

change(s). We appreciate any and all comments, but those most useful and likely to influence decisions on the final regulations will be those that either involve personal experience or include citations to and analyses of SMCRA, its legislative history, its implementing regulations, case law, other pertinent State or Federal laws or regulations, technical literature, or other relevant publications.

We cannot ensure that comments received after the close of the comment period (see **DATES**) or sent to an address other than those listed (see **ADDRESSES**) will be included in the docket for this rulemaking and considered.

Public Availability of Comments

Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

List of Subjects in 30 CFR Part 926

State regulatory program approval, State-Federal cooperative agreement, required program amendments.

David A. Berry,

Regional Director, Unified Regions 5, 7–11.

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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2023–0103; FF09E21000 FXES1111090FEDR 234]

RIN 1018–BG31

Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for the Miami Cave Crayfish

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to list the Miami cave crayfish (*Procambarus milleri*), a crayfish species from Miami-Dade County, Florida, as a threatened species under the Endangered Species Act of 1973, as amended (Act). This determination also

serves as our 12-month finding on a petition to list the Miami cave crayfish. After a review of the best available scientific and commercial information, we find that listing the species is warranted. Accordingly, we propose to list the Miami cave crayfish as a threatened species with a rule issued under section 4(d) of the Act (“4(d) rule”). If we finalize this proposed rule, it would add this species to the List of Endangered and Threatened Wildlife and extend the Act’s protections to the species.

DATES: We will accept comments received or postmarked on or before November 20, 2023. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES**, below) must be received by 11:59 p.m. eastern time on the closing date. We must receive requests for a public hearing, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by November 6, 2023.

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

(1) *Electronically:* Go to the Federal eRulemaking Portal: <https://www.regulations.gov>. In the Search box, enter FWS–R4–ES–2023–0103, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the panel on the left side of the screen, under the Document Type heading, check the Proposed Rule box to locate this document. You may submit a comment by clicking on “Comment.”

(2) *By hard copy:* Submit by U.S. mail to: Public Comments Processing, Attn: FWS–R4–ES–2023–0103, U.S. Fish and Wildlife Service, MS: PRB/3W, 5275 Leesburg Pike, Falls Church, VA 22041–3803.

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

Availability of supporting materials: Supporting materials, such as the species status assessment report, are available at <https://www.regulations.gov> at Docket No. FWS–R4–ES–2023–0103.

FOR FURTHER INFORMATION CONTACT: Lourdes Mena, Division Manager, Florida Classification and Recovery, U.S. Fish and Wildlife Service, Florida Ecological Services Field Office, 7915 Baymeadows Way, Suite 200, Jacksonville, FL 32256–7517; telephone 904–731–3134. 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. For a summary of the proposed rule, please see the “rule summary document” in docket FWS–R4–ES–2023–0103 on <https://www.regulations.gov>.

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 an endangered species 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 Miami cave crayfish meets the definition of a threatened species; therefore, we are proposing to list it as such. Listing a species as an endangered or threatened species can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process (5 U.S.C. 551 *et seq.*).

What this document does. We propose to list the Miami cave crayfish as a threatened species with a rule under section 4(d) of the Act.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species because of 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 the primary threat to Miami cave crayfish is saltwater intrusion caused by sea level rise as a result of climate change.

Information Requested

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

scientific community, industry, or any other interested parties concerning this proposed rule. We particularly seek comments concerning:

