



## **DEPARTMENT OF THE INTERIOR**

### **Fish and Wildlife Service**

#### **50 CFR Part 17**

**[Docket No. FWS–R4–ES–2017–0094; 4500030113]**

**RIN 1018–BC52**

### **Endangered and Threatened Wildlife and Plants; Endangered Species Status for Barrens Topminnow**

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Proposed rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), propose to list the Barrens topminnow (*Fundulus julisia*), a freshwater fish from Tennessee, as an endangered species under the Endangered Species Act (Act). If we finalize this rule as proposed, it would extend the Act's protections to this species.

**DATES:** We will accept comments received or postmarked on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

Comments submitted electronically using the Federal eRulemaking Portal (see

**ADDRESSES**, below) must be received by 11:59 p.m. Eastern Time on the closing date.

We must receive requests for public hearings, in writing, at the address shown in **FOR**

**FURTHER INFORMATION CONTACT** by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** You may submit comments by one of the following methods:

- (1) *Electronically:* Go to the Federal eRulemaking Portal:

<http://www.regulations.gov>. In the Search box, enter FWS–R4–ES–2017–0094, which is the docket number for this rulemaking. Then, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rules link to locate this document. You may submit a comment by clicking on “Comment Now!”

(2) *By hard copy*: Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: FWS–R4–ES–2017–0094, U.S. Fish and Wildlife Service, MS: BPHC, 5275 Leesburg Pike, Falls Church, VA 22041-3803.

We request that you send comments only by the methods described above. We will post all comments on <http://www.regulations.gov>. This generally means that we will post any personal information you provide us (see *Public Comments*, below, for more information).

**FOR FURTHER INFORMATION CONTACT:** Mary Jennings, U.S. Fish and Wildlife Service, Tennessee Ecological Services Field Office, 446 Neal Street, Cookeville, TN 38506; telephone 931–528–6481. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800–877–8339.

## **SUPPLEMENTARY INFORMATION:**

### **Information Requested**

#### *Public Comments*

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from other concerned governmental agencies, Native American tribes, the scientific community, industry, or

any other interested parties concerning this proposed rule. We particularly seek comments concerning:

- (1) The Barrens topminnow's biology, range, and population trends, including:
  - (a) Biological or ecological requirements of the species, including habitat requirements for feeding, breeding, and sheltering;
  - (b) Genetics and taxonomy;
  - (c) Historical and current range, including distribution patterns;
  - (d) Historical and current population levels, and current and projected trends; and
  - (e) Past and ongoing conservation measures for the species, its habitat, or both.
- (2) Factors that may affect the continued existence of the species, which may include habitat modification or destruction, overutilization, disease, predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors.
- (3) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to this species and existing regulations that may be addressing those threats.
- (4) Additional information concerning the historical and current status, range, distribution, and population size of this species, including the locations of any additional populations of this species.
- (5) Information related to climate change within the range of the Barrens topminnow and how it may affect the species' habitat.
- (6) The reasons why areas should or should not be designated as critical habitat as provided by section 4 of the Act (16 U.S.C. 1531 et seq.).
- (7) Specific information on:

(a) What areas, that are currently occupied and that contain the physical and biological features essential to the conservation of the Barrens topminnow, should be included in a critical habitat designation and why;

(b) Special management considerations or protection that may be needed for the essential features in potential critical habitat areas, including managing for the potential effects of climate change; and

(c) What areas not occupied at the time of listing are essential for the conservation of the species and why.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include.

Please note that submissions merely stating support for or opposition to the action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act directs that determinations as to whether any species is an endangered or threatened species must be made “solely on the basis of the best scientific and commercial data available.”

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**.

If you submit information via <http://www.regulations.gov>, your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this

information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on <http://www.regulations.gov>.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on <http://www.regulations.gov>, or by appointment, during normal business hours, at the U.S. Fish and Wildlife Service, Tennessee Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

#### *Public Hearing*

Section 4(b)(5) of the Act requires us to conduct one or more public hearings on this proposal, if requested. Requests for a public hearing must be received within 45 days after the date of publication of this proposed rule in the *Federal Register* (see **DATES**, above) and must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule public hearings on this proposal, if requested, and announce the dates, times, and places of those hearings, as well as how to obtain reasonable accommodations, in the *Federal Register* and local newspapers at least 15 days before the hearing.

