Acquisition Regulations System, telephone 703–717–8226.

SUPPLEMENTARY INFORMATION: This final rule amends the DFARS to make needed editorial changes to 48 CFR part 212. Section 212.301(f)(vii) is amended to list the clauses in numerical order. Sections 212.503 and 212.504 are revised to list the statutory entries in numerical and alphabetical order, and add the descriptive term ''(prohibits mandatory arbitration)'' at the redesignated section 212.503 paragraph (vii) and section 212.504 paragraph (xiv). A typographical error is corrected at section 228.371.

List of Subjects in 48 CFR Parts 212 and 228

Government procurement.

Jennifer D. Johnson,

Editor/Publisher, Defense Acquisition Regulations System.

Therefore, 48 CFR parts 212 and 228 are amended as follows:

■ 1. The authority citation for 48 CFR parts 212 and 228 continues to read as follows:

Authority: 41 U.S.C. 1303 and 48 CFR chapter 1.

PART 212—ACQUISITION OF COMMERCIAL PRODUCTS AND COMMERCIAL SERVICES

■ 2. Amend section 212.301 by—
■ a. Removing paragraph (f)(vii)(C);
■ b. Redesignating paragraphs(f)(vii)(A) and (B) as paragraphs (f)(vii)(B) and (C), respectively; and
■ c. Adding a new paragraph (f)(vii)(A).

The addition reads as follows:

212.301 Solicitation provisions and contract clauses for the acquisition of commercial products and commercial services.

* * * * *

(f) * * *

(vii) * * *

(A) Use the provision at 252.219–7000, Advancing Small Business Growth, as prescribed in 219.309(1), to comply with 10 U.S.C. 4959.

* * * * *

■ 3. Amend section 212.503 by revising paragraphs (a)(iii) through (viii) and (c)(i) and (ii) to read as follows:

212.503 Applicability of certain laws to Executive agency contracts for the acquisition of commercial products and commercial services.

(a) * * *

(iii) 10 U.S.C. 3845, Contractor Inventory Accounting System Standards (see 252.242–7004).

(iv) 10 U.S.C. 4651, note prec. (section 855, Pub. L. 117–81), Employment Transparency Regarding Individuals Who Perform Work in the People's Republic of China.

(v) 10 U.S.C. 4656(a), Prohibition on Persons Convicted of Defense Related Felonies.

(vi) 10 U.S.C. 4753(b), Requirement to Identify Suppliers.

(vii) Section 8116 of the Defense Appropriations Act for Fiscal Year 2010 (Pub. L. 111–118) (prohibits mandatory arbitration) and similar sections in subsequent DoD appropriations acts.

(viii) Domestic Content Restrictions in the National Defense Appropriations Acts for Fiscal Years 1996 and Subsequent Years, unless the restriction specifically applies to commercial products or commercial services. For the restriction that specifically applies to commercial ball or roller bearings as end items, see 225.7009–3 (section 8065 of Pub. L. 107–117).

(c) * * *

(i) 10 U.S.C. 3703, Truthful Cost or Pricing Data (see FAR 15.403–1(b)(3)).

(ii) 10 U.S.C. 4655, Prohibition on Limiting Subcontractor Direct Sales to the United States (see FAR 3.503 and 52.203–6).

■ 4. Amend section 212.504 by revising paragraphs (a)(i) through (xv) to read as follows:

212.504 Applicability of certain laws to subcontracts for the acquisition of commercial products and services.

(a) * * *

(i) 10 U.S.C. 2391 note, Notification of Substantial Impact on Employment.

(ii) 10 U.S.C. 2631, Transportation of Supplies by Sea (except as provided in the clause at 252.247–7023, Transportation of Supplies by Sea).

(iii) 10 U.S.C. 3321(b), Prohibition on Contingent Fees.

(iv) 10 U.S.C. 3741–3750, Allowable Costs Under Defense Contracts.

(v) 10 U.S.C. 3841(d), Examination of Records of a Contractor.

(vi) 10 U.S.C. 3845, Contractor Inventory Accounting System Standards.

(vii) 10 U.S.C. 4651, note prec. (section 855, Pub. L. 117–81), Employment Transparency Regarding Individuals Who Perform Work in the People's Republic of China.

(viii) 10 U.S.C. 4654, Prohibition Against Doing Business with Certain Offerors or Contractors.

(ix) 10 U.S.C. 4656(a), Prohibition on Persons Convicted of Defense Related Felonies.

(x) 10 U.S.C. 4753(b), Requirement to Identify Suppliers.

(xi) 10 U.S.C. 4801 note prec., Notification of Proposed Program Termination.

(xii) 10 U.S.C. 4864, Miscellaneous Limitations on the Procurement of Goods Other Than United States Goods.

(xiii) 10 U.S.C. 4871, Reporting Requirement Regarding Dealings with Terrorist Countries.

(xiv) Section 8116 of the Defense Appropriations Act for Fiscal Year 2010 (Pub. L. 111–118) (prohibits mandatory arbitration) and similar sections in subsequent DoD appropriations acts.

(xv) Domestic Content Restrictions in the National Defense Appropriations Acts for Fiscal Years 1996 and Subsequent Years, unless the restriction specifically applies to commercial products and commercial services. For the restriction that specifically applies to commercial ball or roller bearings as end items, see 225.7009–3 (section 8065 of Pub. L. 107–117).

* * * * *

PART 228—BONDS AND INSURANCE

228.371 [Amended]

■ 5. Amend section 228.371 in paragraph (b)(2) by removing ''228.371–3'' and adding ''228.370–3'' in its place.

[FR Doc. 2023–08647 Filed 4–26–23; 8:45 am]

BILLING CODE 5001–06–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R3–ES–2019–0020; FF09E21000 FXES1111090FEDR 234]

RIN 1018–BD98

Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for Big Creek Crayfish and St. Francis River Crayfish and Designation of Critical Habitat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), determine threatened species status under the Endangered Species Act of 1973 (Act), as amended, for the Big Creek crayfish (*Faxonius peruncus*) and the St. Francis River crayfish (*Faxonius quadruncus*), two crayfish species from southern Missouri. We also finalize a rule under the authority of section 4(d) of the Act that provides regulatory measures that are necessary and advisable to provide for the conservation of these species. In addition, we designate critical habitat for the species; in total, approximately 1,069 river miles (1,720 river

kilometers) for the Big Creek crayfish and 1,043 river miles (1,679 river kilometers) for the St. Francis River crayfish in Iron, Madison, St. Francois, Washington, and Wayne Counties, Missouri, fall within the boundaries of the critical habitat designations. This rule applies the protections of the Act to these species and their designated critical habitats.

DATES: This rule is effective May 30, 2023.

ADDRESSES: This final rule is available on the internet at *https://www.regulations.gov and https://www.fws.gov/midwest/*. Comments and materials we received, as well as supporting documentation we used in preparing this rule, are available for public inspection at *https://www.regulations.gov at* Docket No. FWS–R3–ES–2019–0020.

The coordinates or plot points or both from which the maps are generated are included in the decision file for the critical habitat designations and are available at *https://www.regulations.gov* at Docket No. FWS–R3–ES–2019–0020, and at the field office responsible for the designations (see **FOR FURTHER INFORMATION CONTACT**, below). Any additional tools or supporting information that we developed for the critical habitat designations will also be available at the Service's website and at *https://www.regulations.gov.*

FOR FURTHER INFORMATION CONTACT: John Weber, Field Supervisor; U.S. Fish and Wildlife Service; Missouri Ecological Services Field Office; 101 Park DeVille Drive, Suite A; Columbia, MO 65203–0057; telephone 573–234–2132. Individuals in the United States who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY, TDD, or TeleBraille) to access telecommunications relay services. Individuals outside the United States should use the relay services offered within their country to make international calls to the point-of-contact in the United States.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, a species warrants listing if it meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become endangered within the foreseeable future throughout all or a significant portion of its range). If we determine that a species warrants listing, we must list the species promptly and designate the species' critical habitat to the maximum extent prudent and determinable. We have determined that the Big Creek crayfish and the St. Francis River crayfish both meet the definition of threatened species; therefore, we are listing them as such and finalizing designations of critical habitat for both species. Both listing a species as an endangered or threatened species and designating critical habitat can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process.

What this document does. This rule lists the Big Creek crayfish (*Faxonius peruncus*) and the St. Francis River crayfish (*Faxonius quadruncus*) as threatened species and designates critical habitat for both species. We are designating approximately 1,069 river miles (1,720 river kilometers) for the Big Creek crayfish and 1,043 river miles (1,679 river kilometers) for the St. Francis River crayfish in Iron, Madison, St. Francois, Washington, and Wayne Counties, Missouri. We are also finalizing a rule under the authority of section 4(d) of the Act that provides measures that are necessary and advisable to provide for the conservation of these species.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species based on any of five factors: (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. We have determined that displacement (Factor E) by the woodland crayfish (*Faxonius hylas*) is the primary threat to both the Big Creek crayfish and the St. Francis River crayfish. However, degraded water quality (Factor A) from heavy metal mining activities in the watershed is impacting the species and may act synergistically with the spread of the nonnative woodland crayfish and subsequent displacement of the Big Creek crayfish and St. Francis River crayfish. The existing regulatory mechanisms are not adequately addressing these threats such that the species do not warrant listing (Factor D).

Section 4(a)(3) of the Act requires the Secretary of the Interior (Secretary) to designate critical habitat concurrent with listing to the maximum extent prudent and determinable. Section 3(5)(A) of the Act defines critical habitat as (i) the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protections; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary that such areas are essential for the conservation of the species. Section 4(b)(2) of the Act states that the Secretary must make the designation on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts of specifying any particular area as critical habitat.

Previous Federal Actions

On September 17, 2020, we published in the **Federal Register** (85 FR 58192) a proposed rule to list the Big Creek crayfish and the St. Francis River crayfish as threatened species under the Act, to adopt a species-specific rule issued under section 4(d) of the Act (''4(d) rule'') that provides for the protection of the Big Creek crayfish and the St. Francis River crayfish, and to designate critical habitat for both species under the Act. Please refer to that proposed rule for a detailed description of previous Federal actions concerning this species.

During the public comment period for the September 17, 2020, proposed rule, we received a request for a public hearing. On April 27, 2021, we published a document (86 FR 22127) reopening the September 17, 2020, proposed rule's comment period for an additional 30 days and announcing a public informational meeting and public hearing on the proposed rule. We held the virtual public informational meeting followed by a public hearing on May 13, 2021.

Summary of Changes From the Proposed Rule

The final rule incorporates changes to our September 17, 2020, proposed rule (85 FR 58192) and our species status assessment report based on the comments we received, as discussed below under Summary of Comments and Recommendations. We have also revised our significant portion of the range analysis.

Based on information we received in comments and our further consideration, in this rule, we refine the 4(d) rule for these species to more clearly define take prohibitions and to accurately regulate only those activities that are necessary and advisable for the protection of the Big Creek crayfish and the St. Francis River crayfish (see

Provisions of the 4(d) Rule, below). The Missouri Department of Conservation (MDC) informed us that adopting two of the exceptions to the prohibitions in the proposed 4(d) rule (the exceptions to the incidental take prohibitions for a person capturing crayfish for educational and observation purposes, and for a person capturing and possessing up to 25 of each species for use as bait) would conflict with the Wildlife Code of Missouri (Missouri Code). Under the Missouri Code, any species added to the Federal List of Endangered and Threatened Wildlife is also added to Missouri's State list of endangered species. Because the Missouri Code also prohibits the purposeful take of any species listed by the State as endangered, allowing capture of the crayfishes for educational and observation purposes and for use as bait would be in direct conflict with the Missouri Code and hinder the MDC's ability to conserve the species. The MDC also expressed concerns that these two exceptions would hinder the enforcement of the prohibition on activities that may facilitate the introduction or spread of the invasive woodland crayfish. After reviewing the MDC's comment and further coordinating with the State of Missouri, we conclude that adopting those two exceptions to the prohibitions in the 4(d) rule would undermine the State's ability to provide conservation for the species, and we do not include them in this final rule.

In this rule, we also expand the exception to the prohibitions in the proposed 4(d) rule concerning incidental take caused by restoration activities or other activities that will result in an overall benefit to one or both of the species. In this exception, we now include the additional restoration activity of replacing in-stream low water crossings that obstruct movement of aquatic organisms with crossings that facilitate the movement of species and materials. Replacing these crossings is expected to result in an overall benefit to one or both species and including it as an exception is an additional activity that we would expect to be beneficial to the conservation of the species. We removed mention of specific Federal agencies that we may consult with on these activities. We removed the list of Federal agencies to reduce confusion, as we would consult whenever a Federal nexus exists, not only with the Federal agencies we specifically named in the proposed 4(d) rule. We also added ''surface and groundwater withdrawals'' to the list of prohibited activities that could impact the hydrological flows such that the species' reproduction or survival will be impacted, in an effort to provide a more detailed list of such activities.

Lastly, in this critical habitat designation, we do not include ''[s]paces under rocks or shallow burrows in gravel that provide refugia'' as a physical or biological feature. That physical and biological feature, which was included in the proposed designation, is redundant with the following physical or biological feature that remains in this designation: ''Adequately low stream embeddedness so that spaces under rocks and cavities in gravel remain available to the Big Creek crayfish and St. Francis River crayfish.''

Supporting Documents

A species status assessment (SSA) team prepared an SSA report for the Big Creek crayfish and the St. Francis River crayfish. The SSA team was composed of Service biologists, in consultation with other species experts. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species.

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 solicited independent scientific review of the information contained in the SSA report. We sent the SSA report to four independent peer reviewers and received one response. The peer reviews can be found at *https://www.regulations.gov.* In preparing the proposed rule, we incorporated the results of these reviews, as appropriate, into the SSA report, which was the foundation for the proposed rule and this final rule.

I. Final Listing Determination

Background

A thorough review of the taxonomy, life history, and ecology of the Big Creek crayfish and the St. Francis River crayfish is presented in the SSA report (Service 2022, entire).

The Big Creek crayfish (*Faxonius peruncus*) is a small, olive-tan crayfish with blackish blotches and specks over the upper surface of pincers, carapace, and abdomen. Length of adult individuals ranges from 1.1 to 2.2 inches (in) (2.8 to 5.6 centimeters (cm)). The St. Francis River crayfish (*Faxonius quadruncus*) is a small, dark brown crayfish with blackish blotches or specks over the upper surfaces of the pincers, carapace, and abdomen. Lengths of adult individuals of St. Francis River crayfish have been observed to be similar to adult Big Creek crayfish.

Both the Big Creek crayfish and the St. Francis River crayfish have localized distributions in the Upper St. Francis River watershed upstream of Wappapello Dam in Iron, Madison, St. Francois, Washington, and Wayne Counties in southeastern Missouri (see figure 1, below). The Big Creek crayfish appears most abundant in Big Creek and other streams on the west side of the watershed, as well as in the Twelvemile Creek subwatersheds on the east side; the St. Francis River crayfish mainly inhabits the upper St. Francis River tributaries on the upper end of the Upper St. Francis River watershed. Despite occupying the Upper St. Francis River watershed at a coarse spatial scale, these two species have been observed at the same location only seven times and exhibit mostly discrete distributions (Westhoff 2011, pp. 34–36).

Big Creek crayfish are generally found in streams with widths less than 33 feet (ft) (10 meters (m)) under small rocks or in shallow burrows in headwater streams and small rocky creeks in shallow depths. St. Francis River crayfish are generally found in swiftly moving streams under rocks and boulders in small headwater streams and up to moderately larger rivers. St. Francis River crayfish may prefer pool/backwater areas and run macrohabitats over faster riffles.

Given that both the Big Creek crayfish and St. Francis River crayfish are habitat generalists (Westhoff 2017, pers. comm.) and not all reaches of streams within the watershed have been sampled, it is likely that the species occur at more locations in the watershed. Therefore, we defined the species' ranges as the streams within subwatersheds (12-digit hydrologic units) known to be occupied by each species. We consider these ranges to be a more accurate depiction of the actual ranges of the Big Creek crayfish and St. Francis River crayfish than using only known locations. Within the St. Francis River mainstem (where it is a 5th order stream), the Big Creek crayfish also intermittently occurs in 86 river miles (rmi) (139 river kilometers (km)), and the St. Francis River crayfish occurs in 99 rmi (159 km). Thus, the Big Creek crayfish is found in 1,069 rmi (1,720 km) and the St. Francis River Crayfish is found in 1,043 rmi (1,679 km) in the Upper St. Francis watershed.

Individuals of the Big Creek crayfish and St. Francis River crayfish mate in the fall. Big Creek crayfish females generate an average of 61 eggs, and St. Francis River crayfish females generate an average of 43 to 81 eggs (Pflieger 1996, pp. 116, 122). The normal lifespan for both the Big Creek crayfish and the St. Francis River crayfish appears to be about 2 years (Pflieger 1996, pp. 116, 122). We presume that both species' feeding habits are similar to those of other crayfish species in the region, and their diets likely consist of plant detritus, periphyton, and invertebrates.

Based on genetic analyses (Fetzner and DiStefano 2008, pp. 12–15), we consider the Big Creek crayfish species to consist of two populations (referred to as the Main and Twelvemile Creek populations), whereas the St. Francis River crayfish species consists of a single population (see figure 1, below). We have no evidence to indicate that there has been a reduction in the number of populations for either species from historical conditions. For analytical purposes and for better representation of groups of individuals that occupy the same area and are subject to the same environmental pressures, we defined finer-scale subpopulations. We consider a subpopulation to be those individuals that are able to interbreed and occur within the same stream reach of occupied habitat. Therefore, multiple subpopulations make up the single population (and species) of the St. Francis River crayfish, and multiple subpopulations make up the two populations of the Big Creek crayfish. For Big Creek crayfish and St. Francis River crayfish subpopulations to be healthy, they require a population size and growth rate sufficient to withstand natural environmental fluctuations and habitat of sufficient quantity and quality to support all life stages (specific details of each of these requirements remains unclear). Healthy subpopulations of each species also require gene flow among subpopulations and a native community structure free from nonnative crayfish species that may outcompete and ultimately displace the two species (for more information, see chapter 2 of the SSA report).