- (1) The species' biology, range, and population trends, including:
 - (a) Biological or ecological requirements of the species, including habitat requirements for feeding, breeding, and sheltering;
 - (b) Genetics and taxonomy;
 - (c) Historical and current range, including distribution patterns and the locations of any additional populations of this species;
 - (d) Historical and current population levels, and current and projected trends; and
 - (e) Past and ongoing conservation measures for the species, its habitat, or both.
 - (2) Threats and conservation actions affecting the species, including:
 - (a) Factors that may be affecting the continued existence of the species, which may include habitat modification or destruction, overutilization, disease, predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors.
 - (b) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to this species.
 - (c) Existing regulations or conservation actions that may be addressing threats to this species.
 - (3) Additional information concerning the historical and current status of this species.
 - (4) Information on regulations that may be necessary and advisable to provide for the conservation of the Miami cave crayfish and that we can consider in developing a 4(d) rule for the species. In particular, information concerning the extent to which we should include any of the section 9 prohibitions in the 4(d) rule or whether we should consider any additional exceptions from the prohibitions in the 4(d) rule.
 - (5) Information on sea level rise and saltwater intrusion future projections in the Biscayne Aquifer.
- Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include.
- Please note that submissions merely stating support for, or opposition to, the action under consideration without providing supporting information, although noted, do not provide substantial information necessary to support a determination. Section 4(b)(1)(A) of the Act directs that determinations as to whether any species is an endangered or a threatened

species must be made solely on the basis of the best scientific and commercial data available.

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

If you submit information via <https://www.regulations.gov>, your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on <https://www.regulations.gov>.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on <https://www.regulations.gov>.

Our final determination may differ from this proposal because we will consider all comments we receive during the comment period as well as any information that may become available after this proposal. Based on the new information we receive (and, if relevant, any comments on that new information), we may conclude that the species is endangered instead of threatened, or we may conclude that the species does not warrant listing as either an endangered species or a threatened species. In addition, we may change the parameters of the prohibitions or the exceptions to those prohibitions in the 4(d) rule if we conclude it is appropriate in light of comments and new information received. For example, we may expand the prohibitions to include prohibiting additional activities if we conclude that those additional activities are not compatible with conservation of the species. Conversely, we may establish additional exceptions to the prohibitions in the final rule if we conclude that the activities would facilitate or are compatible with the conservation and recovery of the species. In our final rule, we will clearly explain our rationale and the basis for our final decision, including why we made changes, if any, that differ from this proposal.

Public Hearing

Section 4(b)(5) of the Act provides for a public hearing on this proposal, if requested. Requests must be received by the date specified in **DATES**. Such requests must be sent to the address shown in **FOR FURTHER INFORMATION**

CONTACT. We will schedule a public hearing on this proposal, if requested, and announce the date, time, and place of the hearing, as well as how to obtain reasonable accommodations, in the **Federal Register** and local newspapers at least 15 days before the hearing. We may hold the public hearing in person or virtually via webinar. We will announce any public hearing on our website, in addition to the **Federal Register**. The use of virtual public hearings is consistent with our regulations at 50 CFR 424.16(c)(3).

Previous Federal Actions

We received a petition from the Center for Biological Diversity, Alabama Rivers Alliance, Clinch Coalition, Dogwood Alliance, Gulf Restoration Network, Tennessee Forests Council, West Virginia Highlands Conservancy, Tierra Curry, and Noah Greenwald on April 20, 2010, to list 404 aquatic, riparian, and wetland species from the southeastern United States as threatened or endangered species and to designate critical habitat under the Endangered Species Act (Act). The Miami cave crayfish was included in this petition. On September 27, 2011, we published a 90-day finding in the **Federal Register** (76 FR 59836), concluding that the petition presented substantial information that indicated listing the Miami cave crayfish may be warranted. This document serves as both our 12-month warranted petition finding and our proposed rule to list this species.

Peer Review

A species status assessment (SSA) team prepared an SSA report for the Miami cave 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 Miami cave crayfish SSA report. We sent the SSA report to four independent peer reviewers and received three responses. Results of this structured peer review process can be found at <https://regulations.gov>. In preparing this proposed rule, we incorporated the results of these reviews, as appropriate,

into the SSA report, which is the foundation for this proposed rule.