#### *Peer Review*

The purpose of peer review is to ensure that our listing determination is based on scientifically sound data, assumptions, and analyses. In accordance with our joint policy on peer review published in the *Federal Register* on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review of listing actions under the Act, we sought the expert opinions of six appropriate specialists regarding the species status assessment (SSA) that informed this proposed rule. All of

the peer reviewers have expertise in fish biology, habitat, and stressors to the Barrens topminnow. We received a response from one of the six peer reviewers, which we took into account in our SSA and this proposed rule. We invite any additional comment from the peer reviewers on the proposed rule during this public comment period; all comments received from peer reviewers will be available, along with other public comments, in the docket for this proposed rule on <http://www.regulations.gov>.

### **Previous Federal Actions**

The Barrens topminnow was initially proposed to be listed as endangered under the Act in 1977 (42 FR 65209; December 30, 1977). Because of comments received on the proposed critical habitat, the listing was postponed, and critical habitat was repropoed in 1979 (44 FR 44418; July 27, 1979); however, the proposed listing rule was withdrawn in 1980, because it was not finalized within the required 2 years (45 FR 5782; January 24, 1980, effective December 30, 1979). The Barrens topminnow was designated a Category 2 candidate species in 1982 (47 FR 58454; December 30, 1982) until that list was discontinued in 1996 (61 FR 7596; February 28, 1996), and it was not added to the revised candidate list. In 2010, the Center for Biological Diversity (CBD) petitioned the Service to list 404 aquatic, riparian, and wetland species from the southeastern United States, including the Barrens topminnow, as endangered or threatened under the Act. On September 27, 2011, the Service published a substantial 90-day finding for 374 of the 404 species, including the Barrens topminnow, soliciting information about, and initiating status reviews for, those species (76 FR 59836). In 2015, CBD filed a complaint against the Service for failure to timely complete a 12-month finding for the Barrens topminnow. In 2016, the Service entered into a settlement

agreement with CBD, which specified that a 12-month finding for the Barrens topminnow would be delivered to the *Federal Register* by December 31, 2017.

## **Background**

A thorough review of the taxonomy, life history, ecology, and overall viability of the Barrens topminnow (*Fundulus julisia*) is presented in the SSA (Service 2017; available at <http://www.regulations.gov>). In the SSA, we summarize the relevant biological data and a description of past, present, and likely future stressors, and conduct an analysis of the viability of the species. The SSA documents the results of the comprehensive biological status review for the Barrens topminnow, provides an account of the species' overall viability through forecasting of the species' condition in the future, and provides the scientific basis that informs our regulatory decision regarding whether this species should be listed as an endangered or threatened species under the Act as well as the risk analysis on which the determination is based (Service 2017, entire). The following discussion is a summary of the results and conclusions from the SSA.

### *Species Description*

The Barrens topminnow is a small, colorful fish that grows to 98 millimeters (mm) (3.9 inches (in)). As is typical of its genus, *Fundulus*, the Barrens topminnow has an upturned mouth, flattened head and back, and rounded fins with the unpaired fins set far back on the body (Etnier and Starnes 1993, pp. 360-361). Reproductive males are very showy with bright, iridescent background colors of greens and blues, with reddish orange spots and yellow fins as well as tubercles (hardened projections) on the anal fin rays. Females, juveniles, and non-reproductive males are drabber, with pale brown bodies sprinkled with darker spots on the sides (Williams and Etnier 1982, entire; Etnier and

Starnes 1993, pp. 365-366). A detailed description of scale and fin ray counts and other morphological features is provided in Williams and Etnier (1982, entire) and Etnier and Starnes (1993, p. 365).

#### *Reproduction and Lifespan*

Barrens topminnows spawn in filamentous algae near the water surface, between April and August, with peak activity occurring from May to June. Spawning occurs on multiple occasions, with a few eggs released during each spawning event. By the end of the spawning season, up to 300 eggs are released. While the maximum age of the Barrens topminnow is 4 years, adults typically live for 2 years or less, and only about one-third of individuals spawn more than one season (Rakes 1989, p. 42; Etnier and Starnes 1993, p. 366). Most individuals mature and spawn within the first year, though some of the later spawned fish are in year 2 before they spawn (Rakes 1989, entire).