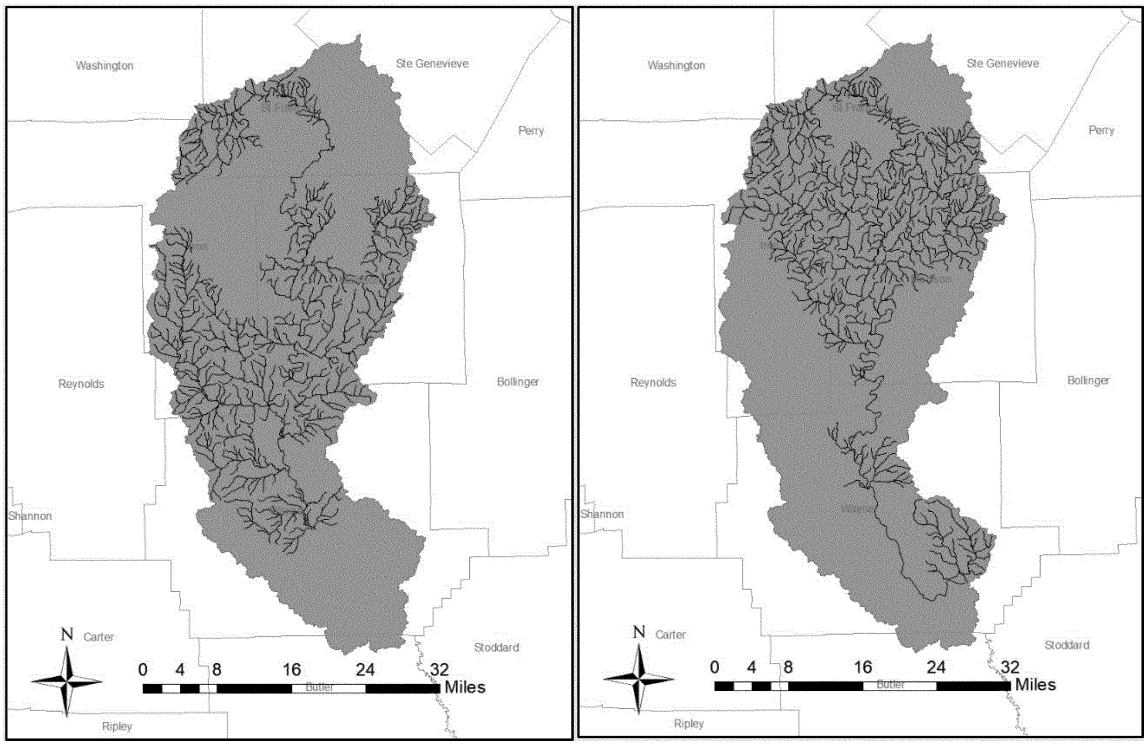

Figure 1. Range of the Big Creek crayfish (left) and St. Francis River crayfish (right) in Missouri.

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and the implementing regulations in title 50 of the Code of Federal Regulations set forth the procedures for determining whether a species is an endangered species or a threatened species, issuing protective regulations for threatened species, and designating critical habitat for endangered and threatened species. In 2019, jointly with the National Marine Fisheries Service, the Service issued a final rule that revised the regulations in 50 CFR part 424 regarding how we add, remove, and reclassify endangered and threatened species and the criteria for designating listed species' critical habitat (84 FR 45020; August 27, 2019). On the same day, the Service also issued final regulations that, for species listed as threatened species after September 26, 2019, eliminated the Service's general protective regulations automatically applying to threatened species the prohibitions that section 9 of the Act applies to endangered species (84 FR 44753; August 27, 2019).

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 requires that we determine whether any species is an endangered species or a threatened species because of any of the following factors:

(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 other actions or conditions that may ameliorate any negative effects or 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). The term ''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 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. The Secretary determines whether the species meets the definition of an ''endangered species'' or a ''threatened species'' only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

The Act does not define the term ''foreseeable future,'' which appears in the statutory definition of ''threatened species.'' Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term ''foreseeable future'' extends only so far into the future as the Services can reasonably determine that both the future threats and the species' responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. ''Reliable'' does not mean ''certain''; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions. It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species' likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an assessment of the potential threats to the species. The SSA report does not represent our decision on whether the species should be listed as an endangered or threatened species under the Act. However, it does provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies.

To assess the viability of the Big Creek crayfish and the St. Francis River crayfish, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency supports the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years), redundancy supports the ability of the species to withstand catastrophic events (for example, droughts, large pollution events), and representation supports the ability of the species to adapt over time to long-term changes in the environment (for example, climate changes). In general, the more resilient and redundant a species is and the more representation it has, the more likely it is to sustain populations over time, even under changing environmental conditions. Using these principles, we identified the species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated the individual species' life-history needs. The next stage involved an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involved making predictions about the species' responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we used the best available information to characterize viability as the ability of a species to sustain populations in the wild over time. We use this information to inform our regulatory decision.

The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket No. FWS–R3–ES–2019–0020 on *https://www.regulations.gov.*

Summary of Biological Status and Threats

In this discussion, we review the biological condition of the species and its resources, and the threats that influence the species' current and future condition, in order to assess the species' overall viability and the risks to that viability.

The primary threat to the future viability of the Big Creek crayfish and the St. Francis River crayfish is displacement by a nonnative crayfish species (woodland crayfish). Currently, no means to slow or stop the spread of the woodland crayfish exist. Contamination from heavy metal mining and habitat degradation from sedimentation also affect the species' viabilities. A brief summary of these stressors is presented below; for a full description of these stressors, refer to chapter 3 of the SSA report for each species (USFWS 2022, pp. 13–22).

Nonnative Crayfish

The introduction of nonnative crayfish is one of the primary factors contributing to declining crayfish populations (Taylor et al. 2007, p. 374). Nonnative crayfish species can displace native crayfishes through competition, differential predation, reproductive interference or hybridization, disease transmission, or a combination of these mechanisms (Lodge *et al.* 2000, pp. 9, 12).

Reproductive interference in the form of hybridization may be the main mechanism driving the displacement of the Big Creek crayfish and the St. Francis River crayfish. Woodland crayfish have been observed engaging in mating behavior with St. Francis River crayfish (Westhoff 2011, p. 117). There is also genetic evidence of hybridization between the woodland crayfish and the Big Creek crayfish, as well as between the woodland crayfish and the St. Francis River crayfish (Fetzner et al. 2016 pp. 19–26). Alleles from both parental species have been detected in individuals in areas invaded by the woodland crayfish, which suggest that both native species readily hybridize with the woodland crayfish (Fetzner *et al.* 2016, p. 28). Genetic swamping (a process by which the local genotype is replaced) appears to be the mechanism that leads to the eventual full displacement of the native species of crayfish, as at least some of the hybrid young appear to be viable (Fetzner *et al.* 2016, p. 29).

In 1984, the woodland crayfish, endemic to southeastern Missouri, was first documented in the Upper St. Francis River watershed, which is outside of its native range (Pflieger 1996, p. 82). It is estimated that by 2008 (22 years later), the crayfish had invaded 5 to 20 percent of the total 3,225 rmi in the watershed (DiStefano and Westhoff 2011, p. 40). Within areas invaded by the woodland crayfish, the distribution and abundance of the Big Creek crayfish and St. Francis River crayfish have been substantially impacted. In one stream, the Big Creek crayfish constituted 87 percent of the crayfish community in areas not invaded by the woodland crayfish, but only 27 percent in invaded areas (DiStefano and Westhoff 2011, p. 40). Similarly, the St. Francis crayfish constituted 50 percent of the crayfish community in uninvaded areas, but only 13 percent in invaded areas of the stream. In the invaded areas of these streams, the woodland crayfish had become the dominant species, constituting 57 to 86 percent of the crayfish community (DiStefano and Westhoff 2011, p. 40).

The woodland crayfish's impact on abundance of the Big Creek crayfish and St. Francis River crayfish has resulted in the range contraction of both of the native species. In one stream, the range of the Big Creek crayfish contracted 9.1 rmi (14.7 km) from 2004 to 2009, simultaneously with the woodland crayfish's expansion in the stream (DiStefano and Westhoff 2011, p. 40). In three other streams, the range of the St. Francis River crayfish contracted in conjunction with the woodland crayfish's invasion (Riggert et al. 1999, p. 1999; DiStefano 2008, p. 419).

The known locations of the woodland crayfish are likely an under-representation of where the species is present in the watershed, given that: (1) The majority of locations were documented prior to 2010, and the species can expand at a rate as high as 745 yards (yd) per year (681 meters (m) per year) in the upstream direction and 2,499 yd per year (2,285 m per year) in the downstream direction (DiStefano and Westhoff 2011, pp. 38, 40); and (2) the woodland crayfish has already been introduced at several locations throughout the watershed and has likely been introduced at additional, undocumented locations (it is not feasible to survey every stream throughout the watershed).

Contamination by Heavy Metal Mining

Approximately 22 percent of the Big Creek crayfish's range and 16 percent of the St. Francis River crayfish's range occur in areas with contaminated soil. Southeastern Missouri has been a primary producer of lead since the early 1700s, in an area referred to as the Old Lead Mining Belt, and more recently in an area referred to as the New Lead Mining Belt. Although most mining ceased in the 1970s, waste from mining operations is still present in the landscape, resulting in contamination of fish and other aquatic biota, alteration of fish and invertebrate communities, and public health advisories against human consumption of lead-contaminated fish (Czarneski 1985, pp. 17–23; Schmitt *et al.* 1993, pp. 468–471). The relocation of mine waste (chat) throughout the area as topsoil, fill material, and aggregate for roads, railroads, concrete, and asphalt has further expanded the area of contamination, as has aerial deposition from heavy metal smelters and the use of lead mining tailings for agricultural purposes due to their lime content (NASEM 2017, pp. 25–37). All of these uses have contributed to contamination of streams in portions of the Upper St. Francis River watershed. As a result, 24.2 rmi (38.9 km) of the Little St. Francis River are currently included in the Environmental Protection Agency's (EPA) 303(d) list of impaired waters for not meeting water quality standards for lead (EPA 2020, p. 28; MDNR 2020, p. 8). In 2012, a portion of Big Creek (34.1 rmi; 54.9 km) was added to the EPA's 303(d) list for not meeting water quality standards for lead and cadmium. That stream reach recently was removed from the 303(d) list for lead (in sediment) due to remediation efforts, but 1.8 rmi (2.9 km) remain listed for cadmium (EPA 2020, p. 16).

Studies conducted in southeastern Missouri and other areas demonstrate that heavy metal contamination adversely affects riffle-dwelling crayfish. In a study conducted in a watershed adjacent to that of the Upper St. Francis River, metal concentrations in crayfish at sites downstream of mining activities were significantly higher than those at reference sites (Allert *et al.* 2008, pp. 100–101). Significantly lower crayfish densities were observed at sites downstream of mining activities than those at reference sites, indicating that metals associated with mining activities have negative impacts on crayfish populations in Ozark streams (Allert *et al.* 2008, p. 100). Similar results were observed in other areas impacted by mining wastes (including sites in the Upper St. Francis River watershed), with sites downstream of mining activities having significantly higher metal concentrations in crayfish, reduced densities of crayfish (from 80 to 100 percent) (Allert et al. 2008, pp. 100–101; Allert et al. 2013, p. 567), and significantly lower survivorship. The mechanisms by which crayfish can be impacted by heavy metal contamination include interference with orienting (Hubschman 1967, pp. 144–147; Lahman et al. 2015, pp. 443–444), inhibition of respiration or aerobic metabolism, and increased susceptibility to predation.

Sedimentation

Crayfish presence is dependent on rocks embedded in little or no sediment and open interstitial spaces (Loughman *et al.* 2016, p. 645; Loughman *et al.* 2017, p. 5). There is little gravel accumulation in the Upper St. Francis River watershed due to the surrounding geology. Streambank soils also are less likely to erode than in most Ozark streams because of these lower densities of gravel. Thus, stream channel substrates contain a significant proportion of stable cobble, stone, and boulders, which provide habitat for crayfishes (Boone 2001, p. GE1). However, similar to many Ozark streams, streams within the Upper St. Francis River watershed may experience increased sedimentation in the future if land uses change or if riparian corridors are cleared. Three streams within the watershed have experienced excessive sedimentation due to eroding or breached mine tailings (Boone 2001, p. WQ4; DiStefano 2008, p. 191). Breaches can allow a large volume of tailings to enter a stream, such as the 1,500 cubic yd (1,200 cubic m) spilled into a stream

in 1992 (Boone 2001, p. WQ4), and it can take multiple years for the aquatic community to begin to recover following a breach. Excessive deposition of fine sediment from tailings or other sources can cover rocks and cavities used by the Big Creek crayfish and St. Francis River crayfish as refugia (an area in which a population of organisms can survive through a period of unfavorable conditions). The loss of refugia likely results in reduced foraging habitat, thereby reducing carrying capacity and the density of subpopulations. The loss of refugia may also increase competition with the woodland crayfish and potentially facilitate displacement of the Big Creek crayfish and St. Francis River crayfish. The loss of refugia, caused by sedimentation, likely also increases predation risk.

Cumulative Effects

In addition to individually affecting the species, it is likely that several of the risk factors summarized above are acting synergistically or additively on both species. The combined impact of multiple stressors is likely more harmful than a single stressor acting alone. For example, in areas affected by lead mining contamination, the rate of displacement of Big Creek crayfish and St. Francis River crayfish by woodland crayfish may increase. Although lead contamination may have negative effects on woodland crayfish as well, we anticipate cumulative synergistic effects in areas where woodland crayfish have invaded and lead mining contamination is present. Additionally, in areas invaded by the woodland crayfish, the loss of refugia from sedimentation may increase competition between the native species and the woodland crayfish. The combination of stressors acting on the Big Creek crayfish and the St. Francis River crayfish will likely impact them more severely in combination than any one factor alone.

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have not only analyzed individual effects on the species, but we have also analyzed their potential cumulative effects. We incorporate the cumulative effects into our SSA analysis when we characterize the current and future condition of the species. To assess the current and future condition of the species, we undertake an iterative analysis that encompasses and incorporates the threats individually and then accumulates and evaluates the effects of all the factors that may be influencing the species, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative effects analysis.

Conservation Efforts and Regulatory Mechanisms

Monitoring and research on the Big Creek crayfish and St. Francis River crayfish have been conducted by the Missouri Department of Conservation (MDC) and various other organizations. Multiple evaluations of effects from lead mining contamination on crayfish, including the St. Francis River crayfish, have been conducted by the U.S. Geological Survey (USGS). Monitoring efforts benefit conservation efforts of the Big Creek crayfish and St. Francis River crayfish by providing information on population health and trends and on the magnitude and extent of threats; research efforts provide information on mechanisms by which threats may impact the native crayfishes.

To help curtail the spread of nonnative crayfish in Missouri, MDC amended the Wildlife Code of Missouri (Missouri Code) in 2011–2012, to increase regulations pertaining to the sale, purchase, and import of live crayfishes. While the virile crayfish (*Faxonius virilis*) may still be commercially sold in the State for live bait, all other live crayfishes can be imported, sold, or purchased in Missouri only for the purposes of human consumption or as food for captive animals kept by authorized entities (for example, research institutions/agencies, publicly owned zoos) (Missouri Code of State Regulations 2018b, pp. 6–7). This State regulation effectively bans the sale and purchase of live crayfish for bait, the import and sale of live crayfishes in pet stores, and the purchase and import of live crayfishes by schools for classroom study, all of which are vectors for crayfish invasions. It is also illegal in Missouri to release any baitfish or crayfish into public waters, except as specifically permitted by the MDC (Missouri Code of State Regulations 2018a, p. 3). These State regulations may help reduce the likelihood of future invasions of nonnative crayfishes within the Upper St. Francis River watershed. However, as the woodland crayfish has already been introduced at several locations in the watershed, these State regulations will not affect the inevitable spread of that species within the Upper St. Francis River watershed.

Approximately 41 percent of the Upper St. Francis River watershed is in Federal and State ownership, with the majority managed by the U.S. Forest Service as part of the Mark Twain National Forest. The U.S. Forest Service's management efforts benefit stream health by focusing on riparian protection and control and reduction of sediment entering streams. Other major public landowners in the watershed include the MDC, the U.S. Army Corps of Engineers, and the Missouri Department of Natural Resources. Additionally, 5.3 rmi (8.5 km) of Big Creek are designated an ''Outstanding State Resource Water.'' Missouri Outstanding State Resource Waters are high-quality waters with significant aesthetic, recreational, or scientific value and receive special protection against degradation in quality (Missouri Code of State Regulations 2018c, pp. 14, 16). These protections help maintain water quality and minimize additional sedimentation; therefore, these protections may maintain the quantity and quality of habitat of the Big Creek crayfish and St. Francis River crayfish.

The EPA has conducted, and has plans to continue, extensive remediation efforts in areas of southeastern Missouri impacted by lead mining, including the Upper St. Francis River watershed (EPA 2017, entire; EPA 2018b, entire). These efforts include sediment, soil, and mine waste removal. The EPA also has funded the development of a watershed master plan for the Little St. Francis River, located in the upper end of the watershed (EPA 2018a, entire). This plan will identify sources of pollution (related to lead mining) and measures to reduce the pollution.