Summary of Peer Reviewer Comments

As discussed in Peer Review above, we received comments from three peer reviewers on the draft SSA report. We reviewed all comments we received from the peer reviewers for substantive issues and new information regarding the contents of the SSA report. The peer reviewers generally concurred with our methods and conclusions and provided additional information, clarifications, and suggestions, including clarification on our methodology used to determine the quantity of habitat and other editorial suggestions. Two peer reviewers provided additional locations of Miami cave crayfish within the established range of the species that we incorporated into the SSA report. Otherwise, no substantive changes to our analysis and conclusions within the SSA report were deemed necessary, and peer reviewer comments are addressed in version 1.0 of the SSA report.

I. Proposed Listing Determination

Background

A thorough review of the taxonomy, life history, and ecology of the Miami cave crayfish (*Procambarus milleri*) is presented in the SSA report (version 1.1; Service 2022, pp. 3–18).

The Miami cave crayfish is a relatively small, freshwater, subterranean crayfish endemic to southern and central Miami-Dade County, Florida. On an evolutionary timescale, the Miami cave crayfish is recently adapted to the belowground aquifer environment as is indicated by the presence of both pigment and eye facets in some individuals. Miami cave crayfish are opportunistic omnivores, primarily consuming surficial detritus that filters down through the porous limestone into their aquifer habitat (Radice and Loftus 1995, p. 114). Individuals may also consume amphipods and isopods found in the same habitat (Hobbs 1971, p. 114).

The species was first described based on specimens collected from a 22-foot (ft; 6.7-meter (m)) deep well, south of Miami in 1968 (Hobbs 1971, entire). Additional confirmed reports of the species followed in 1992, 2000–2004, 2009, and most recently in 2018. The species has been collected from wells 7.9–36 ft (2.41–11 m) deep in the Miami Limestone and Fort Thompson Formation within the Biscayne Aquifer along the Atlantic Coastal Ridge.

The Atlantic Coastal Ridge is a northeast-to-southwest-trending elevated feature, varying between 1.8–

10 miles (mi) (3–16 kilometers (km)) in width and rising 3.2–28.2 ft (1–8.6 m) above sea level between Everglades National Park, Homestead, and North Miami (Fish and Stewart 1991, p. 4; Wacker et al. 2014, p. 26; Whitman and Yeboah-Forson 2015, pp. 782, 790; Meeder and Harlem 2019, pp. 560–561). The Miami Limestone and Fort Thompson Formation on the Atlantic Coastal Ridge are highly porous (containing large holes and cavities), resembling a sponge, whereas those same geologic layers in the surrounding area are partly or completely cemented with mud and sand. The Miami cave crayfish is adapted to the unique porosity of the Atlantic Coastal Ridge, which provides nutrient flow and subterranean space to inhabit. Miami cave crayfish likely occupy the Biscayne Aquifer from the top of the water table in the Miami Limestone to the bottom of the Fort Thompson Formation. The species has not been observed outside of the Atlantic Coastal Ridge, despite surveys done in the surrounding area.

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 must evaluate all identified threats by considering the species' expected response 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 we 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 the 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 proposed for listing 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 Miami cave crayfish viability, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency is the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years), redundancy is the ability of the species to withstand catastrophic events (for example, droughts, large pollution events), and representation is the ability of the species to adapt to both near-term and long-term changes in its physical

and biological environment (for example, climate conditions, pathogens). In general, species viability will increase with increases in resiliency, redundancy, and representation (Smith et al. 2018, p. 306). 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 FWS–R4–ES–2023–0103 on <https://www.regulations.gov> and at <https://ecos.fws.gov/ecp/species/9832>.

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.

