of existing regulatory mechanisms are imminent and considered high in magnitude. This is of particular concern in regard to the vulnerability of the species to threats from natural gas development, which is already impacting populations in the South and Middle forks of the Little Red River and is expected to intensify in the next several years throughout the range of the species. Further, the information available to us at this time does not indicate that the magnitude or imminence of this threat is likely to be appreciably reduced in the foreseeable future.

Chucky Madtom

The chucky madtom and its habitats are afforded some protection from water quality and habitat degradation under the Clean Water Act and TDEC's Division of Water Pollution Control under the TWQCA. However, as demonstrated under Factor A, population declines and degradation of habitat for this species are ongoing despite the protection afforded by these laws. While these laws have resulted in improved water quality and stream habitat for aquatic life, including the chucky madtom, they alone have not been adequate to fully protect this species; sedimentation and non-point source pollutants continue to be a significant problem. Sediment is the most abundant pollutant in the Little Chucky Creek watershed and is the greatest threat to the chucky madtom.

Portions of the Nolichucky River and its tributaries in Greene County, Tennessee, are listed as impaired (303d) by the State of Tennessee due to pasture grazing, irrigated crop production, unrestricted cattle access, land development, municipal point source discharges, septic tank failures, gravel mining, agriculture, and channelization (TDEC 2010, pp. 64–73). However, Little Chucky Creek is not listed as ''an impaired water'' by the State of Tennessee (TDEC 2010, pp. 64–73). For water bodies on the 303(d) (impaired) list, States are required under the Clean Water Act to establish a TMDL for the pollutants of concern that will bring water quality into the applicable standard. The TDEC has developed TMDLs for the Nolichucky River watershed to address the problems of fecal coliform loads, siltation, and habitat alteration by agriculture.

The chucky madtom receives incidental protection under the Act due to the coexistence of the Federally endangered Cumberland bean (*Villosa trabalis*), which is still thought to occur in Little Chucky Creek, Greene County, Tennessee (Ahlstedt pers. comm. 2008). However, this protection has been insufficient to mitigate the threats to either species.

The chucky madtom was listed as Endangered by the State of Tennessee in September of 2000. Under the Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act of 1974 (Tennessee Code Annotated §§ 70–8–101–112), ''[I]t is unlawful for any person to take, attempt to take, possess, transport, export, process, sell or offer for sale or ship nongame wildlife, or for any common or contract carrier knowingly to transport or receive for shipment nongame wildlife.'' Further, regulations included in the Tennessee Wildlife Resources Commission Proclamation 00–15 Endangered Or Threatened Species state the following: ''Except as provided for in Tennessee Code Annotated, Section 70–8–106 (d) and (e), it shall be unlawful for any person to take, harass, or destroy wildlife listed as threatened or endangered or otherwise to violate terms of Section 70–8–105 (c) or to destroy knowingly the habitat of such species without due consideration of alternatives for the welfare of the species listed in (1) of this proclamation, or (2) the United States list of Endangered fauna.'' Under these regulations, potential collectors of this species are required to have a State collection permit. However, in terms of project management, this regulation only provides for the consideration of alternatives, and does not require the level of project review afforded by the Act.

In summary, population declines and degradation of habitat for the chucky madtom are ongoing despite the protection afforded by State and Federal laws and corresponding regulations. Despite these laws, sedimentation and non-point source pollution continue to adversely affect the species. Because of the vulnerability of the small remaining populations of the chucky madtom and the imminence of these threats, we find the inadequacy of existing regulatory mechanisms to be a significant threat of high magnitude. Further, the information available to us at this time does not indicate that the magnitude or imminence of this threat is likely to be appreciably reduced in the foreseeable future.

Laurel Dace

The laurel dace and its habitats are afforded some protection from water quality and habitat degradation under the Clean Water Act and by TDEC's Division of Water Pollution Control under the TWQCA. However, as demonstrated under Factor A, population declines and degradation of habitat for this species are ongoing despite the protection afforded by these laws. While these laws have resulted in improved water quality and stream habitat for aquatic life, including the laurel dace, they alone have not been adequate to fully protect this species; sedimentation and non-point source pollutants continue to be a significant problem. Sediment is the most abundant pollutant in the watershed and one of the greatest threats to the laurel dace.