Current Condition of Species

To evaluate the current (and future viability) of the Big Creek crayfish and the St. Francis River crayfish, we assessed a range of conditions to allow us to consider the species' resiliency, representation, and redundancy. For the purposes of this assessment, populations were delineated using known locations and expanded to a subwatershed scale As previously stated, we scaled down to a subpopulation level for analytical purposes, as both species have a limited number of populations. In the case of the St. Francis River crayfish, population-level ecology is also species-level ecology because genetic analyses indicate the entire species exists as a single population. Scaling down to the subpopulation level allowed us to better represent and compare groups of individuals at a finer scale. A summary of the current condition of each species

is given at the end of this section (Table 1 and Table 2).

The Big Creek crayfish and St. Francis River crayfish currently occur in 16 subwatersheds. In 2008, it was estimated that the woodland crayfish occupied 103 to 403 rmi (166 to 649 km) or 5 to 20 percent of the total 2,004 rmi (3,225 km) in the Upper St. Francis River watershed (DiStefano and Westhoff 2011, p. 40). Based on known locations of the woodland crayfish, we know that 5 of the 16 Big Creek crayfish subwatersheds have been invaded (31 percent) and 4 of the 16 St. Francis River subwatersheds have been invaded (25 percent). We also know that the invasion has resulted in extirpation of the Big Creek crayfish in 9.1 rmi (14.7 km) and of the St. Francis River crayfish in 8.5 rmi (13.7 stream km) (Figure 2). This is likely a sizable underestimate of the actual extent of both range contractions, given that data for known native range contractions represent conditions in only 2 of the 11 streams known to be invaded by the woodland crayfish (the range contractions for each species occurred in different streams).

In addition, the known locations of the woodland crayfish depicted in Figure 2 are likely an under-representation of where the species is present in the watershed given that (1) the majority of locations were documented prior to 2010, (2) the species can expand at a rate as high as 745 yards (y) per year (681 m per year) in the upstream direction and 2,499 y per year (2,285 m year) in the downstream direction (DiStefano and Westhoff 2011, pp. 38, 40) and (3) the woodland crayfish has already been introduced at several locations throughout the watershed and has likely been introduced at additional, undocumented locations (it is not feasible to survey every stream throughout the watershed). Finally, there is currently no means to slow or stop the spread of the woodland crayfish.

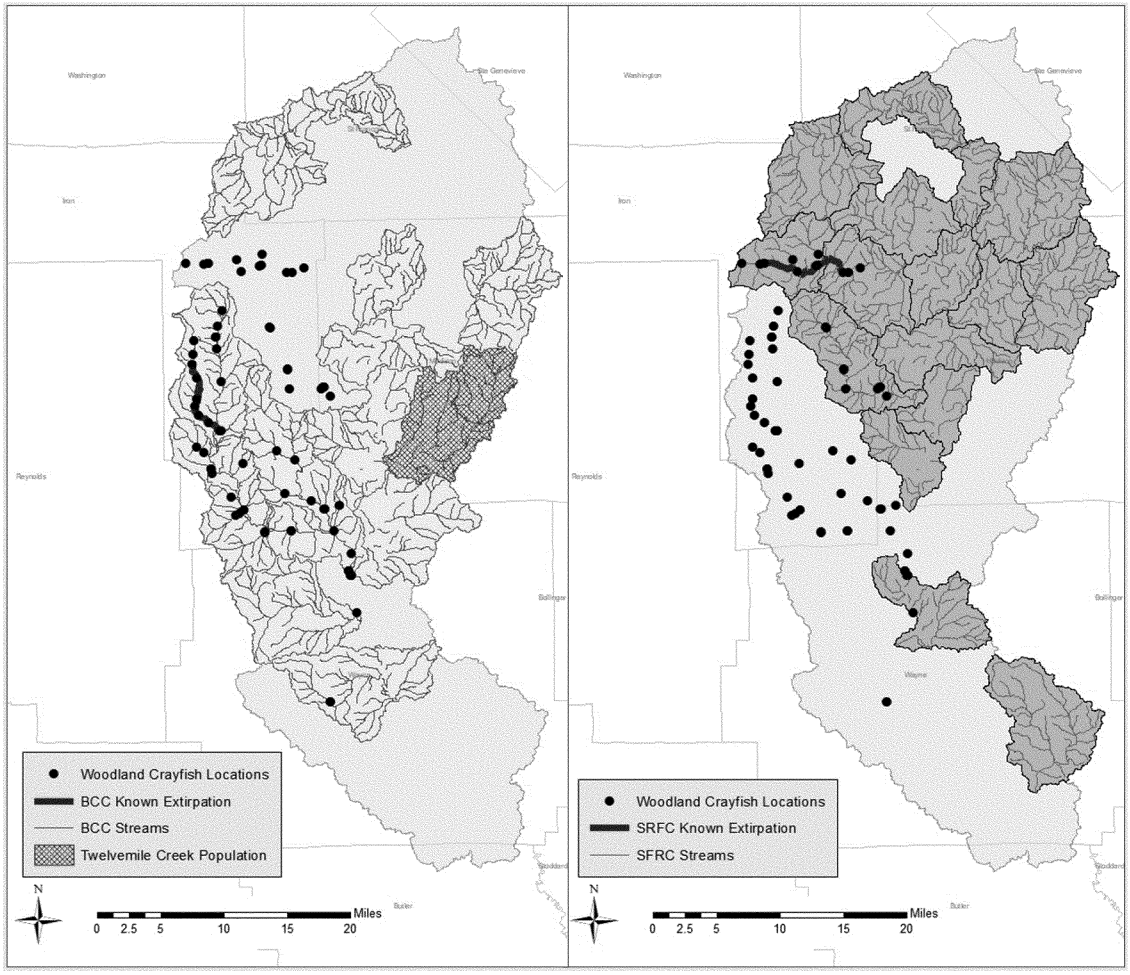

Figure 2. Known locations (as of 2018) of the Woodland Crayfish and stream segments from which the Big Creek Crayfish (BCC; left) and St. Francis River Crayfish (SFRC; right) have been extirpated due to the Woodland Crayfish invasion.

To evaluate the current condition of the Big Creek crayfish and St. Francis River crayfish in terms of the 3Rs, we reviewed available information on health of the subpopulations and queried species experts on the species' representation and redundancy. The full explanation of this analysis can be found in the SSA report; a summary of our conclusions is given below.

Resiliency

Although the Twelvemile Creek population of the Big Creek crayfish has not been invaded by the woodland crayfish, the woodland crayfish has been documented at 30 locations within the Main population, with 5 of the 14 (36 percent) of the population's subwatersheds invaded. Based on the Big Creek crayfish's range contractions

and the rate at which the woodland crayfish can expand, we expect that range contractions are happening throughout the other invaded subwatersheds. We also conclude that it is likely that St. Francis River crayfish abundance in the Main population has been substantially reduced from heavy metal contamination given that 208 rmi (335 km) of the 940 rmi (1,514 km), or 22 percent, of the population occurs in areas with heavy metal surface contamination. Studies conducted in nearby watersheds demonstrate that heavy metal contamination reduces abundance. These impacts have reduced resiliency of the Main population and thus resiliency of the Big Creek crayfish has been reduced.

Four of the 16 subwatersheds occupied by the St. Francis River crayfish (25 percent) have been invaded by the woodland crayfish. Similar to the Big Creek crayfish, we expect that contractions of the St. Francis River crayfish are occurring in these areas based on range contractions documented elsewhere and the rate at which the woodland crayfish can expand. Resiliency of the St. Francis River crayfish has been further reduced due to impacts from heavy metal contamination, with 16 percent of the range occurring in areas with heavy metal contamination.

The narrow ranges of both the Big Creek crayfish and St. Francis River crayfish also inherently make them vulnerable to environmental variation and stochastic events that could affect their entire range (for example, extreme drought or flooding).

Representation

We consider Big Creek crayfish representation as having healthy subpopulations in both the Twelvemile Creek population and the Main population, to maintain the full breadth of adaptive diversity (and, thus, adaptive capacity). There appears to be gene flow throughout most of the Big Creek crayfish's range (Fetzner and DiStefano 2008, p. 12). However, the Big Creek crayfish in the Twelvemile Creek population contain unique haplotypes (a group of alleles that are inherited from a single parent) that were not found anywhere else in the watershed (Fetzner and DiStefano 2008, p. 12). Although the Twelvemile Creek population is currently not impacted by the woodland crayfish, the range of the Main population has been reduced due to woodland crayfish invasion, with 36 percent of the subwatersheds invaded (Table 1 and Table 2). Therefore, the species may have lost some level of representation. For the St. Francis River crayfish, we consider representation as having multiple, healthy subpopulations distributed across the range of the species to maintain the breadth of adaptive diversity (that is, throughout its range in the Upper St. Francis River watershed). Similar to the Big Creek crayfish, some level of representation of the St. Francis River crayfish may have been lost due to documented and undocumented range contractions, with 4 of the 16 (25 percent) of the St. Francis River subwatersheds invaded.

Redundancy

For the purposes of the SSA, we define a catastrophic event as a biotic or abiotic event that causes significant impacts at the population level such that the population cannot rebound from the effects or the population becomes highly vulnerable to normal population fluctuations or stochastic events.

Based on expert input (further described in the SSA report), we do not consider extreme drought or chemical spills as catastrophic events that are likely to have catastrophic effects on the Big Creek crayfish and St. Francis River crayfish at the species-level. While these events may not have the devastating effects of a catastrophic event, the occurrence of extreme droughts or chemical spills would reduce resiliency of the species acting as a stressor on a more localized scale. These stressors may potentially extirpate or compromise subpopulations throughout the impacted area (see chapter 3 of the SSA report). However, both species are inherently vulnerable to extreme events or large-scale stressors given their small range, and there has been some reduction of in-population redundancy due to the extirpation of individuals (and subpopulations) in some areas because of woodland crayfish invasion.

TABLE 1—SUMMARY OF BIG CREEK CRAYFISH'S CURRENT CONDITION

	Assessment of current condition
Currently Occupied Stream Distance.	Occurs in approximately 983 rmi (1,581 km) within 16 subwatersheds. However, this does not account for documented and undocumented range contractions that we expect are occurring in 31 percent of the species' subwatersheds due to the woodland crayfish invasion. In addition, 86 rmi (139 km) of stream reaches are likely occupied intermittently by the species due to movement among occupied watersheds.
Health of Subpopulations	In areas invaded by the woodland crayfish (31 percent of occupied subwatersheds), abundance is substantially reduced, with the species completely extirpated in some invaded areas. In areas impacted by lead mining contamination (22 percent of the range), abundance is also likely reduced. In areas not invaded by the woodland crayfish or impacted by lead mining contamination, we presume subpopulations are healthy.
Health of Populations	We presume the Twelvemile Creek population is currently healthy because it does not appear that the woodland crayfish has invaded the population and the population is outside of the area of lead mining contamination. The health of the Main population, however, has been impacted due to documented and undocumented range contractions from the woodland crayfish invasion in 36 percent of the population's subwatersheds. Abundance has also likely been reduced in 22 percent of the Main population due to heavy metal contamination.
Resiliency	Reduced due to documented and undocumented range contractions in 31 percent of the Big Creek crayfish's subwatersheds and expected reduced abundance in 22 percent of the range due to heavy metal contamination.
Representation	Somewhat reduced ecological diversity due to documented and undocumented range contractions in 25 percent of the Big Creek crayfish's subwatersheds.
Redundancy	Somewhat reduced due to documented and undocumented range contractions in 36 percent of subwatersheds in the Main population. The species is also inherently vulnerable to some extreme events given its small range, However, both populations of the species have a high level of redundancy relative to extreme events that affect areas downstream of the source of the event (for example, chemical spills) due to the number of tributaries that they occupy that would not be downstream of the event.

TABLE 2—SUMMARY OF ST. FRANCIS RIVER CRAYFISH'S CURRENT CONDITION

	Assessment of current condition
Currently Occupied Stream Distance.	Occurs in approximately 944 rmi (1,519 km) within 16 subwatersheds. However, this does not account for documented and undocumented range contractions that we expect are occurring in 25 percent of the species' subwatersheds due to the woodland crayfish invasion. In addition, 99 rmi (159 km) of stream reaches are likely occupied intermittently by the species due to movement among occupied watersheds.
Health of Subpopulations	In areas invaded by the woodland crayfish (25 percent of occupied subwatersheds), abundance is substantially reduced, with the species completely extirpated in some invaded areas. In areas impacted by lead mining contamination (16 percent of the range), abundance is also likely reduced. In areas not invaded by the woodland crayfish or impacted by lead mining contamination, we presume subpopulations are healthy.
Resiliency	Reduced due to documented and undocumented range contractions in 25 percent of the St. Francis River crayfish's subwatersheds. Also reduced due to reduced abundance in 16 percent of the range due to heavy metal contamination.
Representation	Somewhat reduced ecological diversity due to documented and undocumented range contractions in 25 percent of the St. Francis River crayfish's subwatersheds.
Redundancy	Somewhat reduced due to documented and undocumented range contractions in 25 percent of the St. Francis River crayfish's subwatersheds. The species is also inherently vulnerable to some extreme events given the species' small range, and there has been some reduction in redundancy due to reduction of the range. However, the species have a high level of redundancy relative to extreme events that affect areas downstream of the source of the event (for example, chemical spills) due to the number of tributaries that they occupy that would not be downstream of the event.

Future Scenarios

For the purpose of this assessment, we define viability as the ability of the species to sustain populations in the wild over time. To evaluate future conditions of the Big Creek crayfish and St. Francis River crayfish, we predicted the expansion of the nonnative woodland crayfish within the ranges of the native crayfishes. We asked biologists with expertise on crayfishes to estimate the future expansion rate in the Upper St. Francis River watershed, the impact on Big Creek crayfish and St. Francis River crayfish abundances, and the length of time for those impacts to be fully realized. A full description of the expert elicitation meeting methodology and results are available in the SSA report (Service 2022, pp. 36–47 & 64–70). As a way to characterize uncertainty in predicting future conditions and to capture the entire breadth of plausible future conditions, we developed ''reasonable best,'' ''reasonable worst,'' and ''most likely'' scenarios that represent the plausible range of the Big Creek crayfish's and St. Francis River crayfish's future conditions (see Table 3, below). Each of the scenarios is based on the expert-elicited estimates of the woodland crayfish's expansion rates, impacts of the invasion, and time for impacts to be fully realized. For each of the scenarios, we predicted the extent of future expansion of the woodland crayfish at 10, 25, and 50 years into the future. We then calculated the extent of the Big Creek crayfish's and St. Francis River crayfish's ranges that would be affected under each scenario and described effects to abundance based on the experts' projections. Because we used a finer scale data, we present results in river miles invaded, rather than subwatersheds invaded (as we did to assess current conditions). Additional details on the expert elicitation and a summary of results can be found in appendix B of the SSA report. Below is a summary of the results from the SSA; for further details on the methods, assumptions, and results, see chapter 5 of the SSA report. A summary of predicted impacts in 50 years for both species is summarized in Tables 4 and 5 below.

TABLE 3—EXPLANATION OF SCENARIOS USED TO PREDICT THE FUTURE CONDITION OF BIG CREEK CRAYFISH AND ST. FRANCIS RIVER CRAYFISH

Scenario	Estimates used
Reasonable Best	• Lowest plausible expansion rate of the woodland crayfish • Lowest level of predicted impact on abundance of Big Creek crayfish and St. Francis River crayfish • Highest number of years for impacts to be fully realized
Reasonable Worst	• Highest plausible expansion rate of the woodland crayfish • Highest level of predicted impact on abundance of Big Creek crayfish and St. Francis River crayfish • Lowest number of years for impacts to be fully realized
Most Likely	• Most likely expansion rate of the woodland crayfish • Most likely level of predicted impact on abundance of Big Creek crayfish and St. Francis River crayfish • Most likely number of years for impacts to be fully realized

Big Creek Crayfish

Under the ''reasonable best'' scenario, we expect the woodland crayfish invasion will expand to 25 percent of the Big Creek crayfish Main population in 10 years, constituting 24 percent of the species' range. In 25 years, 35 percent of the Big Creek crayfish Main population will have been invaded, constituting 33 percent of the species' range. In 50 years, 49 percent of the Main population will be invaded, constituting 46 percent of the species' range. The Twelvemile Creek population is not predicted to be invaded in 25 or 50 years under this scenario. In areas invaded by the woodland crayfish, abundance is predicted to be reduced by over 50 percent in 10 to 20 years.

Under the ''reasonable worst'' scenario, we expect 44 percent of the Main population and 0.2 percent of the Twelvemile Creek population will be invaded by the woodland crayfish in 10 years, constituting 42 percent of the Big Creek crayfish's total range. In 25 years, 70 percent of the Main population and 81 percent of the Twelvemile Creek population will be invaded by the woodland crayfish, constituting 70 percent of the Big Creek crayfish's total range. In 50 years, 90 percent of the Main population and 100 percent of the Twelvemile Creek population will be invaded, constituting 91 percent of the species' range. In areas invaded by the woodland crayfish, abundance is

predicted to be reduced by approximately 100 percent (that is, extirpation) in less than 10 years.