Prey items consumed by Barrens topminnows consist predominantly of microcrustaceans and immature aquatic insect larvae. However, the species is a generalist feeder, also consuming small snails and terrestrial organisms such as ants and other insects that fall or wander into aquatic habitats (Rakes 1989, pp. 18-25).

#### *Habitat and Range*

Barrens topminnow habitat is restricted to springhead pools and slow-flowing areas of spring runs on the Barrens Plateau in middle Tennessee. These fish are strongly associated with abundant aquatic vegetation such as filamentous algae (*e.g.*, *Cladophora* and *Pithophora*), watercress (*Nasturtium officinale*), rushes (*Juncus*), pondweed (*Potamogeton*), and eelgrass (*Vallisneria*), and will occasionally shelter under overhanging terrestrial plants and tree roots. Barrens topminnows have only been found



in streams where the predominant source of base flow is groundwater. Due to the groundwater influence of these habitats, temperatures are relatively stable, ranging from 15 to 25 degrees Celsius (°C) (59 to 77 degrees Fahrenheit (°F)). The karst topography of the Barrens Plateau results in the presence of a number of spring systems, though not all of these have been inhabited by the Barrens topminnow. In times of drought, if the discharge of the springs is severely reduced, Barrens topminnows likely move downstream into more permanent water if suitable habitat is available.

Historically, Barrens topminnows were found in Cannon, Coffee, and Warren Counties of Tennessee in three river systems, the Elk River, Duck River, and Caney Fork River. The Elk River and Duck River flow to the Tennessee River, and the Caney Fork River flows to the Cumberland River. The small streams or springs inhabited by Barrens topminnows in each river system are separated by hundreds of miles of intervening, unsuitable, larger stream habitat; therefore the individual populations are isolated and cannot come into contact with other populations by moving downstream. Within these three systems, the Barrens topminnow was known to occur in at least 18 sites (Hurt *et al.* 2017, p. 2). It is likely that many more sites were occupied, but were either not surveyed due to lack of access to private land, or were modified to be incompatible with Barrens topminnow presence for uses such as watering livestock before surveys could be conducted.

Currently, the Barrens topminnow occurs in five sites: Marcum Spring (Ovaca Spring), Short Spring, Benedict Spring, McMahan Creek, and Greenbrook Pond. Marcum Spring and Short Spring are in the Duck River system. The remaining three springs are in the Caney Fork River system. Benedict Spring and McMahan Creek are

occupied by native stock, while the three other occupied sites were reestablished with individuals from the Caney Fork system (see discussion under *Conservation Actions and Regulatory Mechanisms*, below). Greenbrook Pond, although it ultimately drains to the Caney Fork, is outside the known historical range of the species, in Dekalb County, Tennessee. Although no longer extant at its native locality, the Pond Spring population from the Elk River system is maintained in captivity at three facilities. Collectively, these captively held topminnows form an “ark population” that is managed as part of a conservation strategy that will enable release back into the wild if Pond Spring can be restored.

Estimates of current population size by site are lacking, but recent surveys (Kuhajda *et al.* 2014, entire; Kuhajda 2017, entire) reported the number of Barrens topminnows captured (Table 1, below), providing a rough approximation of the number of topminnows in each population. Based on these samples, Benedict Spring, Marcum Spring, and Greenbrook Pond had fairly robust populations, with at least, or likely with more than, 100 individuals. The population in McMahan Creek appeared to be small relative to other occupied sites, but this difference is at least partly an artifact of sampling bias. In stream habitat such as McMahan Creek, habitat structure makes it easier for fish to avoid the seine, and fish tend to be more broadly dispersed than they are in pond-like spring habitats.

Table 1. Number of Barrens topminnows captured by site (Kuhajda 2017, entire) McMahan Creek number from 2017 sampling (Service, unpublished).

Site	Barrens Topminnows Captured (Year)
Benedict Spring	100 (2016)
McMahan Creek	10 (2017)
Marcum Spring	132 (2015)
Short Spring	30 (2015)

Greenbrook Pond	91 (2015)
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### *Species Needs*

In this section, we describe the needs of the species at the individual, population, and species level. We describe the Barrens topminnow's viability needs in terms of resiliency (ability of the populations to withstand stochastic events), redundancy (ability of the species to withstand large-scale, catastrophic events), and representation (the ability of the species to adapt to changing environmental conditions). In later sections, using various time frames and the current and projected resiliency, redundancy, and representation, we will describe the species' viability over time.