Species Needs

The SSA report contains a detailed discussion of the Miami cave crayfish individual and population requirements (Service 2022, pp. 23–27); we provide a summary here. Based upon the best available scientific and commercial information, and acknowledging existing ecological uncertainties, the resource and demographic needs for breeding, feeding, sheltering, and dispersal of the Miami cave crayfish are characterized as:

- Sufficient freshwater quality and availability to support a suitable aquatic environment for movement and healthy individuals.
- Sufficient quantities of mega-porous limestone to provide the structure

needed for Miami cave crayfish movement and shelter. The Miami cave crayfish has adapted to these mega-porous limestone layers in the Biscayne Aquifer, which provides them with structures through which juvenile and adult Miami cave crayfish can travel between areas within the aquifer system, facilitating connectivity; microhabitats in which individuals can shelter or hide from intra- and interspecific threats; and enhanced groundwater flow for improved water quality and food availability (Loftus and Trexler 2004, p. 49, Hobbs and Means 1972, p. 401; Caine 1978, pp. 323, 325, Fish and Stewart 1991, p. 47; Wacker et al. 2014, pp. 27–40).

- Sufficient quantities of detritus filtering from the surface into the subterranean aquifer to support both the Miami cave crayfish and the amphipods and isopods upon which the crayfish may also feed.

Miami cave crayfish abundance is limited to the availability and condition of these resources in the Biscayne Aquifer along the Atlantic Coastal Ridge. While there is high confidence in these identified species needs, uncertainty exists as to the exact parameters and quantities needed for each of these factors, as no ecological or quantitative studies have been completed on them.

Threats

The main threats affecting the Miami cave crayfish are related to shifts in climate largely as a result of increasing greenhouse gas emissions. Saltwater intrusion into the Biscayne Aquifer as a result of sea level rise, more frequent tidal flooding (increase of tides above the mean high tide), and increasing intensity of storm events (such as hurricanes) are the predominant threats to the Miami cave crayfish and its habitat. Additional threats with greater uncertainty and likely less severity to the Miami cave crayfish include water quality degradation, groundwater pumping, and modification of surface cover resulting from urban development. We also evaluated existing ongoing conservation measures and regulatory mechanisms. In the SSA report, we considered additional threats: modification of subterranean limestone, competition and predation, disease, and overutilization. We concluded that, as indicated by the best available scientific and commercial information, these additional threats are currently having little to no impact on the Miami cave crayfish, and thus their overall effect now is expected to be minimal and the best available information does not indicate this will change in the future.

For full descriptions of all threats and how they impact the Miami cave crayfish, please see the SSA report (Service 2022, pp. 27–78).

Saltwater Intrusion

Although the salinity tolerance of Miami cave crayfish has not been assessed, surrogate species, such as the closely related Everglades crayfish (*Procambarus alleni*), indicate it is highly unlikely that the species could persist in the salinity levels found in areas affected by saltwater intrusion. Surface-dwelling crayfish are able to persist in saline environments in the short-term, but exposure to salinity levels above naturally occurring levels for long periods of time can cause inhibition of growth, limited to no reproduction, lower hatching success, and mortality (Vesely et al. 2017, pp. 4–5). Additionally, when comparing the salinity levels found in the closely related, brackish-water-dwelling Everglades crayfish to salinity levels found in areas of the Biscayne Aquifer affected by saltwater intrusion, the salinity levels in areas affected by saltwater intrusion far exceeded tolerances of the Everglades crayfish (Hendrix and Loftus 2000, p. 194; Service 2022, p. 69). This indicates that a closely related, saline-tolerant species of crayfish would not be able to tolerate the salinity levels that the Miami cave crayfish would be experiencing in areas of saltwater intrusion. Therefore, we concluded the Miami cave crayfish likely cannot persist in areas affected by saltwater intrusion, because it needs sufficient freshwater in order to survive and reproduce.