Under the ''most likely'' scenario, we expect 28 percent of the Big Creek crayfish Main population will be invaded by the woodland crayfish in 10 years, constituting 27 percent of the species' range. In 25 years, 44 percent of the Main population and 6 percent of the Twelvemile Creek population will be invaded by the woodland crayfish, constituting 42 percent of the Big Creek crayfish's total range. In 50 years, 64 percent of the Main population and 56 percent of the Twelvemile Creek population will be invaded, constituting 64 percent of the species' range. The best available information indicates that once an area is invaded by the woodland crayfish, the Big Creek crayfish will be extirpated within 10 years.

Given that there are currently no known feasible measures to curtail the woodland crayfish invasion for the long term, we consider it extremely likely that the invasion will continue. Based on our use of expert-elicited estimates of the rate of expansion and the resulting impacts on the Big Creek crayfish, we are also reasonably certain that we can predict the plausible range of future conditions within 50 years. Here, we discuss the species' future condition in terms of the next 50 years (Summarized below in Table 4.); 10- and 25-year future conditions are discussed (beyond what was stated above) in the SSA report. As previously stated, resiliency of the Big Creek crayfish has already been reduced from historical conditions due to range contractions in 31 percent of occupied subwatersheds caused by invasion of the woodland crayfish. Resiliency also has likely been reduced due to lead mining contamination in 22 percent of the crayfish's range. Using the modeling results (that represent the range of all future scenarios), we predict that within 50 years resiliency of the species will continue to be reduced due to a 50 to 100 percent reduction in abundance in 49 to 90 percent of the Main population and 0 to 100 percent of the Twelvemile Creek population. In addition, if other threats (aside from woodland crayfish invasion and lead mining contamination) such as drought, flood events, disease, and degraded water quality, remain the same or increase, resiliency will be further reduced by these threats. Thus, our modeled results represent the minimum amount of the species' range that is expected to be impacted within 50 years because the decline in resiliency only considers impacts of the woodland crayfish invasion and none of the other stressors mentioned above that affect the Big Creek crayfish.

We predict that the Big Creek crayfish will continue to lose ecological diversity, given the expected expansion of the woodland crayfish and the resulting impact on subpopulations in both the Main and Twelvemile Creek populations. Both populations are expected to experience a 50 to 100 percent reduction in abundance in invaded areas. For the Twelvemile Creek population, in 50 years there may be as much as 100 percent of the population's range invaded, whereas up to 90 percent of the Main population's range may be invaded in the same time. Given the unique haplotypes contained in the Twelvemile Creek population, the reduced abundance of subpopulations in the majority of that population, or especially the complete loss of that population, would represent an appreciable reduction in the species' representation.

The Big Creek crayfish is inherently vulnerable to extreme events and other stressors, given the species' small range. There has been already been some reduction in redundancy due to documented and undocumented range contractions in 36 percent of subwatersheds in the Main population. Based on results of the future scenario modeling, we expect that within 50 years, redundancy of the Big Creek crayfish will be further reduced by the predicted 50 to 100 percent reduction in abundance in 49 to 90 percent of the range of the Main population and 0 to 100 percent of the range of the Twelvemile Creek population. Because the Twelvemile Creek population consists of only one subwatershed, it will be more vulnerable to extreme events if multiple sub-tributaries are impacted by the woodland crayfish invasion.

St. Francis River Crayfish

Under the ''reasonable best'' scenario, we expect 12 percent of the St. Francis River crayfish's range will be invaded by the woodland crayfish in 10 years. In 25 years, 21 percent of the range will have been invaded, and 33 percent of the range will have been invaded in 50 years. In areas where the woodland crayfish has invaded, abundance is predicted to be reduced by over 10 to 50 percent in 30 to 40 years.

Under the ''reasonable worst'' scenario, we expect 30 percent of the St. Francis River crayfish's range will be invaded by the woodland crayfish in 10 years. In 25 years, 56 percent of the range will have been invaded, and 81 percent of the range will have been invaded in 50 years. In areas where the woodland crayfish has invaded, abundance is predicted to be reduced by approximately 100 percent (that is, extirpation) in less than 10 years.

Under the ''most likely'' scenario, we expect 18 percent of the St. Francis River crayfish's range will be invaded by the woodland crayfish in 10 years. In 25 years, 32 percent of the range will have been invaded, and 50 percent of the range will have been invaded in 50 years. In areas where the woodland crayfish has invaded, abundance is predicted to be reduced by 50 to 100 percent in 10 to 30 years (Table 5).

Similar to the Big Creek crayfish, we are also reasonably certain that we can predict the plausible range of future conditions for the St. Francis River crayfish within 50 years because there are no known feasible measures to curtail the spread of the woodland crayfish. Here, we discuss the species' future condition over the next 50 years; 10- and 25-year future conditions are discussed (beyond what was stated above) in the SSA report. As previously stated, resiliency of the St. Francis River crayfish has already been reduced from historical conditions due to effects of the woodland crayfish invasion in 25 percent of subwatersheds occupied by the St. Francis River crayfish and also from lead mining contamination in 22 percent of the species' range. Based on the modeling results (the range of all future scenarios), we predict that resiliency of the species will continue to be reduced due to the woodland crayfish invasion and resulting 10 to 100 percent reduction in abundance in an estimated 33 to 81 percent of the range within 50 years. If threats other than the woodland crayfish and lead mining contamination, such as drought, flood events, disease and degraded water quality remain the same or increase, resiliency will be further reduced. Like the Big Creek crayfish, our modeled results represent the minimum amount of the species' range that is expected to be impacted within 50 years because the decline in resiliency only considers impacts of the woodland crayfish invasion and none of the other stressors mentioned above that affect the St. Francis River crayfish.

There has already been some loss in St. Francis River crayfish's representation due to the loss of the subpopulations (and therefore ecological diversity) impacted by the woodland crayfish invasion and impacts of lead mining contamination. The reduction in representation is expected to continue given the predicted 10 to 100 percent reduction in abundance in 33 to 81 percent of the species' range,

based on the results of all future scenarios.

The St. Francis River crayfish is inherently vulnerable to extreme events and stressors, given the species' small range and single population, and there has been some reduction in redundancy due to range reduction and reduced abundance of subpopulations due to the woodland crayfish invasion and lead mining contamination. Similar to representation, we expect that redundancy of the St. Francis River crayfish will be further reduced by the predicted 10 to 100 percent reduction in abundance in 33 to 81 percent of the species' range within 50 years as more tributaries are invaded and subpopulations are extirpated.

TABLE 4—THE RANGE OF PREDICTED IMPACTS TO THE BIG CREEK CRAYFISH FROM THE WOODLAND CRAYFISH AT 50 YEARS BASED ON EXPERT INPUT

	Reasonable best (percent)	Most likely (percent)	Reasonable worst (percent)
Percent of Main population invaded	48.7	64.1	90.4
Percent of Twelvemile Creek population invaded	0	55.6	100
Percent of total range invaded	46.2	63.7	90.9
Percent reduction in abundance in invaded areas	>50	~100	~100

TABLE 5—THE RANGE OF PREDICTED IMPACTS TO THE ST. FRANCIS RIVER CRAYFISH FROM THE WOODLAND CRAYFISH AT 50 YEARS BASED ON EXPERT INPUT

	Reasonable best (percent)	Most likely (percent)	Reasonable worst (percent)
Percent of range invaded	33.2	49.5	81.0
Percent reduction in abundance in invaded areas	10 to 50	50 to 100	~100

Summary of Comments and Recommendations

In the proposed rule published on September 17, 2020 (85 FR 58192), we requested that all interested parties submit written comments on the proposal by November 16, 2020. 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 public comment were published in the Democratic News (October 7, 2020) and the Farmington Press (October 1, 2020). After receiving a request for a public hearing, we reopened the public comment period on April 27, 2021 (86 FR 22127) and requested that all interested parties submit their comments by May 27, 2021. We held a virtual public informational meeting followed by a public hearing on May 13, 2021. All substantive information received during both comment periods has either been incorporated directly into this final determination or is addressed below.

Peer Reviewer Comments

As discussed in Supporting Documents, above, we received comments from one peer reviewer. We reviewed all comments we received from the peer reviewer for substantive issues regarding the information contained in the SSA report and new information about the species. The peer reviewer generally concurred with our methods and conclusions and provided additional information, clarifications, and suggestions to improve the final SSA report. Peer reviewer comments were incorporated into the final SSA report as appropriate.

Public Comments

(1) Comment: Commenters stated that the Service should consider best management practices (BMPs) for forestry activities in the assessment of conservation efforts benefitting the species and account for these beneficial actions in any analyses conducted on the species' status.

Our Response: To assess the conservation benefit provided by the forestry BMPs, we considered the extent to which the BMPs are implemented within the two crayfishes' ranges. Based on information from surrounding States, the implementation rate of BMPs in Missouri is estimated to be 82 percent, with the rate representing the number of sites at which forestry BMPs were applied correctly or where major water quality impacts were avoided (Ice et al. 2010, p. 272). However, actual rates for Missouri are not available, as implementation of forestry BMPs is not required or monitored (NASF 2019, p. 3). In particular, we have no information to determine whether the estimate in Ice et al. (2010, p. 272) is applicable within the ranges of the two crayfishes. Because we are not able to confidently assess the extent to which implementation of forestry BMPs is benefitting the species, we did not factor the conservation benefits of BMPs into the analysis conducted on the species' status. Should we obtain data on BMP implementation rates within the species' ranges, we will include that information in the next revision of the species' SSA report.

(2) Comment: Commenters stated that because the woodland crayfish is native to other watersheds in Missouri, it should not be referred to as a nonnative species and should not be considered a threat to the Big Creek crayfish or St. Francis River crayfish.

Our Response: Because the woodland crayfish is not endemic (native) to the Upper St. Francis River watershed, we consider it accurate to refer to the species as nonnative in the watershed. We also consider it accurate to characterize the woodland crayfish as a threat to the Big Creek crayfish and St. Francis River crayfish given the documented declines in their abundance in stream reaches invaded by the woodland crayfish.

(3) Comment: Commenters believe there are no data to support that hybridization with the woodland crayfish is detrimental to the Big Creek crayfish and St. Francis River crayfish.

Our Response: Although some of the hybrid individuals appear to be viable, alleles (versions of a gene) from the Big Creek crayfish and St. Francis River crayfish are typically absent at most or all of the loci (specific physical locations of genes or other DNA sequences on a chromosome) of the hybrid individuals (Fetzner et al. 2016, p. 29). The low frequency of alleles from

the native crayfishes indicates that individuals with the native crayfish alleles are experiencing lower survivorship and/or reproduction than crayfish with the woodland crayfish alleles. Thus, the distribution of alleles within stream reaches invaded by the woodland crayfish is expected to shift towards the alleles of the woodland crayfish and away from those of the Big Creek crayfish and St. Francis River crayfish.

(4) Comment: Historical mining activities within the Upper St. Francis River watershed are not negatively affecting crayfish if the woodland crayfish is expanding its range within the watershed.

Our Response: The woodland crayfish's expansion in the watershed has been documented in areas other than those with heavy metal contamination. Therefore, it is possible for woodland crayfish abundance to be reduced in contaminated stream reaches while simultaneously expanding its range within the rest of the watershed.

(5) Comment: A commenter said remediation activities for heavy metal contamination have improved water quality in certain areas of the crayfishes' ranges from historical conditions. Therefore, the Service's assertion that heavy metal mining activities have affected crayfish abundance is not supported.

Our Response: Remediation activities have improved water quality in some areas of the crayfishes' ranges. However, we expect that abundance is still lower in these areas due to the time required for crayfishes to repopulate the affected stream reaches. In addition, heavy metal contamination is still present in more than 24 miles of the Little St. Francis River due to lead and 1.8 miles of Big Creek due to cadmium, as evidenced by the inclusion of these areas on the EPA's 303(d) list of impaired waterbodies (EPA 2020, pp. 16, 28).

(6) Comment: A commenter stated results of studies evaluating effects to crayfish from heavy metal exposure cannot be extrapolated to areas outside of where the studies were conducted.

Our Response: Various water chemistry parameters, such as water hardness and alkalinity, can influence bioavailability (the extent to which a chemical is absorbed) and toxicity of metals. However, heavy metal concentrations in tissue are representative of bioavailability since the concentrations represent the amount to heavy metals absorbed by crayfish. In the northeast portion of the Upper St. Francis River watershed (within the two crayfishes' ranges), Allert *et al.* (2016) documented heavy metal concentrations in crayfish tissue that were either higher than or comparable to the crayfish tissue concentrations documented in several of the other studies cited in the SSA report and the proposed rule (Allert *et al.* 2008, 2009, 2012). Total chronic toxic unit scores in the Upper St. Francis River watershed study also were either higher than or comparable to those in most of the other studies (Allert *et al.* 2009, 2012, 2013), with the scores representing the combined toxicity of metals given water hardness and the extent to which the metals dissolve in water (making the metals available for absorption by aquatic species). Lastly, Allert *et al.* (2016) documented significantly reduced densities of crayfish, including the St. Francis River Crayfish, downstream of mining sites and in some areas, a complete absence of crayfish, providing direct evidence that heavy metal exposure is negatively affecting crayfish in the Upper St. Francis River watershed.

(7) Comment: One commenter asserted that contamination due to heavy metal mining should not be considered a primary threat to the two crayfishes and that activities related to heavy metal mining should not be included in the list of prohibitions in the 4(d) rule for the species because the commenter does not consider it appropriate to use results of two studies (Allert *et al.* 2009 and Allert *et al.* 2010) to assess impacts to the Big Creek crayfish and St. Francis River crayfish from heavy metal exposure for reasons detailed below in *(7a)–(7e) Comments.* We address this commenter's specific assertions regarding the use of those two studies below.

(7a) Comment: Physical conditions such as substrate coarseness, water depth, and current velocity differed between reference and study sites and could explain the differences in crayfish densities observed.

Our Response: In a separate study, Allert *et al.* (2008, p. 105), documented significantly lower crayfish densities at mining sites, despite mining and reference sites having similar temperature, physical habitat, and organic matter. Crayfish densities did not correlate with any of the physical habitat variables that were measured (Allert *et al* 2008, p. 104). In addition, Allert *et al.* (2009, pp. 1209, 1213) documented significantly reduced crayfish survival downstream of mining sites when caging crayfish in situ (in the wild as opposed to a laboratory setting) with the same substrate and organic material as reference sites. These results are consistent with other studies documenting reduced crayfish densities and survival downstream of mining sites.

(7b) Comment: Two of the study sites were downstream of a city, and contaminants other than heavy metals were not assessed. Instead of heavy metal exposure, inputs from the city's residential, commercial, and industrial activities, as well as the agricultural uses surrounding the city, may have caused the reduced crayfish abundance.

Our Response: Multiple studies have demonstrated that, regardless of proximity to cities, crayfish have elevated heavy metal concentrations, reduced densities, and reduced survival downstream of mining sites (Allert *et al.* 2008, pp. 100–105; Allert *et al.* 2009, pp. 1210–1213; Allert *et al.* 2013, pp. 512–515). These results provide multiple lines of evidence that heavy metal exposure does negatively affect crayfish, regardless of proximity to cities.

(7c) Comment: Because macroinvertebrate populations vary significantly over small spatial scales, it cannot be concluded that heavy metal exposure caused the reduced crayfish abundance at study sites.

Our Response: As noted above, multiple lines of evidence demonstrate that heavy metal exposure negatively affects crayfish. The large number of studies documenting reduced macroinvertebrate populations downstream of mining sites, combined with heavy metal concentrations in macroinvertebrates downstream of mining sites, indicates that heavy metal exposure is responsible for the reduced crayfish densities downstream of mining sites documented by Allert *et al.* (2008, pp. 100–104; 2012, p. 569; 2013, p. 512).

(7d) Comment: Heavy metal levels were measured in fine sediment obtained from depositional areas. However, crayfish predominantly occupy riffles. Therefore, it is not appropriate to correlate heavy metal concentrations in fine sediment with crayfish densities.

Our Response: Allert *et al.* (2009, p. 1210) and Allert *et al.* (2010, p. 8) evaluated heavy metal concentrations in riffle crayfish tissue as well as in sediment. For both studies, heavy metal concentrations were higher in sediment and in crayfish tissue downstream of mining sites, with crayfish downstream of mining sites in the 2010 study having 100 to 200 times higher concentrations of lead than crayfish at reference sites (Allert *et al.* 2010, p. 19). Crayfish densities were significantly lower in areas with higher heavy metal concentrations in sediment and also in areas with higher heavy metal

concentrations in crayfish tissue (Allert *et al.* 2010, p. 28).

(7e) Comment: To assess heavy metal concentrations in sediment, Allert *et al.* (2009 and 2010) sieved the sediment to remove particles larger than 2 millimeters. The process of sieving the sample to concentrate sediments biased the sampling results.

Our Response: As noted above, Allert *et al.* 2010 (entire) assessed heavy metal concentrations in crayfish as well as in sediment and found a significant negative correlation of both with crayfish density (Allert *et al.* 2010, p. 28). Allert *et al.* 2009 (p. 1213) also found a significant negative correlation between heavy metal concentrations in crayfish and crayfish survival. These results are consistent with other studies documenting reduced crayfish density in areas downstream of mining sites. Therefore, negative effects from heavy metal exposure can be concluded even without the sediment data.

(8) Comment: A public commenter stated that lead is no longer a concern in Big Creek, and lead is not listed as a pollutant for the stream on the EPA's current list of impaired streams under section 303(d) of the Clean Water Act (33 U.S.C. 1251 *et seq.*). Although 1.8 miles of the stream is currently listed for cadmium, the listing is predominantly based on older data ranging from 2008–2012, and values only slightly exceed the chronic water quality standard. Therefore, heavy metal mining should not be included in the list of prohibitions in the 4(d) rule for the species.