Barrens topminnows need filamentous algae or other submerged vegetation for egg deposition and cover, and consistently cool water ranging from 15 to 25 °C (59 to 77 °F) that is sufficiently clear for mating display (Rakes, 1989, entire). For feeding, they need microcrustaceans and immature aquatic insect larvae (Rakes 1989, pp. 18-25). At the larval and juvenile stage, it is essential that predation rates and competition from other fishes is low (Laha and Mattingly 2006, pp. 1, 6-10).

### *Resiliency*

For the Barrens topminnow to maintain viability, its populations or some portion thereof must be resilient. Stochastic events that affect resiliency are reasonably likely to occur infrequently, but are of a magnitude that can drastically alter the ecosystem where they happen. Classic examples of stochastic events include drought, major storms (hurricanes), fire, and landslides (Chapin et al. 2002, pp. 285-288). To be resilient to stochastic events populations of Barrens topminnow need to be sufficiently abundant, with several hundred individuals (Service 2017, p. 11) represented by adult and juvenile

age classes. The larger the range, or spatial extent, occupied by a Barrens topminnow population, the more resilient the population will be to a stochastic event. Additionally, populations need to exist in locations where environmental conditions provide suitable habitat and water quality such that adequate numbers of individuals can be supported. Without all of these factors, a population has an increased likelihood of extirpation.

### Representation

Maintaining representation in the form of genetic diversity is important to the Barrens topminnow's capacity to adapt to environmental changes. Ecological diversity, another measure of species' representation, is naturally low, as the Barrens topminnow has always been restricted to spring habitats in a single physiographic province. Based on mitochondrial DNA, genetic variation of extant populations is extremely low, and there are fixed differences between the Caney Fork system populations and the Elk River system population (Hurt et al. 2017, pp. 1, 5), which is from Pond Spring and is represented now only by individuals held in captivity. The captive Elk River population, for which there are two identified mitochondrial DNA haplotypes unique from the third haplotype present in all Caney Fork system sampled fish, should be considered an evolutionary significant unit (ESU) (Hurt et al. 2017, p. 5), a historically isolated population that is on an independent evolutionary trajectory (Moritz 1994, p. 373). Accordingly, reestablishing the captive Elk River population in the wild will be important to increasing genetic representation and species' viability.

### Redundancy

Finally, the Barrens topminnow needs to have multiple resilient populations distributed throughout its range to provide redundancy, the ability of the species to

withstand catastrophic events. The more populations, and the wider the distribution of those populations, the more redundancy the species will exhibit. Redundancy reduces the risk that a large portion of the species' range will be negatively affected by a catastrophic natural or anthropogenic event at a given point in time. Species that are well-distributed across their historical range are considered less susceptible to extinction and have higher viability than species confined to a small portion of their range (Carroll *et al.* 2010, entire; Redford *et al.* 2011, entire).

### **Summary of Biological Status and Threats**

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an “endangered species” or a “threatened species.” The Act defines an endangered species as a species that is “in danger of extinction throughout all or a significant portion of its range,” and a threatened species as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act directs us to determine whether any species is an endangered species or a threatened species because of one or more of the following factors affecting its continued existence: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals

of the species, as well as for those that may ameliorate any negative effects and those that may have positive effects.

We use the term “threat” to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term “threat” includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). A threat may encompass—either together or separately—the source of the action or condition, or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species—such as any existing regulatory mechanisms or conservation efforts. It is only after conducting this cumulative analysis of threats and the actions that may ameliorate them or have positive effects on the species, and describing the expected effect on the species now and in the foreseeable future, that the Secretary can determine whether the species meets the definition of an “endangered species” or a “threatened species.” We completed a comprehensive assessment of the biological status of the Barrens topminnow, and

prepared a report of the assessment which provides a thorough account of the species' overall viability and evaluates the cumulative effects of the five listing factors (Service 2017, entire).

### *Risk Factors*

In the SSA, we assessed the potential risk factors (*i.e.*, threats, stressors) that could be affecting the Barrens topminnow now and in the future. In this proposed rule, we will discuss only those factors in detail that could meaningfully impact the status of the species. Those risks that are not known to have effects on Barrens topminnow populations, such as collection and disease, are not discussed here.