The State of Tennessee maintains water-use classifications through issuance of NPDES permits to industries, municipalities, and others that set maximum limits on certain pollutants or pollutant parameters. For water bodies on the 303(d) list, States are required under the Clean Water Act to establish a TMDL for the pollutants of concern that will bring water quality into the applicable standard. The TDEC has not identified any impaired water bodies in the Soddy Creek, the Sale Creek system, or the Piney River system (TDEC 2008).

The TWRA lists the laurel dace as endangered. Under the Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act of 1974 (Tennessee Code Annotated §§ 70–8–101–112), ''[I]t is unlawful for any person to take, attempt to take, possess, transport, export, process, sell or offer for sale or ship nongame wildlife, or for any common or contract carrier knowingly to transport or receive for shipment nongame wildlife.'' Further, regulations included in the Tennessee Wildlife Resources Commission Proclamation 00–15 Endangered Or Threatened Species state the following: ''Except as provided for in Tennessee Code Annotated, Section 70–8–106 (d) and (e), it shall be unlawful for any person to take, harass, or destroy wildlife listed as threatened or endangered or otherwise to violate terms of Section 70–8–105 (c) or to destroy knowingly the habitat of such species without due consideration of alternatives for the welfare of the species listed in (1) of this proclamation, or (2) the United States list of Endangered fauna.'' Under these regulations, potential collectors of this species are required to have a State collection permit. However, in terms of project management, this regulation only provides for the consideration of alternatives, and does not require the level of project review afforded by the Act.

In summary, population declines and degradation of habitat for the laurel dace are ongoing despite the protection afforded by State and Federal water quality laws. While these laws have resulted in improved water quality and stream habitat for aquatic life, including the laurel dace, they alone have not been adequate to fully protect this species; sedimentation and non-point source pollutants continue to be a significant problem. Non-point source pollution is not regulated by the Clean Water Act. Due to the vulnerability of the laurel dace to water quality and habitat degradation, we find the inadequacy of regulatory mechanisms that address water quality to be an imminent threat of high magnitude. Further, the information available to us at this time does not indicate that the magnitude or imminence of this threat is likely to be appreciably reduced in the foreseeable future.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Restricted Range and Population Size

The Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace have limited geographic ranges and small population sizes. Their existing populations are extremely localized, and geographically isolated from one another, leaving them vulnerable to localized extinctions from intentional or accidental toxic chemical spills, habitat modification, progressive degradation from runoff (non-point source pollutants), natural catastrophic changes to their habitat (e.g., flood scour, drought), other stochastic disturbances, and to decreased fitness from reduced genetic diversity. Potential sources of unintentional spills include accidents involving vehicles transporting chemicals over road crossings of streams inhabited by one of these five fish, or the accidental or intentional release of chemicals used in agricultural or residential applications into streams.

Species that are restricted in range and population size are more likely to suffer loss of genetic diversity due to genetic drift, potentially increasing their susceptibility to inbreeding depression, decreasing their ability to adapt to environmental changes, and reducing the fitness of individuals (Soule 1980, pp. 157–158; Hunter 2002, pp. 97–101; Allendorf and Luikart 2007, pp. 117–146). It is likely that some of the Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace populations are below the effective population size required to maintain long-term genetic and population viability (Soule 1980, pp. 162–164; Hunter 2002, pp. 105–107). The long-term viability of a species is founded on the conservation of numerous local populations throughout its geographic range (Harris 1984, pp. 93–104). These separate populations are essential for the species to recover and adapt to environmental change (Noss and Cooperrider 1994, pp. 264–297; Harris 1984, pp. 93–104). The level of isolation seen in these five species makes natural repopulation following localized extirpations virtually impossible without human intervention.

Climate Change

Climate change has the potential to increase the vulnerability of the Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace to random catastrophic events (*e.g.,* McLaughlin *et al.* 2002; Thomas *et al.* 2004). Climate change is expected to result in increased frequency and duration of droughts and the strength of storms (*e.g.,* Cook *et al.* 2004). During 2007, a severe drought affected the upper Cumberland River basin in Kentucky and Tennessee. Streamflow values for the Cumberland River at Williamsburg, Kentucky (USGS Station Number 03404000), in September and October of 2007 were among the lowest recorded monthly values (99th percentile for low-flow periods) during the last 67 years (Cinotto pers. comm. 2008). Climate change could intensify or increase the frequency of drought events, such as the one that occurred in 2007. Thomas *et al.* (2004, p. 112) report that the frequency, duration, and intensity of droughts are likely to increase in the Southeast as a result of global climate change.