Our Response: We have noted that the extent of Big Creek listed as impaired under section 303(d) of the Clean Water Act is only 1.8 miles and that lead is no longer listed as a pollutant for the waterbody. Because heavy metal contamination remains a factor influencing the crayfishes elsewhere in the watershed, however, we are retaining heavy metal mining in the list of prohibitions in the 4(d) rule for the species.

(9) Comment: A commenter stated the Service should add an exception to the prohibitions in the proposed 4(d) rule for the discharge or other introduction of heavy metals conducted in compliance with relevant Federal and State permits.

Our Response: Under the Act's section 4(d), whenever a species is listed as a threatened species, the Secretary issues regulations as she deems necessary and advisable to provide for the conservation of the listed species. As we discuss above, mining activities can increase heavy metal exposure in downstream stream reaches, and results of multiple studies indicate that the heavy metal exposure significantly reduces crayfish survival and abundance (Allert *et al.* 2008, pp. 100–104; 2012, p. 569; 2013, p. 512). Thus, we consider regulating take from mining activities as necessary and advisable for conserving the Big Creek crayfish and the St. Francis River crayfish. As such, we include a prohibition on activities that lead to the introduction of heavy metals into streams, such as heavy metal mining, in the 4(d) rule for these species.

(10) Comment: A public commenter stated because the declines of these two crayfishes appear to be directly attributed to the woodland crayfish, most of the prohibitions in the 4(d) rule should be removed, except for those directly aimed at slowing the spread of the woodland crayfish.

Our Response: Although invasion by the woodland crayfish is the primary factor causing the species' population declines, additional stressors that affect crayfishes' reproduction or survival make the species less viable. Lowered viability, in turn, results in the crayfishes being more susceptible to displacement by the woodland crayfish. Therefore, prohibiting take from these additional stressors will maximize the species' ability to withstand woodland crayfish invasion. As such, prohibiting take from these additional stressors is considered necessary and advisable, and these prohibitions are included in the 4(d) rule for the species.

(11) Comment: One commenter stated that because the woodland crayfish is the primary factor impacting the two crayfish species, the critical habitat designation will not help to conserve the species. Another commenter asserted that, given the economic impact of designating critical habitat and the minimal conservation benefit, the Service should not designate critical habitat.

Our Response: Under section 4(a)(3)(A) of the Act, the Secretary shall, to the maximum extent prudent and determinable, concurrently with making a determination that a species is an endangered species or a threatened species, designate critical habitat for that species. We have determined that designating critical habitat is both prudent and determinable for the Big Creek crayfish and the St. Francis River crayfish. Therefore, as required by the Act, we proposed to designate as critical habitat those areas occupied by the species at the time of listing and that contain the physical or biological features essential for the conservation of the species, which may require special management considerations or protection.

We are making a determination based on the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impact, of specifying any particular area as critical habitat, as required by section 4(b)(2) of the Act. Our consideration of the economic impacts of the designation are laid out in our economic analysis, as summarized in a memorandum produced by Industrial Economics, Incorporated (IEc) (IEc 2019, entire).

We are not relieved of our statutory obligation to designate critical habitat based on the contention that it will not provide additional conservation benefit. We also do not agree with the assertion that critical habitat will not help conserve the species. Habitat-based threats have been identified as affecting the current and future conditions of these species. Consultations with Federal agencies (and those projects with a Federal nexus) will provide additional conservation benefit. For more information, see the discussion under Summary of Biological Status and Threats, above. If any area provides the physical or biological features essential to the conservation of the species, that area qualifies as critical habitat under the statutory definition of that term (see section 3(5)(A) of the Act) if special management considerations or protection are needed.

(12) Comment: One commenter believes the economic analysis for the proposed designation of critical habitat does not address all of the incremental costs from the designation, particularly costs to those who currently discharge to streams occupied by the two species.

Our Response: In our economic analysis, we incorporated the incremental costs from section 7 consultations associated with the regulation of discharges in our discussion of the Clean Water Act and how discharges are regulated. Regardless of the listing status or designation of critical habitat for the Big Creek crayfish and St. Francis River crayfish, anyone who wishes to discharge dredge or fill material into Big Creek crayfish and St. Francis River crayfish habitat must obtain a permit from the U.S. Army Corps of Engineers (Corps). Under the Clean Water Act, the EPA also implements pollution control programs, such as setting standards for wastewater and other point sources discharges and sets water quality standards for all contaminants in surface waters. Under section 7 of the Act, Federal agencies are required to consult with the Service to ensure that

any action the agencies authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species that is determined by the Secretary to be critical habitat. Issuance of permits by the Corps, implementation of pollution control programs by the EPA, and creation of water quality standards by the EPA all constitute Federal actions and thus require section 7 consultation on the effects on the species, regardless of whether critical habitat is designated. The incremental costs (costs beyond those attributable to a species' listing) associated with section 7 consultations on critical habitat were found to be limited to administrative costs. A further explanation of the incremental costs of section 7 consultations can be found in the screening analysis memorandum for the Big Creek crayfish and the St. Francis River crayfish (IEc 2019, section 3).

Determination of Big Creek Crayfish's and St. Francis River Crayfish's Status

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 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 requires that we determine whether a species meets the definition of endangered species or threatened species because of any of the following factors: (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.

Status Throughout All of Its Range

After evaluating threats to the species and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we found that both the Big Creek crayfish and the St. Francis River crayfish face threats from a nonnative crayfish invasion (Factor E) and declines in water quality (due to heavy metal mining, sedimentation, etc.) (Factor A). These threats continue to impact the species despite the existing regulatory mechanisms (Factor D) and on-going conservation efforts. Given current and predicted future decreases in resiliency, populations will become more vulnerable to extirpation from stochastic events, thereby resulting in concurrent losses in representation and redundancy. The range of plausible future scenarios for the Big Creek crayfish and the St. Francis River crayfish suggests significant reductions in viability into the future (USFWS 2022, pp. 39–43).

In 2008, the woodland crayfish, which is not native to the Upper St. Francis River watershed, was estimated to occupy between 103 and 403 rmi (166 to 649 km) in 5 to 20 subwatersheds. Based on known locations of the woodland crayfish, we know that 5 of the 16 Big Creek crayfish subwatersheds (31 percent) and 4 of the 16 St. Francis River crayfish subwatersheds (25 percent) have been invaded. We also know that the invasion has resulted in extirpation of the Big Creek crayfish in 9.1 rmi (14.7 km) and the St. Francis River crayfish in 8.5 rmi (13.7 km). This is likely an underestimate of the actual extent of both range contractions, given that this represents conditions in only 2 of the 21 streams and 3 of 9 subwatersheds known to be invaded by the woodland crayfish (not all known invaded streams and subwatersheds were surveyed; MDC 2018, unpublished data). In addition, the known locations of the woodland crayfish are likely an under-representation of where the species is present in the watershed given that: (1) The majority of locations were documented prior to 2010; (2) the species can expand at a rate as high as 745 yd per year (681 m per year) in the upstream direction and 2,499 yd per year (2,285 m year) in the downstream direction (DiStefano and Westhoff 2011, pp. 38, 40); (3) the woodland crayfish has likely been introduced at additional, undocumented locations (it is not feasible to survey every stream throughout the watershed); and (4) the invasion has likely progressed since the development of the SSA report and this final rule because there is currently no means to slow or stop the spread of the woodland crayfish.

The range of plausible future scenarios for the Big Creek crayfish and St. Francis River crayfish suggests reduced viability into the future. Under the ''most likely'' scenarios for both species, resiliency is expected to decline within 50 years, given that more than 50 percent of streams occupied by the species are predicted to be invaded by the woodland crayfish. As additional subpopulations become extirpated, this expected reduction in both the number and distribution of healthy (and thus sufficiently resilient) subpopulations is likely to make the species vulnerable to extreme disturbances and environmental and demographic stochasticity.

Our analysis of the Big Creek crayfish's and the St. Francis River crayfish's current and future conditions based on the increasing threat of woodland crayfish invasion and the continuing threat of contamination, as well as the consideration of conservation efforts discussed above, indicates that viability for both the Big Creek crayfish and the St. Francis River crayfish will continue to decline such that they are likely to become in danger of extinction within the foreseeable future throughout all of their ranges.

We considered whether these species are presently in danger of extinction and determined that endangered status is not appropriate. The current conditions as assessed in the SSA indicate that the species are abundant in areas not invaded by the woodland crayfish and the nonnative woodland crayfish has displaced only a portion of both species in their ranges. Although there are documented declines in areas that have been invaded by woodland crayfish, both species are presumed present in over 99 percent of their historical ranges and these areas are relatively small in comparison to the whole occupied area (Service 2022, pp. 27–28). Although the species' representation has declined by some small amount, ecological diversity (and, therefore, adaptive capacity) likely remains at a level that is currently adequate. Redundancy has also slightly declined from historical conditions from a reduction in subpopulations. In short, while the primary threats are currently acting on the species and many of those threats are expected to continue or increase into the future, we did not find that either species is currently in danger of extinction throughout all of its range.

These declines in the species' viability that are predicted to occur in the future will put the species in danger of extinction in the foreseeable future. Thus, after assessing the best available information, we determine that Big Creek crayfish and St. Francis River crayfish are not currently in danger of extinction but are likely to become in danger of extinction within the foreseeable future throughout all of their ranges.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant

listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. The court in *Center for Biological Diversity* v. *Everson,* 435 F. Supp. 3d 69 (D.D.C. 2020) (*Everson*), vacated the aspect of 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'' (Final Policy; 79 FR 37578; July 1, 2014) that provided that the Service does not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range.

Therefore, we proceed to evaluating whether the species is endangered in a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant; and (2) the species is in danger of extinction in that portion. Depending on the case, it might be more efficient for us to address the ''significance'' question or the ''status'' question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species' range.

Following the court's holding in *Everson,* we now consider whether there are any significant portions of the species' range where the species is in danger of extinction now (*i.e.,* endangered). In undertaking these analyses for Big Creek crayfish and the St. Francis River crayfish, we chose to address the status question first—we considered information pertaining to the geographic distribution of both the species and the threats that the species faces to identify portions of the range where the species may be endangered.

We evaluated the range of the Big Creek crayfish and the St. Francis River crayfish to determine if either species is in danger of extinction now in any portion of their ranges.

St. Francis River Crayfish

The St. Francis River Crayfish is a narrow endemic that functions as a single population. Thus, there is no biologically meaningful way to break this limited range into portions, and the threats that this species faces affect the species throughout its entire range. As a result, there are no portions of the species' range where the species has a different biological status from its rangewide biological status. Therefore, we conclude that there are no portions of this species' range that warrant further consideration, and the St. Francis River crayfish is not in danger of extinction in any significant portion of its range, and we determine that this species is likely to become in danger of extinction within the foreseeable future throughout all of its range. This does not conflict with the courts' holdings in *Desert Survivors* v. *U.S. Department of the Interior,* 321 F. Supp. 3d 1011, 1070–74 (N.D. Cal. 2018) and *Center for Biological Diversity* v. *Jewell,* 248 F. Supp. 3d 946, 959 (D. Ariz. 2017) because, in reaching this conclusion, we did not apply the aspects of the Final Policy, including the definition of ''significant'' that those court decisions held to be invalid.

Big Creek Crayfish

We evaluated the range of the Big Creek crayfish to determine if the species is in danger of extinction now in any portion of its range. The range of a species can theoretically be divided into portions in an infinite number of ways. We focused our analysis on portions of the species' range that may meet the definition of an endangered species. For Big Creek crayfish, we considered whether the threats or their effects on the species are greater in any biologically meaningful portion of the species' range than in other portions such that the species is in danger of extinction now in that portion.

The statutory difference between an endangered species and a threatened species is the time frame in which the species becomes in danger of extinction; an endangered species is in danger of extinction now while a threatened species is not in danger of extinction now but is likely to become so in the foreseeable future. Thus, we reviewed the best scientific and commercial data available regarding the time horizon for the threats that are driving the Big Creek crayfish to warrant listing as a threatened species throughout all of its range. We then considered whether these threats or their effects are occurring in any portion of the species' range such that the species is in danger of extinction now in that portion of its range. We examined the following threats: effects from the invasion of nonnative crayfish, contamination by heavy metal mining, and sedimentation, including cumulative effects.

As discussed above, the Big Creek crayfish functions as two populations: the Main and the Twelvemile populations. The woodland crayfish has invaded part of (approximately 31 percent) the range of the Big Creek crayfish but not the Twelvemile population. Because of this difference in the threats, we evaluated whether or not the Main population may have a different status from the rest of the range.

Within the Main population, the woodland crayfish has invaded approximately 36 percent of the range and effects to the species have begun in those areas. However, declines have not been observed in 64 percent of this population (Table 1) and the woodland crayfish will not be impacting those areas until the foreseeable future. Abundance in the Main population has also likely been reduced from heavy metal contamination given that 22 percent of the population occurs in areas with heavy metal surface contamination. However, as discussed above, there are currently multiple healthy subpopulations within the Main population.

The best scientific and commercial data available indicate that the time horizon on which the woodland crayfish threat to the species and the species' responses to this threat are likely to occur is the foreseeable future. In addition, while there are ongoing threats of heavy metal contamination within a small area of the Main population, these combined threats are not causing the Big Creek Crayfish to be in danger of extinction in the Main population, now. The best scientific and commercial data available do not indicate that any of the species' responses to those threats are more immediate in any portions of the species' range.

Instead, the Big Creek Crayfish is likely to become in danger of extinction within the foreseeable future due to the demonstrated threat of the woodland crayfish (and cumulative impacts of other identified threats) in the future for the Main population and the anticipated arrival of the woodland crayfish into the Twelvemile population.

Therefore, we determine, that the Big Creek crayfish is likely to become in danger of extinction within the foreseeable future throughout all of its range. This does not conflict with the courts' holdings in *Desert Survivors* v. *U.S. Department of the Interior,* 321 F. Supp. 3d 1011, 1070–74 (N.D. Cal. 2018) and *Center for Biological Diversity* v. *Jewell,* 248 F. Supp. 3d 946, 959 (D. Ariz. 2017) because, in reaching this conclusion, we did not apply the aspects of the Final Policy, including the definition of ''significant'' that those court decisions held to be invalid.

Determination of Status

Our review of the best scientific and commercial data available indicates that the Big Creek crayfish and the St. Francis River crayfish meet the Act's definition of threatened species.

Therefore, we are listing the Big Creek crayfish and the St. Francis River crayfish as threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition as a listed species, planning and implementation of 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, including the Service, 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. Section 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. 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 consists of preparing draft and final recovery plans, beginning with the development of a recovery outline, and making it available to the public within 30 days of this final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available.

The recovery plan also identifies recovery criteria for review of when a species may be ready for reclassification from endangered to threatened (''downlisting'') or removal from protected status (''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 other conservation partners) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our website (*https://ecos.fws.gov/ecp/*) by searching for each species of crayfish, or from our Missouri 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.

When this listing becomes effective, 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 Missouri will be eligible for Federal funds to implement management actions that promote the protection or recovery of the Big Creek crayfish and the St. Francis River crayfish. Information on our grant programs that are available to aid species recovery can be found at: *https://www.fws.gov/service/financial-assistance.*

Please let us know if you are interested in participating in recovery efforts for the Big Creek crayfish and the St. Francis River crayfish. Additionally, we invite you to submit any new information on these 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 listed as an endangered or threatened species and with respect to its critical habitat. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. 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 any endangered or threatened 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 us.

Federal agency actions within the species' habitat that may require conference or consultation or both as described in the preceding paragraph may include, but are not limited to, management and any other landscape-altering activities on Federal lands administered by the Service, or U.S. Forest Service; issuance of section 404 Clean Water Act permits by the U.S. Army Corps of Engineers; and construction and maintenance of roads or highways by the Federal Highway Administration.

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 final listing on proposed and ongoing activities within the range of a listed species. The discussion below regarding protective regulations under section 4(d) of the Act complies with our policy.

II. Final Rule Issued Under Section 4(d) of the Act

Background

Section 4(d) of the Act contains two sentences. The first sentence states that the Secretary shall issue such regulations as she deems necessary and advisable to provide for the conservation of species listed as threatened. The U.S. Supreme Court has noted that statutory language like ''necessary and advisable'' demonstrates a large degree of deference to the agency (see *Webster* v. *Doe,* 486 U.S. 592 (1988)). Conservation is defined in the Act to mean the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Additionally, the second sentence of section 4(d) of the Act states that the Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants. Thus, the combination of the two sentences of section 4(d) provides

the Secretary with wide latitude of discretion to select and promulgate appropriate regulations tailored to the specific conservation needs of the threatened species. The second sentence grants particularly broad discretion to the Service when adopting the prohibitions under section 9.