The primary risk factor affecting the status of the Barrens topminnow is western mosquitofish (*Gambusia affinis*), a species invasive to the Barrens Plateau that preys on young topminnows, harasses older individuals, and may compete with adults for space and food (Factor C).

Western mosquitofish are native to Tennessee, but their range within the State was most likely confined to the Coastal Plain province (Etnier and Starnes 1993, p. 373), and they are not native to the Barrens Plateau. In many parts of North America, western mosquitofish were stocked in attempt to control mosquito larvae, which is presumably the means by which they were introduced to the Barrens Plateau in the mid twentieth century. Although to the best of our knowledge mosquitofish stocking stopped shortly thereafter, the species has spread and become a permanent inhabitant throughout most of the Barrens Plateau. Mosquitofish are well adapted to spread in habitats where they are introduced because they reproduce rapidly, spawning three to four cohorts per year of a few to a hundred or more individuals (Etnier and Starnes 1993, p. 373). They can move

through very shallow water and have invaded sites connected by temporarily wetted areas created by floods. Mosquitofish prey on young topminnows and harass adults, causing recruitment failure such that only the adult age class remains after a spawning season (Goldsworthy and Bettoli 2006, p. 341; Laha and Mattingly 2007, p. 9). Under most circumstances, extirpation of Barrens topminnows occurs within 3 to 5 years of mosquitofish invading a site (Service 2017, p. 32). The five extant Barrens topminnow populations are at sites free of mosquitofish.

As a consequence of the western mosquitofish invasion, the habitat available to the Barrens topminnow, and the species' range, has been curtailed (Factor A). Historically, Barrens topminnow populations were likely connected by floods and high flow events that washed individuals downstream or provided temporary connections across local stream divides. Most, if not all, pathways via flood-facilitated migration are no longer viable owing to the presence of mosquitofish. Many of the sites where the topminnow is extirpated currently have sufficient habitat quality to support populations (Kuhajda et al. 2014, entire; Kuhajda 2017, entire). Thus, it is the presence of mosquitofish rather than habitat that is limiting Barrens topminnow populations because mosquitofish prevent topminnows from colonizing previously occupied springs in their range. This reduction in connectivity contributes to reduced gene flow, which in turn reduces genetic diversity and species' representation. Additionally, the lost connectivity contributes to the diminished range (number of occupied sites), which has caused a reduction in species' redundancy.

Reduced habitat availability has exacerbated the threat of drought (Factor E), which has greatest effect on one of the two remaining native populations, at Benedict



Spring. Approximately once every 5 years, drought results in Benedict Spring drying completely or nearly so, to the point that it can no longer support the Barrens topminnow. In these years, all topminnows are removed from Benedict Spring and placed in aquaria, where they are held until water levels return. Under natural (*i.e.*, mosquitofish free) conditions, drought would not be a concern because Barrens topminnows would recolonize areas in wetter years; however, due to the widespread reduction in suitable habitat due to mosquitofish and the resulting small number of remaining populations, the loss of any population is a concern.

#### *Conservation Actions and Regulatory Mechanisms*

There have been many targeted efforts since circa 1980 to conserve the Barrens topminnow. Without these efforts it is likely the species would persist only at one site, McMahan Spring, which has not gone dry during periods of drought and is not occupied by mosquitofish. In 2001, the Barrens Topminnow Working Group, consisting of the Tennessee Wildlife Resources Agency, the Service, universities, and nonprofit organizations, was created to coordinate actions such as habitat improvement, propagation, and reintroduction of the species in the wild. Since the initiation of the stocking program, more than 44,000 Barrens topminnows have been reintroduced in 27 sites deemed to have appropriate habitat. Brood fish were taken from McMahan Creek and Benedict Spring in the Caney Fork watershed, and Pond Spring in the Elk River watershed. Reintroduction was unsuccessful at most of these sites, either because of insufficient or marginal habitat or the invasion of mosquitofish (Goldsworth and Bettoli 2005, entire). At the 2016 Working Group meeting, the decision was made to stop the stocking program because it was no longer needed to maintain populations at suitable

sites that lack mosquitofish, and at other sites, continued stocking was unlikely to establish self-sustaining populations.