Fluker *et al.* (2007, p. 10) reported that drought conditions, coupled with rapid urbanization in watersheds that contain rush darters, render the populations vulnerable, especially during the breeding season when they concentrate in wetland pools and shallow pools of headwater streams. Drought conditions from 2006 to 2007 greatly reduced spawning habitat for rush darter in Jefferson County (Drennen pers. obs. 2007). Survey numbers for the rush darter within the spring-fed headwaters for the unnamed tributary to Turkey Creek during 2007 were reduced due to a lack of water (Kuhajda pers. comm. 2008). In Winston County, Stiles and Mills (2008, pp. 5–6) noted that Doe Branch almost completely dried up during the summer of 2007 (Stiles pers. comm. 2008).

The Little Red River watershed in Arkansas experienced moderate drought conditions during 1997–2000 (Southern Regional Climate Center 2000), which reduced flows in its tributaries and affected yellowcheek darter populations. During a status survey for the species conducted in 2000, the stage height of the Little Red River was 0.3 m (1 ft) lower than what was reported during a 1979–1980 status survey of the darter (Wine *et al.* 2000, p. 7). Stream flow is strongly correlated with important physical and chemical parameters that limit the distribution and abundance of riverine species (Power *et al.* 1995, p. 159; Resh *et al.* 1988, p. 437) and it regulates the ecological integrity of flowing water systems (Poff *et al.* 1997, p. 769). During the 2000 status survey, the yellowcheek darter was not found in the upper reaches of any study streams or in the Turkey/Beech Fork reach of Devils Fork, a likely result of drought conditions. This indicates a contraction of yellowcheek darter range to stream reaches lower in the watershed where flows are maintained for a greater portion of the year (Wine *et al.* 2000, p. 11). It is possible that the perceived contraction in range occurs only during low precipitation years in north-central Arkansas. The threat of drought is imminent and moderate to high, respectively, in all four watersheds for the yellowcheek darter. Exacerbation of natural drought cycles as a result of global climate change could have detrimental effects on the species, which could continue for the foreseeable future.

Competition From Introduced Species

The Federally endangered watercress darter (*Etheostoma nuchale*) was translocated outside of its native range by the Service into Tapawingo Springs in 1988 in order to assist in the species' recovery by expanding its range (Moss 1995, p. 5). The watercress darter is now reproducing and is competing with the rush darter in Tapawingo Springs (USFWS 1993, p. 1; Drennen pers. obs. 2004; George *et al.* 2009, p. 532). In 2001, a population of watercress darters was found in the Penny Springs site (Stiles and Blanchard 2001, p. 3). The introduced watercress darter appears to be out-competing the rush darter at this site (Fluker *et al.* 2008, p. 1; George *et al.* 2009, p. 532), even though the rush darter has always been considered rare in the Tapawingo Spring area (Stiles pers. comm. 2008). Further investigation may be required to determine whether interspecific competition is occurring between the watercress darter and the rush darter at this site (Stiles pers. comm. 2008). However, Fluker *et al.* (2008, p. 1) and George *et al.* (2009, p. 532) consider the rush darter to be extirpated after completing 2 years of surveys (2008–2009) in Tapawingo Spring.

Reduced Fecundity

The low fecundity rates exhibited by many madtom catfishes (Breder and Rosen 1966 *in* Dinkins and Shute 1996, p. 58) could limit the potential for populations to rebound from disturbance events. The short lifespan exhibited by members of the *N. hildebrandi* clade (a taxonomic group of organisms classified together on the basis of homologous features traced to a common ancestor) of madtoms, if also true of chucky madtoms, would further limit the species' viability by rendering it vulnerable to severe demographic shifts from disturbances that prevent reproduction in even a single year, and could be devastating to the population if the disturbance persists for successive years.

Summary

Because the Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace all have limited geographic ranges and small population sizes, they are subject to several ongoing natural and manmade threats. Since these threats are ongoing, they are considered to be imminent. The magnitude of these threats is high for each of these species because they result in a reduced ability to adapt to environmental change. Further, the information available to us at this time does not indicate that the magnitude or imminence of this threat is likely to be appreciably reduced in the foreseeable future.