The courts have recognized the extent of the Secretary's discretion under this standard to develop rules that are appropriate for the conservation of a species. For example, courts have upheld rules developed under section 4(d) as a valid exercise of agency authority where they prohibited take of threatened wildlife or include a limited taking prohibition (see *Alsea Valley Alliance* v. *Lautenbacher,* 2007 U.S. Dist. Lexis 60203 (D. Or. 2007); *Washington Environmental Council* v. *National Marine Fisheries Service,* 2002 U.S. Dist. Lexis 5432 (W.D. Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (see *State of Louisiana* v. *Verity,* 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history when the Act was initially enacted, ''once an animal is on the threatened list, the Secretary has an almost infinite number of options available to [her] with regard to the permitted activities for those species. [She] may, for example, permit taking, but not importation of such species, or [she] may choose to forbid both taking and importation but allow the transportation of such species'' (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Exercising our authority under section 4(d), we have developed a rule that is designed to address the Big Creek crayfish's and the St. Francis River crayfish's specific threats and conservation needs. Although the statute does not require us to make a ''necessary and advisable'' finding with respect to the adoption of specific prohibitions under section 9, we find that this rule as a whole satisfies the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of the Big Creek crayfish and the St. Francis River crayfish. As discussed above under Summary of Biological Status and Threats, we have concluded that the Big Creek crayfish and the St. Francis River crayfish are likely to become in danger of extinction within the foreseeable future primarily due to invasion by the woodland crayfish, but additionally from the impacts from heavy metal contamination and sedimentation. The provisions of this 4(d) rule will promote conservation of the Big Creek crayfish and the St. Francis River crayfish by discouraging the spread of the woodland crayfish (and other invasive species) and encouraging management of the landscape in ways that maintains the health of Big Creek crayfish and St. Francis River crayfish and conserves the species by maximizing their ability to withstand the woodland crayfish invasion. The provisions of this rule are one of many tools that we will use to promote the conservation of the Big Creek crayfish and the St. Francis River crayfish.

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species.

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Examples of actions that are subject to the section 7 consultation process are actions on State, Tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat—and actions on State, Tribal, local, or private lands that are not federally funded, authorized, or carried out by a Federal agency—do not require section 7 consultation.

This obligation does not change in any way for a threatened species with a species-specific 4(d) rule. Actions that result in a determination by a Federal agency of ''not likely to adversely affect'' continue to require the Service's written concurrence and actions that are ''likely to adversely affect'' a species require formal consultation and the formulation of a biological opinion.

Provisions of the 4(d) Rule

This 4(d) rule will provide for the conservation of the Big Creek crayfish and the St. Francis River crayfish by prohibiting the following activities, except as otherwise authorized or permitted: Import or export; take; possession and other acts with unlawfully taken specimens; delivery, receipt, transport, or shipment in interstate or foreign commerce in the course of commercial activity; and sale or offer for sale in interstate or foreign commerce. The 4(d) rule will also provide for the conservation of the species by the use of other protective regulations as follows:

As discussed above under Summary of Biological Status and Threats, the spread of nonnative crayfish (Factor E) and declines in water quality (due to mining, sedimentation, etc.) (Factor A) are affecting the status of the Big Creek crayfish and the St. Francis River crayfish. A range of activities have the potential to impact these species, including, but not limited to: Recreational activities that promote the spread of the woodland crayfish; mining (heavy metal and gravel); wastewater effluent discharge; agricultural activities; construction of low-water crossings and bridge construction; and destruction of bank habitat that increases rates of sedimentation. Regulating take from these activities would help preserve these species, slow their rate of decline, and decrease synergistic, negative effects from other stressors.

Under the Act, ''take'' means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Some of these provisions have been further defined in regulation at 50 CFR 17.3. Take can result knowingly or otherwise, by direct and indirect impacts, intentionally or incidentally. Regulating incidental and intentional take will help discourage the spread of the woodland crayfish and will maintain or increase water quality to preserve the Big Creek crayfish and the St. Francis River crayfish, slow their rate of decline, and decrease synergistic, negative effects from other stressors.

We may issue permits to carry out otherwise prohibited activities, including those described above, involving threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32. With regard to threatened wildlife, a permit may be issued for the following purposes: For scientific purposes, to enhance propagation or survival, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for special purposes consistent with the purposes of the Act. The statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

We recognize the special and unique relationship with our State natural resource agency partners in contributing to conservation of listed species. State

agencies often possess scientific data and valuable expertise on the status and distribution of endangered, threatened, and candidate species of wildlife and plants. State agencies, because of their authorities and their close working relationships with local governments and landowners, are in a unique position to assist us in implementing all aspects of the Act. In this regard, section 6 of the Act provides that we shall cooperate to the maximum extent practicable with the States in carrying out programs authorized by the Act. Therefore, any qualified employee or agent of a State conservation agency that is a party to a cooperative agreement with us in accordance with section 6(c) of the Act, who is designated by his or her agency for such purposes, will be able to conduct activities designed to conserve Big Creek crayfish or St. Francis River crayfish that may result in otherwise prohibited take without additional authorization. Additionally, this 4(d) rule also allows a person to take a Big Creek crayfish or a St. Francis River crayfish if that person is conducting research or education under a valid Missouri Department of Conservation Wildlife Collector's permit.

Along with State (and State-sponsored) conservation efforts, a person may take, incidental to an otherwise lawful activity, a Big Creek crayfish or a St. Francis River crayfish during restoration activities or other activities that will result in an overall benefit to one or both of the species or their habitat. Such activities include, but are not limited to, heavy metal remediation efforts and habitat restoration efforts.

Our full 4(d) rule for the Big Creek crayfish and the St. Francis River crayfish, including all of the prohibitions and exceptions to prohibitions for these species, is provided below, under Regulation Promulgation.

Nothing in this 4(d) rule will change in any way the recovery planning provisions of section 4(f) of the Act, the consultation requirements under section 7 of the Act, or the ability of the Service to enter into partnerships for the management and protection of the Big Creek crayfish and the St. Francis River crayfish. However, interagency cooperation may be further streamlined through planned programmatic consultations for the species between Federal agencies and the Service.

III. 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.

Our regulations at 50 CFR 424.02 define the geographical area occupied by the species as an area that may generally be delineated around species' occurrences, as determined by the Secretary (*i.e.,* range). Such areas may include those areas used throughout all or part of the species' life cycle, even if not used on a regular basis (*e.g.,* migratory corridors, seasonal habitats, and habitats used periodically, but not solely by vagrant individuals).

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 also 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 Federal agency will be required to consult with the Service under section 7(a)(2) of the Act. However, even if the Service were to conclude that the proposed activity would result in destruction or adverse modification of the critical habitat, the Federal action agency and the landowner are not required to abandon the proposed activity, or to restore or recover the species; instead, they must implement ''reasonable and prudent alternatives'' to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat).

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

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.

When we are determining which areas should be designated as critical habitat, the primary sources of information are generally referenced in the SSA report and also include information developed during the listing process for the species. Additional information sources may include any generalized conservation strategy, criteria, or outline that may have been developed for the species; the recovery plan for the species; articles in peer-reviewed journals; conservation plans developed by States and counties; scientific status surveys and studies; biological assessments; other unpublished materials; or experts' opinions or personal knowledge.

Habitat is dynamic, and species may move from one area to another over time. We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) Conservation actions implemented under section 7(a)(1) of the Act; (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to ensure their actions are not likely to jeopardize the continued existence of any endangered or threatened species; and (3) the prohibitions found in section 9 of the Act. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of this species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of these planning efforts calls for a different outcome.

Physical or Biological Features Essential to the Conservation of the Species

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12(b), in determining which areas we will designate as critical habitat from within the geographical area occupied by the species at the time of listing, we consider the physical or biological features that are essential to the conservation of the species and that may require special management considerations or protection. The regulations at 50 CFR 424.02 define ''physical or biological features essential to the conservation of the species'' as the features that occur in specific areas and that are essential to support the life-history needs of the species, including, but not limited to, water characteristics, soil type, geological features, sites, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity. For example, physical features essential to the conservation of the species might include gravel of a particular size required for spawning, alkaline soil for seed germination, protective cover for migration, or susceptibility to flooding or fire that maintains necessary early-successional habitat characteristics. Biological features might include prey species, forage grasses, specific kinds or ages of trees for roosting or nesting, symbiotic fungi, or a particular level of nonnative species consistent with conservation needs of the listed species. The features may also be combinations of habitat characteristics and may encompass the relationship between characteristics or the necessary amount of a characteristic essential to support the life history of the species.

In considering whether features are essential to the conservation of the species, we may consider an appropriate quality, quantity, and spatial and temporal arrangement of habitat characteristics in the context of the life-history needs, condition, and status of the species. These characteristics include, but are not limited to, space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, or rearing (or development) of offspring; and habitats that are protected from disturbance.

Summary of Essential Physical or Biological Features

We derive the specific physical or biological features essential to the conservation of Big Creek crayfish and St. Francis River crayfish from studies of the species' habitat, ecology, and life history, and describe them below. Additional information can be found in the SSA report (Service 2022, entire) or the proposed rule (85 FR 58192), both documents are available on *https://www.regulations.gov* under Docket No. FWS–R3–ES–2019–0020). We have determined that the following physical or biological features are essential to the conservation of Big Creek crayfish and St. Francis River crayfish:

(1) Stream flow velocity generally between 0 and 1.1 feet per second (ft/s) (0 and 0.35 meters per second (m/s)).

(2) Stream depths generally between 0.2 and 1.6 ft (0.06 and 0.49 m) for the Big Creek crayfish, and stream depths generally between 0.2 and 1.7 ft (0.06 and 0.52 m) for the St. Francis River crayfish.

(3) Water temperatures between 34 and 84 degrees Fahrenheit (°F) (1.1 and 28.9 degrees Celsius (°C)).

(4) Adequately low stream embeddedness so that spaces under rocks and cavities in gravel remain available to the Big Creek crayfish and St. Francis River crayfish.

(5) An available forage and prey base consisting of invertebrates, periphyton, and plant detritus.

(6) Connectivity among occupied stream reaches of the Big Creek crayfish (both within and among occupied subwatersheds), and connectivity among occupied stream reaches of the St. Francis River crayfish (both within and among occupied subwatersheds).

(7) Ratios or densities of nonnative species low enough to allow for maintaining the populations of the Big Creek crayfish and St. Francis River crayfish.

Special Management Considerations or Protection

When designating critical habitat, we assess whether the specific areas within the geographical area occupied by the species at the time of listing contain features that are essential to the conservation of the species and which may require special management considerations or protection. The features essential to the conservation of the Big Creek crayfish and St. Francis River crayfish may require special management considerations or protections to reduce the following threats: (1) Facilitated movement of nonnative crayfish (for example, bait bucket dumping); (2) nutrient pollution that impacts water quantity and quality, including, but not limited to, agricultural runoff and wastewater effluent; (3) significant alteration of water quality (for example, heavy metal contamination); (4) forest management

or silviculture activities that do not implement State-approved best management practices (BMPs) such that riparian corridors are impacted or sedimentation is increased; (5) sedimentation from construction of dams, culverts, and low water crossings that do not allow for the passage of species or materials, and pipeline and utility installation that creates barriers to movement; and (6) other watershed and floodplain disturbances that release sediments or nutrients into the water.

Management activities that could ameliorate these threats include, but are not limited to: Education to encourage responsible and legal bait use and proper disposal of unused bait; use of BMPs designed to reduce sedimentation, erosion, and bank side destruction; protection of riparian corridors and retention of sufficient canopy cover along banks; moderation of surface and ground water withdrawals to maintain natural flow regimes; increased use of stormwater management and reduction of stormwater flows into the systems; remediation of contaminated stream reaches and eroding stream banks; and reduction of other watershed and floodplain disturbances that release sediments, pollutants, or nutrients into the water.

Criteria Used To Identify Critical Habitat

As required by section 4(b)(2) of the Act, we use the best scientific data available to designate critical habitat. In accordance with the Act and our implementing regulations at 50 CFR 424.12(b), we review available information pertaining to the habitat requirements of the species and identify specific areas within the geographical area occupied by the species at the time of listing and any specific areas outside the geographical area occupied by the species to be considered for designation as critical habitat. We are not designating any areas outside the geographical areas occupied by the species because we have not identified any unoccupied areas that meet the definition of critical habitat and we have determined that designating the occupied areas is sufficient to conserve the Big Creek crayfish and the St. Francis River crayfish.

We anticipate that recovery will require continued protection of existing populations and habitat, as well as ensuring there are adequate numbers of Big Creek crayfish and St. Francis River crayfish in stable subpopulations and that these subpopulations occur over a wide geographic area. This strategy will help to ensure that extreme events, such as the effects of flooding (for example, flooding that causes excessive sedimentation, nutrients, and debris to disrupt stream ecology), droughts, or chemical spills, cannot simultaneously affect all known subpopulations. The following rangewide potential recovery actions were considered in formulating this designation of critical habitat: (1) Mitigating or minimizing the effects of the spread of woodland crayfish, preventing additional introductions of woodland crayfish (and other nonnative species), investigating methods to slow or halt the expansion of woodland crayfish, and investigating methods of eradicating woodland crayfish; (2) maintaining the quality and quantity of habitat (including, but not limited to, preventing increased sedimentation rates); (3) preventing additional heavy metal contamination and remediating previous heavy metal contamination; (4) investigating other water quality issues that may impact crayfish abundance; and (5) minimizing loss of rangewide genetic diversity by maintaining adequate population sizes, distribution, and connectivity.

Sources of data for these designations of critical habitat include the Missouri Department of Conservation, National Hydrography Dataset Plus (for mapping purposes), published literature, survey reports on water quality in various streams within the species' ranges (for more information, see the SSA report), and the proposed rule (85 FR 58192; September 17, 2020). We have also reviewed available information that pertains to the habitat requirements of this species. Sources of information on habitat requirements include studies conducted at occupied sites and published in peer-reviewed articles, agency reports, and data collected during monitoring efforts (see the SSA report: Service 2022). We have also reviewed all comments submitted by the public during two public comment periods on the proposed rule (see 85 FR 58192, September 17, 2020, and 86 FR 22127, April 27, 2021).

We consider the areas occupied at the time of listing to include all streams within occupied subwatersheds (at the 12-digit hydrologic unit level). Occupied watersheds were determined using data from the Missouri Department of Conservation. For the purposes of designating critical habitat, we also consider stretches of the St. Francis River between subwatersheds as occupied migratory corridors, based on genetic analyses that indicate there is gene flow among subwatersheds.

Based on this information, we consider all streams within the following subwatersheds in the Upper St. Francis River watershed to be currently occupied by the Big Creek crayfish at the time of this final listing (numbers in parentheses represent the 12-digit hydrologic codes): Big Lake Creek-St. Francis River (080202020503), Blankshire Branch-St. Francis River (080202020204), Captain Creek-St. Francis River (080202020405), Cedar Bottom Creek-St. Francis River (080202020402), Clark Creek (080202020407), Cedar Bottom Creek (080202020501), Crane Pond Creek (080202020303), Headwaters St. Francis River (080202020201), Headwaters Twelvemile Creek (080202020403), Leatherwood Creek-St. Francis River (080202020406), Lower Big Creek (080202020304), Middle Big Creek (080202020302), Saline Creek-Little St. Francis River (080202020102), Turkey Creek-St. Francis River (080202020210), Twelvemile Creek (080202020404), and Upper Big Creek (080202020301). We also consider the entire St. Francis River upstream of 37.091254N, 90.447212W to be occupied, as genetic analyses indicate gene flow among the subwatersheds.

For the St. Francis River crayfish, we consider all streams within the following subwatersheds to be currently occupied at the time of listing: Blankshire Branch-St. Francis River (80202020204), Captain Creek-St. Francis River (80202020405), Cedar Bottom Creek-St. Francis River (80202020402), Headwaters St. Francis River (80202020201), Headwaters Stouts Creek (80202020207), Hubble Creek-St. Francis River (80202020502), Leatherwood Creek-St. Francis River (80202020406), Little St. Francis River (80202020103), Lost Creek (80202020507), Marble Creek (80202020401), Musco Creek-Little St. Francis River (80202020101), O'Bannon Creek-St. Francis River (80202020206), Saline Creek-Little St. Francis River (80202020102), Stouts Creek (80202020208), Turkey Creek-St. Francis River (80202020210), and Wachita Creek-St. Francis River (80202020209). We also consider the entire St. Francis River upstream of 36.982104N, 90.335400W to be currently occupied, given that genetic analyses indicate gene flow among subwatersheds. The final critical habitat designation for each species includes all known currently occupied streams within the historical range, as well as those that connect occupied streams that contain the physical or biological features that will allow for the maintenance and expansion of existing populations and movement between them. See Final Critical Habitat

Designations, below, for a more detailed explanation of the units.

When determining critical habitat boundaries, we made every effort to avoid including developed areas such as lands covered by buildings, pavement, and other structures because such lands lack physical or biological features necessary for Big Creek crayfish and the St. Francis River crayfish. The scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed lands. Any such lands inadvertently left inside critical habitat boundaries shown on the maps of this rule have been excluded by text in the rule and are not designated as critical habitat. Therefore, a Federal action involving these lands will not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification unless the specific action will affect the physical or biological features in the adjacent critical habitat.

We are designating as critical habitat areas that we have determined are occupied at the time of listing (*i.e.,* currently occupied) and that contain one or more of the physical or biological features that are essential to support life-history processes of the species.

We are designating one critical habitat unit for each species, for a total of two units for both species, based on one or more of the physical or biological features being present to support the Big Creek crayfish or St. Francis River crayfish's life-history processes. All units are occupied and contain one or more of the identified physical or biological features and support multiple life-history processes.

The critical habitat designations are defined by the map or maps, as modified by any accompanying regulatory text, presented at the end of this document under Regulation Promulgation. We include more detailed information on the boundaries of each critical habitat designation in the preamble of this document. We will make the coordinates or plot points or both on which each map is based available to the public on *https://www.regulations.gov* at Docket No. FWS–R3–ES–2019–0020 and at the field office responsible for the designation (see **FOR FURTHER INFORMATION CONTACT**).

Final Critical Habitat Designations

We are designating one unit for each species, for a total of two units for both species, as critical habitat for the Big Creek crayfish and the St. Francis River crayfish. The critical habitat areas we describe below constitute our current best assessment of areas that meet the definition of critical habitat for Big Creek crayfish and St. Francis River crayfish. We are designating approximately 1,069 rmi (1,720 km) of critical habitat in one unit for Big Creek crayfish. We are designating approximately 1,043 rmi (1,679 km) of critical habitat in another unit for the St. Francis River crayfish. Tables 6 and 7 provide information on the approximate area of each unit and the adjacent land ownership. Because all streambeds are navigable waters, both critical habitat units are managed by the State of Missouri. The units include stream habitat up to bank full height. We are not designating any adjacent land as critical habitat.