One of the stocked sites, Vervilla Spring, was situated in the Caney Fork watershed on land opportunistically purchased by the Service for Barrens topminnow reintroduction. When the land came under the management of Tennessee National Wildlife Refuge, mosquitofish were present in the spring on the property and topminnows were not. To improve habitat for topminnows at the site, spring pools were deepened, a concrete low water barrier was installed, and the mosquitofish removed with a piscicide. Topminnows from Benedict Spring were then stocked above the barrier. This population was stocked in 2001, and maintained viability until 2010, when mosquitofish reinvaded the spring during a flood. In 2011, only adults were present, and by 2013, no Barrens topminnows remained in Vervilla Spring.

From the late 1980s into the 2000s, the Service's Partners for Fish and Wildlife program worked with landowners to exclude livestock from the springs and spring runs where Barrens topminnows occurred in an effort to curb sedimentation. None of these Partners agreements is currently active. However, there are still buffers that exclude livestock from topminnow habitat in place at some sites, many which have since been invaded by mosquitofish.

#### *Current Condition*

As discussed above, only five remaining populations of Barrens topminnow remain (see Table 1, above), in contrast to at least 18 identified historical populations (occupied sites) and likely several more that were extirpated without having been first identified. Thus, there has been at least a 72 percent reduction in the number of

populations in the wild. Furthermore, the number of native populations has been reduced by at least 89 percent. The only population known to be native in the Elk River watershed, from Pond Spring, is now maintained as a captive “ark population” at three facilities. In the Duck River system, native populations were extirpated by the late 1960s (Etnier and Starnes 1993, p. 366), and if there was any genetic component unique to the Duck River system, it has been lost. The only two remaining native populations are at Benedict Spring and McMahan Creek.

In summary, the current condition for each of the conservation metrics of resiliency, redundancy, and representation is low. Regarding resiliency, four of the five extant populations are of moderate size, likely with 100 individuals or more. The other population is smaller, although based on recent surveys it appears to be persisting and recruiting new cohorts each year. However, even if the number of individuals in each population is sufficient to maintain future generations, all currently occupied sites are small and vulnerable to stochastic events, so that a disturbance would adversely affect a site and its whole population equally. Regarding redundancy, at least 16 of 18 native populations (89 percent) have been lost, with only 5 populations remaining in the wild. Thus, the spatial distribution of a naturally narrow-ranging endemic has become more concentrated, making the species more susceptible to a catastrophic event. Lastly, representation has been reduced and the species’ adaptive capacity may be limited as there is little genetic variation between extant populations. Native stock from the Elk River and Duck River has been extirpated, although members of the Elk River population survive in captivity.

#### *Future Condition*

As part of the SSA, we developed three future condition scenarios to capture the range of uncertainties regarding future threats and the projected responses by the Barrens topminnow. Our scenarios included a status quo scenario, which incorporated the current risk factors continuing on the same trajectory that they are on now. We also evaluated a best case scenario, under which management actions to exclude mosquitofish and reintroduce populations would occur. Finally, we evaluated a worst case scenario, under which no management actions would be applied and climate change would increase the frequency and magnitude of droughts and floods. Regarding the likelihood of each scenario transpiring, in the near future (3- to 5-year time frame), the status quo scenario was predicted to be “very likely” and best case and worst case scenarios were “unlikely.” For the SSA, the terms “very likely” and “unlikely” as they apply to confidence are 70–90 percent certain and 10–40 percent certain, respectively (IPCC 2014, p. 2). In 20 to 30 years, the time frame constituting the extent of the foreseeable future, beyond which there is insufficient confidence in how threats will act, the best case scenario was predicted to be “unlikely” and the status quo and worst case scenarios were “as likely as not,” defined as having a 40–70 percent certainty of occurrence (IPCC 2014, p. 2). Because we determined that the current condition of the Barrens topminnow was consistent with that of an endangered species (see **Determination**, below), and that it is very likely the current condition will persist through the near future, we are not presenting in any more detail how each scenario would likely act on species viability. Please refer to the SSA (Service 2017, pp. 32–42) for the full analysis of future scenarios.