Saltwater intrusion occurs when saltwater enters into a freshwater aquifer system. Four main processes contribute to the intrusion of saltwater into aquifer systems like the Biscayne Aquifer: (1) the escape of saltwater that had been previously stored in sedimentary rocks, (2) the gradual advance of oceanwater along the base of the aquifer as a result of lowering freshwater levels within the aquifer and sea level rise, (3) seepage of hypersaline (extremely salty) water from coastal saltwater marshes, and (4) leakage of saltwater from canal systems that feed into the ocean (Prinos et al. 2014, pp. 12–16). Processes two and four are of greatest concern to the Biscayne Aquifer within the range of Miami cave crayfish because of large sea level rise projections, the potential effects from the planned construction of a curtain wall west of the Atlantic Coastal Ridge (discussed below), and the extensive canal network in the area. Additionally, the area's low altitude and topographic

gradient, high permeability, and the bordering saltwater sources of the Atlantic Ocean, Biscayne Bay, and Florida Bay make it especially susceptible to saltwater intrusion (Prinos et al. 2014, p. 2).

Sea level rise—Regional sea levels could rise between 1.41 ft (0.43 m) and 4.53 ft (1.38 m) by 2070. Temperatures are predicted to rise as well, while dry seasons, droughts, and tropical storms are likely to become more extreme (IPCC 2014, pp. 1452–1456; Infanti et al. 2020, entire; IPCC 2021, pp. 32, 33). The cumulation of all of these climatic factors is highly likely to result in the continued inland migration of the saltwater interface in the Biscayne Aquifer along the Atlantic Coastal Ridge. The loss of habitat along the eastern edge of the Atlantic Coastal Ridge is particularly impactful since these coastal areas exhibit the greatest aquifer depths and, thus, the greatest overall quantity of Miami cave crayfish habitat.

Curtain wall—In the western range of the species, a project started in 2012 that may impact saltwater intrusion is the construction of a 19- to 31-mile (31- to 50-kilometer) curtain wall west of the Atlantic Coastal Ridge. The curtain wall's purpose is to manage waters within the Everglades wetland ecosystem and protect the coastal urbanized area of Miami-Dade County from flooding (Owosina 2020, unpaginated). The project is expected to be completed in five-to-10-mile increments within the next ten years if funding can be secured. The curtain wall will alter the superficial water flow that reaches the Miami-Dade area, but we are not certain of the level of effects or dynamics to the Biscayne Aquifer, particularly to the east of the structure on the Atlantic Coastal Ridge where water flow from the Everglades wetland ecosystem in the east may be reduced. Groundwater will still flow under the curtain wall. The recommended configuration for further study (a 27-mile South scenario) will include gaps in the curtain wall and is seeking to balance restoration and flood control while mitigating impacts to Biscayne Bay, Taylor Slough, and water supply (South Florida Water Management District 2023, p. 9–89–9–92).

Currently, a general eastward and southeastward direction of groundwater flow along the Atlantic Coastal Ridge counters the encroachment of saltwater from the ocean (Prinos et al. 2014, p. 6). Weakening of this eastward and southeastward water flow may cause increased saltwater intrusion and subsequent loss of Miami cave crayfish habitat. In addition, any potential loss of

freshwater recharge provided by the Everglades wetland ecosystem may drop the groundwater levels of the Biscayne Aquifer on the Atlantic Coastal Ridge, further contributing to saltwater intrusion.

Canals—Modern water management and its impact on saltwater intrusion has a long history in the Miami area, beginning with the coordinated draining of the Everglades wetland ecosystem in 1845. Historically, canals along the Atlantic Coastal Ridge aided in draining the adjacent wetland systems, which, along with groundwater pumping, led to a permanent drop of about 9.5 ft (2.9 m) in regional groundwater levels within the Biscayne Aquifer (Prinos et al. 2014, pp. 2, 64). As a result, saltwater intrusion began to expand inward from the coast (Prinos et al. 2014, p. 64). Concurrently, saltwater flowed up the expanded canal systems from the ocean and seeped into the surrounding aquifer system (Prinos et al. 2014, p. 64).

Today's water management system is operated by the South Florida Water Management District and includes a complex, interconnected network of water conservation areas, well-fields, water control structures, levees, pumps, and canals. Despite the installation of salinity control structures along most of the tidal canal system in Miami-Dade County, saltwater seepage from canals into the adjacent aquifer system is still one of the primary mechanisms by which saltwater intrusion occurs in the region (Prinos et al. 2014, pp. 42, 43, 47–55, 66).