TABLE 6—CRITICAL HABITAT UNIT FOR BIG CREEK CRAYFISH

Adjacent land ownership	Stream miles (kilometers)
Federal	296 (476)
State	42 (68)
Private	730 (1,175)
Total	1,069 (1,720)

Note: Area sizes may not sum due to rounding.

TABLE 7—CRITICAL HABITAT UNIT FOR ST. FRANCIS RIVER CRAYFISH

Adjacent land ownership	Stream miles (kilometers)
Federal	329 (529)
State	22 (35)
Private	693 (1,115)
Total	1,043 (1,679)

Note: Area sizes may not sum due to rounding.

We present brief descriptions of both units, and reasons why each one meets the definition of critical habitat for Big Creek crayfish or St. Francis River crayfish, below.

Big Creek Crayfish Unit

The Big Creek crayfish unit consists of approximately 1,069 rmi (1,720 km) in the Upper St. Francis River watershed upstream of Wappapello Dam in Iron, Madison, St. Francois, Washington, and Wayne Counties in Missouri. The unit consists of all of the streams in the following 12-digit hydrologic units: Big Lake Creek-St. Francis River (080202020503), Blankshire Branch-St. Francis River (080202020204), Captain Creek-St. Francis River (080202020405), Cedar Bottom Creek-St. Francis River (080202020402), Clark Creek (080202020407), Cedar Bottom Creek (080202020501), Crane Pond Creek (080202020303), Headwaters St. Francis River (080202020201), Headwaters Twelvemile Creek (080202020403), Leatherwood Creek-St. Francis River (080202020406), Lower Big Creek (080202020304), Middle Big Creek (080202020302), Saline Creek-Little St. Francis River (080202020102), Turkey Creek-St. Francis River (080202020210), Twelvemile Creek (080202020404), and Upper Big Creek (080202020301). The unit also consists of the entire St. Francis River upstream of 37.091254N, 90.447212W. The unit does not include any areas of adjacent land. A large portion of the riparian land adjacent to streams in this unit is privately owned (68 percent), with 28 percent in Federal ownership and 4 percent in State ownership.

St. Francis River Crayfish Unit

The St. Francis River crayfish unit consists of approximately 1,043 rmi (1,679 km) in the Upper St. Francis River watershed upstream of Wappapello Dam in Iron, Madison, St. Francois, Washington, and Wayne Counties in Missouri. The unit consists of all of the streams in the following 12-digit hydrologic units: Blankshire Branch-St. Francis River (80202020204), Captain Creek-St. Francis River (80202020405), Cedar Bottom Creek-St. Francis River (80202020402), Headwaters St. Francis River (80202020201), Headwaters Stouts Creek (80202020207), Hubble Creek-St. Francis River (80202020502), Leatherwood Creek-St. Francis River (80202020406), Little St. Francis River (80202020103), Lost Creek (80202020507), Marble Creek (80202020401), Musco Creek-Little St. Francis River (80202020101), O'Bannon Creek-St. Francis River (80202020206), Saline Creek-Little St. Francis River (80202020102), Stouts Creek (80202020208), Turkey Creek-St. Francis River (80202020210), and Wachita Creek-St. Francis River (80202020209). The unit also consists of the entire St. Francis River upstream of 36.982104N, 90.335400W. The unit does not include any areas of adjacent land. A large portion of the riparian land adjacent to streams in this unit is privately owned (66 percent), with 32 percent in Federal ownership and 2 percent in State ownership.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species.

We published a final rule revising the definition of destruction or adverse modification on August 27, 2019 (84 FR 44976). Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.

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

Compliance with the requirements of section 7(a)(2) is documented through our issuance of:

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

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

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

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

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

(3) Are economically and technologically feasible, and

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

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

Regulations at 50 CFR 402.16 set forth requirements for Federal agencies to reinitiate consultation on previously reviewed actions. These requirements apply when the Federal agency has retained discretionary involvement or control over the action (or the agency's discretionary involvement or control is authorized by law) and, subsequent to the previous consultation: (a) if the amount or extent of taking specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or (d) if a new species is listed or critical habitat designated that may be affected by the identified action. The reinitiation requirement applies only to actions that remain subject to some discretionary Federal involvement or control. As provided in 50 CFR 402.16, the requirement to reinitiate consultations for new species listings or critical habitat designation does not apply to certain agency actions (*e.g.,* land management plans issued by the Bureau of Land Management in certain circumstances.

Application of the ''Adverse Modification'' Standard

The key factor related to the destruction or adverse modification determination is whether implementation of the proposed Federal action directly or indirectly alters the designated critical habitat in a way that appreciably diminishes the value of the critical habitat as a whole for the conservation of the listed species. As discussed above, the role of critical habitat is to support physical or biological features essential to the conservation of a listed species and provide for the conservation of the species.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe, in any proposed or final regulation that designates critical habitat, activities involving a Federal action that may violate section 7(a)(2) of the Act by destroying or adversely modifying such habitat, or that may be affected by such designation.

At this time, we are not aware of any activities that are likely to destroy or adversely modify critical habitat. However, during each consultation under section (7a)(2) of the Act, we will evaluate whether proposed activities are likely to destroy or adversely modify critical habitat.

Exemptions

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

Section 4(a)(3)(B)(i) of the Act (16 U.S.C. 1533(a)(3)(B)(i)) provides that the Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense (DoD), or designated for its use, that are subject to an integrated natural resources management plan (INRMP) prepared under section 101 of the Sikes Act Improvement Act of 1997 (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation. There are no DoD lands with a completed INRMP within the final critical habitat designations.

Consideration of Impacts Under Section 4(b)(2) of the Act

Section 4(b)(2) of the Act states that the Secretary shall designate and make revisions to critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if she determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless she determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species. In making the determination to exclude a particular area, the statute on its face, as well as the legislative history, are clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor. In this final rule, we have not considered any areas for exclusion from critical habitat.

On December 18, 2020, we published a final rule in the **Federal Register** (85 FR 82376) revising portions of our regulations pertaining to exclusions of critical habitat. These final regulations became effective on January 19, 2021, and apply to critical habitat rules for which a proposed rule was published

after January 19, 2021. Consequently, these new regulations do not apply to this final rule.

Exclusions Based on Economic Impacts

Section 4(b)(2) of the Act and its implementing regulations require that we consider the economic impact that may result from a designation of critical habitat. To consider economic impacts, we prepared an incremental effects memorandum (IEM) and screening analysis, which, together with our narrative and interpretation of effects, we consider our economic analysis of the proposed critical habitat designations and related factors (IEc 2019, entire). The analysis, dated March 28, 2019, was made available for public review from September 17, 2020, through November 16, 2020 (see 85 FR 58192; September 17, 2020) and from April 27, 2021, to May 27, 2021 (see 86 FR 22127; April 27, 2021). The economic analysis addressed probable economic impacts of critical habitat designation for Big Creek crayfish and St. Francis River crayfish. Following the close of the comment periods, we reviewed and evaluated all information submitted during the comment periods that may pertain to our consideration of the probable incremental economic impacts of these critical habitat designations.

Our analysis concluded that these costs will not reach the threshold of ''significant'' under E.O. 12866. For the critical habitat designations for both species, we anticipate a maximum of 115 section 7 consultations annually at a total incremental cost of approximately $135,000 per year (IEc 2019, entire).

As we stated earlier, we solicited data and comments from the public on the economic analysis, as well as all aspects of the proposed rule and our required determinations. We did not receive any comments or additional data that would necessitate a revision of our IEM or screening analysis. Therefore, we are adopting our draft economic analysis as our final economic analysis.

We considered the economic impacts of the critical habitat designations. The Secretary is not exercising her discretion to exclude any areas from these designations of critical habitat for the Big Creek crayfish and the St. Francis River crayfish based on economic impacts.

Exclusions Based on Impacts on National Security and Homeland Security

In preparing this final rule, we have determined that the lands within the designations of critical habitat for Big Creek crayfish and St. Francis River crayfish are not owned or managed by the DoD or Department of Homeland Security, and, therefore, we anticipate no impact on national security or homeland security. We did not receive any additional information during the public comment period for the proposed designation regarding impacts of the designation on national security or homeland security that would support excluding any specific areas from the final critical habitat designation under authority of section 4(b)(2) and our implementing regulations at 50 CFR 424.19.

Exclusions Based on Other Relevant Impacts

Under section 4(b)(2) of the Act, we consider any other relevant impacts, in addition to economic impacts and impacts on national security as discussed above. We consider a number of factors, including whether there are permitted conservation plans covering the species in the area such as HCPs, safe harbor agreements (SHAs), or candidate conservation agreements with assurances (CCAAs), or whether there are non-permitted conservation agreements and partnerships that would be encouraged by designation of, or exclusion from, critical habitat. In addition, we look at the existence of Tribal conservation plans and partnerships and consider the government-to-government relationship of the United States with Tribal entities. We also consider any social impacts that might occur because of the designations.

In preparing this final rule, we have determined that there are currently no HCPs or other management plans for Big Creek crayfish and St. Francis River crayfish, and the designations do not include any Tribal lands or trust resources. We anticipate no impact on Tribal lands, partnerships, or HCPs from the critical habitat designations. Additionally, as described above, we are not excluding any particular areas on the basis of impacts to national security or economic impacts because there are no national security areas in the critical habitat designations.

During the development of these final designations, we considered all additional information received through the public comment periods regarding other relevant impacts to determine whether any specific areas should have been excluded from the final critical habitat designations under authority of section 4(b)(2) and our implementing regulations at 50 CFR 424.19. As stated above, the Secretary is not exercising her discretion to exclude any areas from the final critical habitat designations.

Required Determinations

Regulatory Planning and Review (Executive Orders 12866 and 13563)

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

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

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

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq.*), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA; 5 U.S.C. 801 *et seq.*), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (*i.e.,* small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. The SBREFA amended the RFA to require Federal agencies to provide a certification statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities.

According to the Small Business Administration, small entities include small organizations such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; and small businesses (13 CFR 121.201). Small businesses include manufacturing and mining

concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential economic impacts to these small entities are significant, we considered the types of activities that might trigger regulatory impacts under this designation as well as types of project modifications that may result. In general, the term ''significant economic impact'' is meant to apply to a typical small business firm's business operations.

Under the RFA, as amended, and as understood in light of recent court decisions, Federal agencies are required to evaluate the potential incremental impacts of rulemaking on those entities directly regulated by the rulemaking itself; in other words, the RFA does not require agencies to evaluate the potential impacts to indirectly regulated entities. The regulatory mechanism through which critical habitat protections are realized is section 7 of the Act, which requires Federal agencies, in consultation with the Service, to ensure that any action authorized, funded, or carried out by the agency is not likely to destroy or adversely modify critical habitat. Therefore, under section 7, only Federal action agencies are directly subject to the specific regulatory requirement (avoiding destruction and adverse modification) imposed by critical habitat designation. Consequently, it is our position that only Federal action agencies will be directly regulated by this designation. There is no requirement under the RFA to evaluate the potential impacts to entities not directly regulated. Moreover, Federal agencies are not small entities. Therefore, because no small entities will be directly regulated by this rulemaking, we certify that the final critical habitat designations will not have a significant economic impact on a substantial number of small entities.

In summary, we have considered whether the final critical habitat designations will result in a significant economic impact on a substantial number of small entities. For the above reasons and based on currently available information, we certify that the final critical habitat designation will not have a significant economic impact on a substantial number of small business entities. Therefore, a regulatory flexibility analysis is not required.

Energy Supply, Distribution, or Use—Executive Order 13211

Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare Statements of Energy Effects when undertaking certain actions. In our economic analysis, we did not find that the critical habitat designations will significantly affect energy supplies, distribution, or use. The critical habitat designations for Big Creek crayfish and St. Francis River crayfish are unlikely to generate costs exceeding $100 million in a single year (IEc 2019, p. 2). Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

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

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

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

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

(2) We do not believe that this rule will significantly or uniquely affect small governments because the lands within the critical habitat designations are primarily Federally or privately owned and are managed by the State of Missouri and, therefore, do not fall within the jurisdiction of small governments. Therefore, a Small Government Agency Plan is not required.

Takings—Executive Order 12630

In accordance with E.O. 12630 (Government Actions and Interference with Constitutionally Protected Private Property Rights), we have analyzed the potential takings implications of designating critical habitat for Big Creek crayfish and St. Francis River crayfish in a takings implications assessment. The Act does not authorize the Service to regulate private actions on private lands or confiscate private property as a result of critical habitat designation. Designation of critical habitat does not affect land ownership, or establish any closures, or restrictions on use of or access to the designated areas. Furthermore, the designation of critical habitat does not affect landowner actions that do not require Federal funding or permits, nor does it preclude development of habitat conservation programs or issuance of incidental take permits to permit actions that do require

Federal funding or permits to go forward. However, Federal agencies are prohibited from carrying out, funding, or authorizing actions that would destroy or adversely modify critical habitat. A takings implications assessment has been completed for the designation of critical habitat for Big Creek crayfish and the St. Francis River crayfish, and it concludes that the designations of critical habitat do not pose significant takings implications for lands within or affected by the designations.

Federalism—Executive Order 13132

In accordance with E.O. 13132 (Federalism), this rule does not have significant Federalism effects. A federalism summary impact statement is not required. In keeping with Department of the Interior and Department of Commerce policy, we requested information from, and coordinated development of the critical habitat designations with, appropriate State resource agencies and incorporated comments when applicable into this final rule. From a federalism perspective, the designation of critical habitat directly affects only the responsibilities of Federal agencies. The Act imposes no other duties with respect to critical habitat, either for States and local governments, or for anyone else. As a result, the rule does not have substantial direct effects either on the States, or on the relationship between the national government and the States, or on the distribution of powers and responsibilities among the various levels of government. The designations may have some benefit to these governments because the areas that contain the features essential to the conservation of the species are more clearly defined, and the physical or biological features of the habitat necessary for the conservation of the species are specifically identified. This information does not alter where and what federally sponsored activities may occur. However, it may assist State and local governments in long-range planning because they no longer have to wait for case-by-case section 7 consultations to occur.

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

Civil Justice Reform—Executive Order 12988

In accordance with Executive Order 12988 (Civil Justice Reform), the Office of the Solicitor has determined that the rule will not unduly burden the judicial system and that it meets the requirements of sections 3(a) and 3(b)(2) of the Order. We are designating critical habitat in accordance with the provisions of the Act. To assist the public in understanding the habitat needs of the species, this rule identifies the physical or biological features essential to the conservation of the species. The designated areas of critical habitat are presented on maps, and the rule provides several options for the interested public to obtain more detailed location information, if desired.

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

This rule does not contain information collection requirements, and a submission to the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*) is not required. We may not conduct or sponsor and you are not required to respond to a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act (32 U.S.C. 4321 et seq.)

Regulations adopted pursuant to section 4(a) of the Act are exempt from the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) and do not require an environmental analysis under NEPA. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This includes listing, delisting, and reclassification rules, as well as critical habitat designations and species-specific protective regulations promulgated concurrently with a decision to list or reclassify a species as threatened. The courts have upheld this position (*e.g., Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995) (critical habitat); *Center for Biological Diversity* v. *U.S. Fish and Wildlife Service,* 2005 WL 2000928 (N.D. Cal. Aug. 19, 2005) (concurrent 4(d) rule)).

Government-To-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with federally recognized Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. We have determined that no Tribal lands fall within the boundaries of the final critical habitat designation for the Big Creek crayfish or for the St. Francis River crayfish, so no Tribal lands will be affected by the designations.

References Cited

A complete list of references cited in this rulemaking is available on the internet at *https://www.regulations.gov* and upon request from the Missouri Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this final rule are the staff members of the Fish and Wildlife Service's Species Assessment Team and the Missouri Ecological Services Field Office.

List of Subjects in 50 CFR Part 17

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

Regulation Promulgation

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

PART 17—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, in paragraph (h), by adding, in alphabetical order under CRUSTACEANS, entries for ''Crayfish, Big Creek'' and ''Crayfish, St. Francis

River'' to the List of Endangered and Threatened Wildlife to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
*	*	*	*	*
CRUSTACEANS				
*	*	*	*	*
Crayfish, Big Creek	*Faxonius peruncus*	Wherever found	T	88 FR [insert **Federal Register** page where the document begins], 4/27/2023; 50 CFR 17.46(c);[4d] 50 CFR 17.95(h).[CH]
*	*	*	*	*
Crayfish, St. Francis River.	*Faxonius quadruncus*	Wherever found	T	88 FR [insert **Federal Register** page where the document begins], 4/27/2023; 50 CFR 17.46(c);[4d] 50 CFR 17.95(h).[CH]
*	*	*	*	*

■ 3. Amend § 17.46 by adding paragraph (c) to read as follows:

§ 17.46 Special rules—crustaceans.

* * * * *

(c) Big Creek crayfish (*Faxonius peruncus*) and St. Francis River crayfish (*Faxonius quadruncus*).

(1) *Prohibitions.* The following prohibitions that apply to endangered wildlife also apply to the Big Creek crayfish and the St. Francis River crayfish. Except as provided under paragraph (c)(2) of this section and §§ 17.4 and 17.5, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or cause to be committed, any of the following acts in regard to this species:

(i) Import or export, as set forth at § 17.21(b) for endangered wildlife.