## **Determination**

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of “endangered species” or “threatened species.” The Act defines an endangered species as any species that is “in danger of extinction throughout all or a significant portion of its range” and a threatened species as any species “that is likely to become endangered throughout all or a significant portion of its range within the foreseeable future.” We have carefully assessed the best scientific and commercial information available and find that the Barrens topminnow is presently in danger of extinction throughout its entire range based on the severity and immediacy of threats currently impacting the species.

The overall range of the Barrens topminnow has been significantly reduced (Factor A), and its remaining populations are threatened by mosquitofish (Factor C), drought, and small population size (Factor E) acting in combination to reduce the overall viability of the species. The risk of extinction is high because the remaining populations have a high risk of extirpation, are isolated, and have no potential for recolonization without intervening management actions. Therefore, on the basis of the best available scientific and commercial information, we propose listing the Barrens topminnow as endangered in accordance with sections 3(6) and 4(a)(1) of the Act. We find that a threatened species status is not appropriate for the Barrens topminnow, as it is already in danger of extinction throughout its range because of the currently contracted range (loss of 79 percent of occupied sites), because the threats are occurring across the entire range of the species, and because the threats are ongoing currently and are expected to continue into the future.

Under the Act and our implementing regulations, a species may warrant listing if it is endangered or threatened throughout all or a significant portion of its range. Because we have determined that the Barrens topminnow is endangered throughout all of its range, no portion of its range can be “significant” for purposes of the definitions of “endangered species” and “threatened species.” See the Final Policy on Interpretation of the Phrase “Significant Portion of Its Range” in the Endangered Species Act’s Definitions of “Endangered Species” and “Threatened Species” (79 FR 37578; July 1, 2014).

### **Available Conservation Measures**

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

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

and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning includes the development of a recovery outline when a species is listed and preparation of a draft and final recovery plan. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Subsequently, a recovery plan identifies recovery criteria for review of when a species may be ready for downlisting or delisting, and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. We intend to make a recovery outline available to the public concurrent with the final listing rule, if listing continues to be warranted. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our website

(<http://www.fws.gov/endangered>), or from our Tennessee Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species

cannot be accomplished solely on Federal lands because their ranges may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands. If this species is listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the State of Tennessee would be eligible for Federal funds to implement management actions that promote the protection or recovery of the Barrens topminnow. Information on our grant programs that are available to aid species recovery can be found at: <http://www.fws.gov/grants>.

Although the Barrens topminnow is only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery efforts for this species. Additionally, we invite you to submit any new information on this species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that



activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into 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 issuance of section 404 Clean Water Act (33 U.S.C. 1251 et seq.) permits by the U.S. Army Corps of Engineers, construction and maintenance of roads or highways by the Federal Highway Administration, construction and maintenance of utility corridors by the Tennessee Valley Authority, and construction and maintenance of natural gas or oil pipeline corridors by the Federal Energy Regulatory Commission.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to endangered wildlife. The prohibitions of section 9(a)(1) of the Act, codified at 50 CFR 17.21, make it illegal for any person subject to the jurisdiction of the United States to take (which includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these) endangered wildlife within the United States or on the high seas. In addition, it is unlawful to import; export; deliver, receive, carry, transport, or ship in interstate or foreign commerce in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any listed species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to employees of the Service, the National Marine Fisheries Service, other Federal land management agencies, and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22. With regard to endangered wildlife, a permit may 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. There are also certain statutory exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing. Based on the best available information, if we list this species, the following actions are unlikely to result in a violation of section 9, if these activities are carried out in accordance with existing regulations and permit requirements; this list is not comprehensive:

(1) Normal agricultural and silvicultural practices, including herbicide and pesticide use, which are carried out in accordance with any existing regulations, permit and label requirements, and best management practices; and

(2) Normal residential landscape activities.

Based on the best available information, if we list this species, the following activities may potentially result in a violation of section 9 of the Act; this list is not comprehensive:

- (1) Intentional release of mosquitofish into occupied Barrens topminnow habitat;
- (2) Unauthorized handling or collecting of the species;
- (3) Modification of the water flow of any spring or stream in which the Barrens topminnow is known to occur;
- (4) Direct or indirect destruction of stream habitat; and
- (5) Discharge of chemicals or fill material into any waters in which the Barrens topminnow is known to occur.