Exacerbation of natural drought cycles as a result of global climate change could have detrimental effects on these five species, which are expected to continue or increase in the future. The specific threat of global climate change is considered to be nonimminent. The Federally endangered watercress darter (*Etheostoma nuchale*) introduced into the range of the rush darter is now potentially competing with the rush darter. The low fecundity rates exhibited by many madtom catfishes could specifically affect the chucky madtom and exacerbate the problem of its recovering from disturbance events. These threats are considered moderate/low in magnitude because of the uncertainty of their effects, but are considered imminent as they are ongoing.

Determination

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace. Section 3(6) of the Act defines an endangered species as ''any species which is in danger of extinction throughout all or a significant portion of its range.'' We find that each of these five species is presently in danger of extinction throughout its entire range, based on the immediacy and magnitude of the threats described above. Based on our analysis, we have no reason to believe that the negative population trends for any of the five species addressed in this final rule will improve, nor will the effects of current threats acting on the species be ameliorated in the foreseeable future. Therefore, on the basis of the best available scientific and commercial information, we are listing the Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace as endangered under the Act.

Without the protection of the Act, these five species are in danger of extinction throughout all of their highly localized ranges. Extinction could occur within a few years, given the reduction of habitats and ranges, small population sizes, current habitat threats, and natural or human-induced catastrophic events. Furthermore, because of the immediate and ongoing significant threats to each species throughout their entire respective ranges, as described above in the five-factor analysis, we find that it is unnecessary to analyze whether there are any significant portions of ranges for each species that may warrant a different determination of status.

Critical Habitat

In the June 24, 2010 proposed listing rule (75 FR 36035) we determined that designation of critical habitat was prudent for all five species. However, we found that critical habitat was not determinable at the time, and set forth the steps we would undertake to obtain the information necessary to develop a proposed designation of critical habitat. We have completed these steps and intend to publish a proposed designation in the next few months for all five species. We were unable to include the critical habitat with the final listing rule due to an internal publishing issue requiring separate publication of proposed and final rules in the **Federal Register**.

Available Conservation Measures

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

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

Federal agency actions within the species' habitat that may require conference or consultation or both as described in the preceding paragraph include, but are not limited to, the carrying out or the issuance of permits for reservoir construction, stream alterations, discharges, wastewater facility development, water withdrawal projects, pesticide registration, mining, and road and bridge construction.

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

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

Required Determinations

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

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

National Environmental Policy Act (NEPA)

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*), need not be prepared in connection with regulations pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited in this rulemaking is available on the Internet at *http://www.regulations.gov* or upon request from the Field Supervisor, Tennessee Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this document are the staff members of the Tennessee Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

List of Subjects in 50 CFR Part 17

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

Regulation Promulgation

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as follows:

PART 17—[AMENDED]

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

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

■ 2. Amend § 17.11(h) by adding entries for ''Dace, laurel,'' ''Darter, Cumberland,'' ''Darter, rush,'' ''Darter, yellowcheek,'' and ''Madtom, chucky'' to the List of Endangered and Threatened Wildlife, in alphabetical order, under FISHES, to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
*	*	*	*	*	*	*	
FISHES							
*	*	*	*	*	*	*	
Dace, laurel	*Chrosomus saylori*	U.S.A (TN)	Entire	E	791	NA	NA
*	*	*	*	*	*	*	
Darter, Cumberland	*Etheostoma susanae.*	U.S.A. (KY, TN)	Entire	E	791	NA	NA
*	*	*	*	*	*	*	
Darter, rush	*Etheostoma phytophilum.*	U.S.A. (AL)	Entire	E	791	NA	NA
*	*	*	*	*	*	*	
Darter, yellowcheek	*Etheostoma moorei*	U.S.A. (AR)	Entire	E	791	NA	NA
*	*	*	*	*	*	*	
Madtom, chucky	*Noturus crypticus*	U.S.A. (TN)	Entire	E	791	NA	NA
*	*	*	*	*	*	*	

* * * * *

Dated: July 27, 2011.

James J. Slack,

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

[FR Doc. 2011–20018] Filed 8–8–11; 8:45 am]

BILLING CODE 4310–55–P