(ii) Take, as set forth at § 17.21(c)(1) for endangered wildlife. Activities that could result in take are those that:

(A) Impact crayfish habitat, riparian areas adjacent to crayfish sites, or habitat between connecting sites such that the species' reproduction or survival will be impacted or the effects of woodland crayfish invasion will be exacerbated. Such activities include, but are not limited to:

(*1*) Construction of instream low-water crossings;

(*2*) Destruction of riparian habitat that results in excessive sedimentation;

(*3*) Bridge construction; and

(*4*) Gravel mining.

(B) Lead to the introduction of heavy metals into streams. Such activities include, but are not limited to, heavy metal mining.

(C) Appreciably negatively affect water quality, chemistry, or quantity such that the species' reproduction or survival will be impacted. Such activities may include, but are not limited to, the release of wastewater effluent and agricultural runoff.

(D) Impact hydrological flows such that the species' reproduction or survival will be impacted. Such activities include, but are not limited to, construction of dams, modification of stream channels, and surface and groundwater withdrawals.

(E) Facilitate the spread of woodland crayfish or introduce additional woodland crayfish in occupied Big Creek crayfish or St. Francis River crayfish stream reaches. Such activities may include, but are not limited to, bait bucket dumping.

(iii) Possession and other acts with unlawfully taken specimens, as set forth at § 17.21(d)(1) for endangered wildlife.

(iv) Interstate or foreign commerce in the course of commercial activity, as set forth at § 17.21(e) for endangered wildlife.

(v) Sale or offer for sale, as set forth at § 17.21(f) for endangered wildlife.

(2) *Exceptions from prohibitions.* In regard to this species, you may:

(i) Conduct activities as authorized by a permit under § 17.32.

(ii) Take, as set forth at § 17.21(c)(2) through (c)(4) for endangered wildlife.

(iii) Take, as set forth at § 17.31(b).

(iv) Take incidental to an otherwise lawful activity caused by:

(A) Restoration activities or other activities that will result in an overall benefit to one or both of the species or their habitat that are completed in coordination with the Missouri Ecological Services Field Office. Such activities include, but are not limited to, stream bank stabilization, habitat restoration, heavy metal remediation, and replacement of low water crossings that obstruct movement of aquatic organisms with crossings that facilitate the movement of aquatic species (aquatic organism passages).

(B) A person conducting research or education under a valid Missouri Department of Conservation Wildlife Collector's permit.

(v) Possess and engage in other acts with unlawfully taken wildlife, as set forth at § 17.21(d)(2) for endangered wildlife.

■ 4. In § 17.95 amend paragraph (h), by:

■ a. Adding an entry for ''Big Creek Crayfish (*Faxonius peruncus*)'' following the entry for ''Pecos amphipod (*Gammarus pecos*)''; and

■ b. Adding an entry for ''St. Francis River Crayfish (*Faxonius quadruncus*)'' following the entry for ''Slenderclaw Crayfish (*Cambarus cracens*)''.

The additions read as follows:

§ 17.95 Critical habitat—fish and wildlife.

* * * * *

(h) *Crustaceans.*

* * * * *

Big Creek Crayfish (*Faxonius peruncus*)

(1) The critical habitat unit is depicted for Iron, Madison, St. Francois, Washington, and Wayne Counties in Missouri, on the map in this entry.

(2) Within the critical habitat unit, the physical or biological features essential to the conservation of the Big Creek crayfish consist of the following components:

(i) Stream flow velocity generally between 0 and 1.1 feet per second (ft/s) (0 and 0.35 meters per second (m/s)).

(ii) Stream depths generally between 0.2 and 1.6 feet (0.06 and 0.49 meters).

(iii) Water temperatures between 34 and 84 °F (1.1 and 28.9 °C).

(iv) Adequately low stream embeddedness so that spaces under rocks and cavities in gravel remain available to the Big Creek crayfish.

(v) An available forage and prey base consisting of invertebrates, periphyton, and plant detritus.

(vi) Connectivity among occupied stream reaches of the Big Creek crayfish (both within and among occupied subwatersheds).

(vii) Adequately low ratios or densities of nonnative species that allow for maintaining populations of the Big Creek crayfish.

(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on May 30, 2023.

(4) The National Hydrography Dataset Plus (NHD*Plus*) was the geospatial data used to delineate critical habitat. NHD*Plus* is a national geospatial surface water framework that integrates the National Hydrography Dataset with the National Elevation Dataset and the Watershed Boundary Dataset. NHD*Plus* uses medium resolution (1:100,000-scale) data with a geographic projection and NAD83 datum. Critical habitat was delineated by including all streams within subwatersheds (at the 12-digit hydrologic unit level) occupied by the Big Creek crayfish. Occupied watersheds were defined using data from the Missouri Department of Conservation; the entire St. Francis River upstream of 37.091254N, 90.447212W is also considered occupied as a migratory route. The map in this entry, as modified by any accompanying regulatory text, establishes the boundaries of the critical habitat designation. The coordinates or plot points or both on which the map is based are available to the public at *https://www.regulations.gov* under Docket No. FWS–R3–ES–2019–0020 and at the Missouri Ecological Services Field Office. You may obtain field office location information by contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) Big Creek Crayfish Unit—Iron, Madison, St. Francois, Washington, and Wayne Counties, Missouri.

(i) The unit consists of all of the streams (approximately 1,069 river miles (1,720 kilometers)) upstream of Wappapello Dam in the following subwatersheds (numbers in parentheses represent the 12-digit hydrologic codes): Big Lake Creek-St. Francis River (080202020503), Blankshire Branch-St. Francis River (080202020204), Captain Creek-St. Francis River (080202020405), Cedar Bottom Creek-St. Francis River (080202020402), Clark Creek (080202020407), Cedar Bottom Creek (080202020501), Crane Pond Creek (080202020303), Headwaters St. Francis River (080202020201), Headwaters Twelvemile Creek (080202020403), Leatherwood Creek-St. Francis River (080202020406), Lower Big Creek (080202020304), Middle Big Creek (080202020302), Saline Creek-Little St. Francis River (080202020102), Turkey Creek-St. Francis River (080202020210), Twelvemile Creek (080202020404), and Upper Big Creek (080202020301). The unit also consists of the entire St. Francis River upstream of 37.091254N, 90.447212W. The unit does not include any areas of adjacent land. This unit includes stream habitat up to bank full height.

(ii) Map of Big Creek Crayfish Unit of Big Creek crayfish critical habitat follows:

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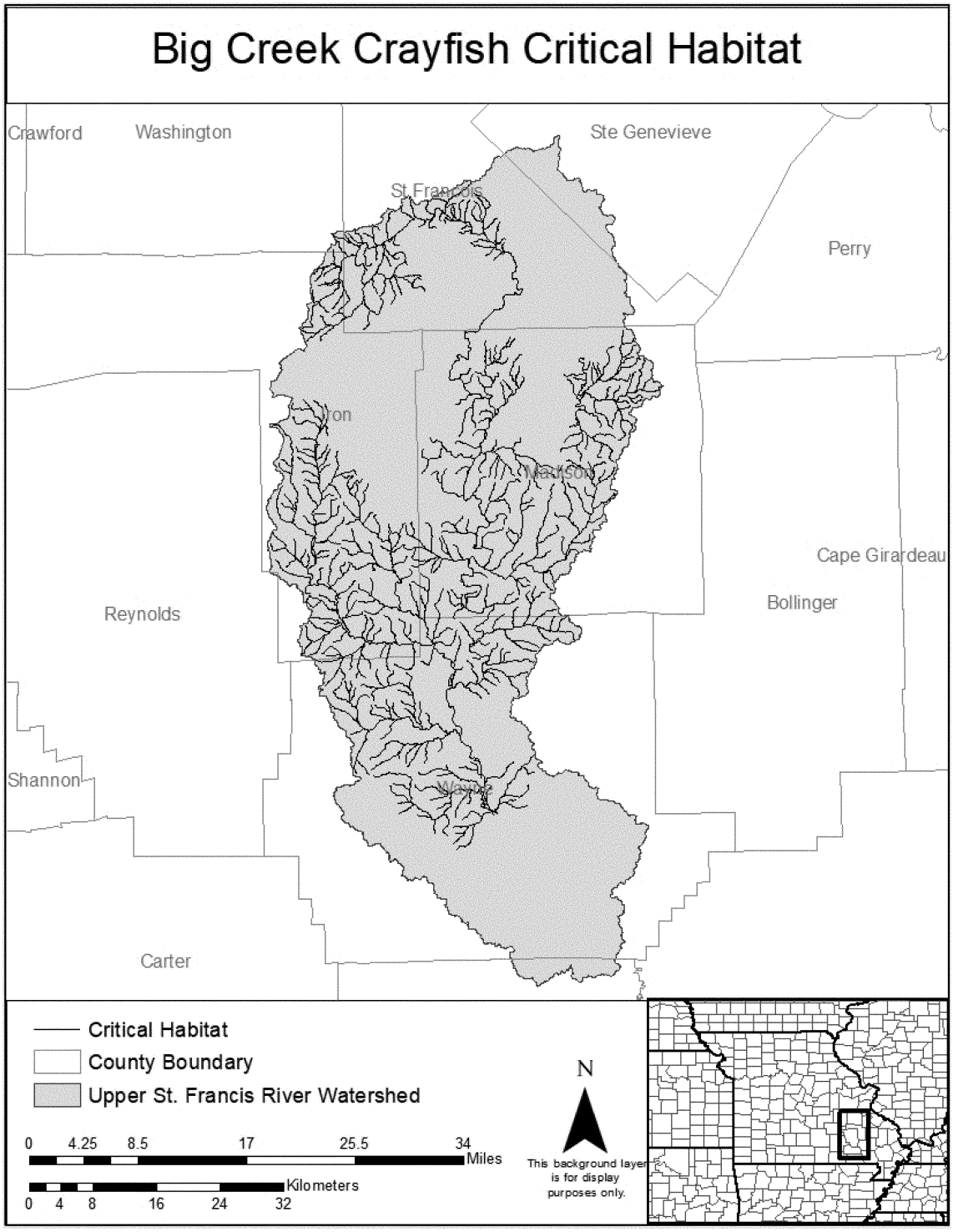
Figure 1 for Big Creek Crayfish (*Faxonius peruncus*) paragraph (5)(ii)



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St. Francis River Crayfish (*Faxonius quadruncus*)

(1) The critical habitat unit is depicted for Iron, Madison, St. Francois, Washington, and Wayne Counties in Missouri, on the map in this entry.

(2) Within the critical habitat unit, the physical or biological features essential to the conservation of the St. Francis River crayfish consist of the following components:

(i) Stream flow velocity generally between 0 and 1.1 feet per second (ft/s) (0 and 0.35 meters per second (m/s)).

(ii) Stream depths generally between 0.2 and 1.7 feet (0.06 and 0.52 meters).

(iii) Water temperatures between 34 and 84 °F (1.1 and 28.9 °C).

(iv) Adequately low stream embeddedness so that spaces under rocks and cavities in gravel remain available to the St. Francis River crayfish.

(v) An available forage and prey base consisting of invertebrates, periphyton, and plant detritus.

(vi) Connectivity among occupied stream reaches of the St. Francis River

crayfish (both within and among occupied subwatersheds).

(vii) Adequately low ratios or densities of nonnative species that allow for maintaining populations of the St. Francis River crayfish.

(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on May 30, 2023.

(4) The National Hydrography Dataset Plus (NHD*Plus*) was the geospatial data used to delineate critical habitat. NHD*Plus* is a national geospatial surface water framework that integrates the National Hydrography Dataset with the National Elevation Dataset and the Watershed Boundary Dataset. NHD*Plus* uses medium resolution (1:100,000-scale) data with a geographic projection and NAD83 Datum. Critical habitat was delineated by including all streams within subwatersheds (at the 12-digit hydrologic unit level) occupied by the St. Francis River crayfish. Occupied watersheds were defined using data from the Missouri Department of Conservation; the entire St. Francis River upstream of 36.982104N, 90.335400W is also considered occupied as a migratory route. The map in this entry, as modified by any accompanying regulatory text, establishes the boundaries of the critical habitat designation. The coordinates or plot points or both on which the map is based are available to the public at *https://www.regulations.gov* under Docket No. FWS–R3–ES–2019–0020 and at the Missouri Ecological Services Field Office. You may obtain field office location information by contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) St. Francis River Crayfish Unit—Iron, Madison, St. Francois, Washington, and Wayne Counties, Missouri.

(i) The unit consists of all of the streams (approximately 1,043 river miles (1,679 kilometers)) upstream of Wappapello Dam in the following subwatersheds (numbers in parentheses represent the 12-digit hydrologic codes): Blankshire Branch-St. Francis River (80202020204), Captain Creek-St. Francis River (80202020405), Cedar Bottom Creek-St. Francis River (80202020402), Headwaters St. Francis River (80202020201), Headwaters Stouts Creek (80202020207), Hubble Creek-St. Francis River (80202020502), Leatherwood Creek-St. Francis River (80202020406), Little St. Francis River (80202020103), Lost Creek (80202020507), Marble Creek (80202020401), Musco Creek-Little St. Francis River (80202020101), O'Bannon Creek-St. Francis River (80202020206), Saline Creek-Little St. Francis River (80202020102), Stouts Creek (80202020208), Turkey Creek-St. Francis River (80202020210), and Wachita Creek-St. Francis River (80202020209). The unit also consists of the entire St. Francis River upstream of 36.982104N, 90.335400W. The unit does not include any areas of adjacent land. The Upper St. Francis River Watershed Unit includes stream habitat up to bank full height.

(ii) Map of St. Francis River Crayfish Unit of St. Francis River crayfish critical habitat follows:

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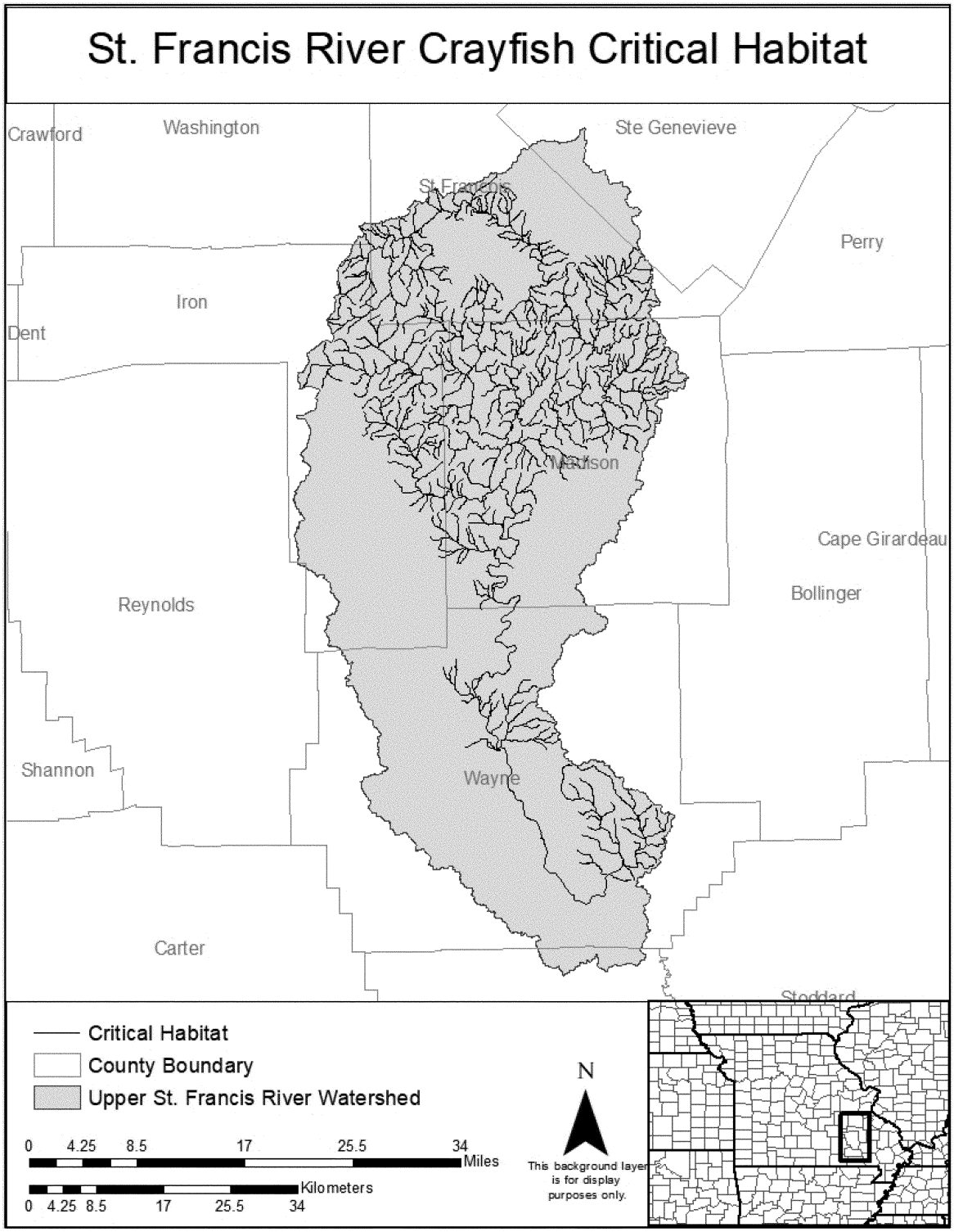
Figure 1 for St. Francis River Crayfish (*Faxonius quadruncus*) paragraph (5)(ii)



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Wendi Weber,

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

[FR Doc. 2023–08849 Filed 4–26–23; 8:45 am]

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