Questions regarding whether specific activities would constitute a violation of section 9 of the Act should be directed to the Tennessee Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

### **Critical Habitat**

#### *Background*

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

- (1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features:
  - (a) Essential to the conservation of the species, and
  - (b) Which may require special management considerations or protection; and
- (2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened

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

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

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR

34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

#### *Prudency Determination*

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12), require that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time the species is determined to be endangered or threatened. Our regulations (50 CFR 424.12(a)(1)) state that the designation of critical habitat is not prudent when one or both of the following situations exist: (1) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or (2) such designation of critical habitat would not be beneficial to the species.

As discussed above and in the SSA, there is currently no imminent threat to the Barrens topminnow of take attributed to collection or vandalism (Factor B), and identification and mapping of critical habitat would not likely to increase any such threat. In the absence of finding that the designation of critical habitat would increase threats to a species, if there are any benefits to a critical habitat designation, then a prudent finding is warranted. The potential benefits of designation include: (1) Triggering consultation under section 7 of the Act in new areas for actions in which there may be a Federal nexus

where it would not otherwise occur because, for example, it is or has become unoccupied or the occupancy is in question; (2) focusing conservation activities on the most essential features and areas; (3) providing educational benefits to State or county governments or private entities; and (4) preventing people from causing inadvertent harm to the species. Therefore, because we have determined that the designation of critical habitat will not likely increase the degree of threat to these species and may provide some measure of benefit, we find that designation of critical habitat is prudent for the Barrens topminnow.

#### *Critical Habitat Determinability*

Having determined that designation is prudent, under section 4(a)(3) of the Act we must find whether critical habitat for the species is determinable. Our regulations at 50 CFR 424.12(a)(2) state that critical habitat is not determinable when one or both of the following situations exist: (1) Information sufficient to perform required analyses of the impacts of the designation is lacking, or (2) The biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat. As discussed above, we have reviewed the available information pertaining to the biological needs of this species and the habitat characteristics where this species is located. However, a careful assessment of the economic impacts that may occur due to a critical habitat designation is ongoing, and we are in the process of working with the States and other partners in acquiring the complex information needed to perform that assessment. Until these efforts are complete, information sufficient to perform a required analysis of the impacts of the designation is lacking, and, therefore, we find designation of critical habitat for this species to be not determinable at this time. However, we expect to have

the necessary information, and publish a proposed rule in the *Federal Register*, in the near future.

## **Required Determinations**

### *Clarity of the Rule*

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

- (1) Be logically organized;
- (2) Use the active voice to address readers directly;
- (3) Use clear language rather than jargon;
- (4) Be divided into short sections and sentences; and
- (5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

### *National Environmental Policy Act (42 U.S.C. 4321 et seq.)*

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act, need not be prepared in connection with listing a species as an endangered or threatened species under the Endangered Species 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 references cited is available in Appendix A of the SSA (Service 2017. Species Status Assessment Report for the Barrens Topminnow (*Fundulus julisia*), Version 1.0. Cookeville, TN), available online at <http://www.regulations.gov> under Docket No. FWS–R4–ES–2017–0094.

## Authors

The primary authors of this proposed rule are the staff members of the Tennessee Ecological Services Field Office.

## List of Subjects in 50 CFR Part 17

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

## Proposed Regulation Promulgation

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

### **PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS**

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

AUTHORITY: 16 U.S.C. 1361-1407; 1531-1544; and 4201-4245, unless otherwise noted.

2. Amend § 17.11(h) by adding an entry for “Topminnow, Barrens” to the List of Endangered and Threatened Wildlife in alphabetical order under FISHES to read as follows:



**§ 17.11 Endangered and threatened wildlife.**

\* \* \* \* \*

(h) \* \* \*

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
* * * * *	* *			
FISHES				
* * * * *	* *			
Topminnow, Barrens	<i>Fundulus julisia</i>	Wherever found	E	[Insert <b>Federal Register</b> citation when published as a final rule]
* * * * *	* *			

Dated: 3 Dec 2017

Signed: James W. Kurth  
Deputy Director  
for U.S. Fish and Wildlife Service,  
Exercising the Authority of the Director  
for U.S. Fish and Wildlife Service.

**Billing Code 4333–15**

[FR Doc. 2017-28491 Filed: 1/3/2018 8:45 am; Publication Date: 1/4/2018]