In summary, saltwater intrusion is the primary threat to the Miami cave crayfish, because it causes complete loss of habitat and is projected to get worse in the future; and the species has no dispersal potential outside of its current, restricted range.

Groundwater Pumping

Residents of Miami-Dade County have been pumping freshwater out of the Biscayne Aquifer for residential, agricultural, industrial, municipal, and recreational use since the first public supply wells were drilled in 1899 (Prinos et al. 2014, p. 18; Hughes and White 2016, pp. 27–29). As the population has grown, so too has the demand for freshwater. Public groundwater withdrawals increased in line with population growth until 2006 when demand on the aquifer was mitigated by stricter water use regulations (Bradner et al. 2005, p. 1; Prinos et al. 2014, p. 7).

Although 90 percent of the freshwater consumed by Miami-Dade County residents is pumped from the Biscayne Aquifer, these are not the only South

Florida populations drawing from the aquifer's groundwater reserves. Over 4 million people in Broward and Palm Beach Counties also rely on the Biscayne Aquifer for their freshwater needs, and groundwater piped from the Biscayne Aquifer to the Florida Keys serves as the main source of potable water for all of Monroe County (Bradner et al. 2005, p. 1; Prinos et al. 2014, p. 7). Consequently, the U.S. Environmental Protection Agency (EPA) has designated the Biscayne Aquifer as a sole-source aquifer (*i.e.*, the only viable groundwater source in the region; EPA 2016, entire).

As mentioned in the Canals discussion above, groundwater pumping was part of what caused an estimated 9.5-ft (2.9-m) drop in water levels compared to levels before the drainage of the Everglades (Prinos et al. 2014, p. 17). This drop in water level roughly equates to an 11 percent loss in potential Miami cave crayfish habitat since the 1840s (Service 2022, pp. 53). An 11 percent loss in habitat from potential historical levels is significant because the species has an already limited range.

In addition to causing direct loss of habitat, groundwater withdrawal can exacerbate the effects of saltwater intrusion. Lower freshwater levels as a result of groundwater withdrawal can cause saltwater intrusion to move further inland (Prinos et al. 2014, pp. 12–16). Lower freshwater levels also act synergistically with sea level rise to increase the rate of saltwater intrusion encroachment into the aquifer.

The most uncertain but potentially most impactful result of groundwater pumping is from the pumping process itself. Mortality events are possible for Miami cave crayfish that get sucked into a water pump system. In fact, the original specimens from which the species was first described were deceased individuals collected from a water pump trap (Hobbs 1971, p. 114). However, public water supply wells may have water pumps that are deep enough to avoid impacting the Miami cave crayfish. For example, the Miami-Dade Water and Sewer Department Northwest Wellfield has wells constructed with 46 feet of casing, meaning water is being pumped deeper than 46 feet (Krupa et al. 2001, p. 3). The deepest Miami cave crayfish have been collected from is 36 feet deep. Therefore, public water supply wells may not have a significant effect on the species depending on the depth of the well. Private water supply, agricultural, or other types of wells that are shallower may have a more significant impact to the species. Overall, the

extent of mortality resulting from water pumping is unknown but could be having ongoing impacts on the species.

Water Quality Degradation

The high permeability of the Biscayne Aquifer, particularly along the Atlantic Coastal Ridge, makes its groundwater vulnerable to contamination from surficial inputs, belowground septic tanks, and adjoining water bodies (Bradner et al. 2005, entire; Potter et al. 2007, p. 1306; Florida Department of Environmental Protection 2019, entire). In particular, the sandy soils typical to the Atlantic Coastal Ridge contain relatively small amounts of soil organic matter and exhibit low water retention, increasing the potential for leaching of surface contaminants into groundwater below (Marchi et al. 2016, pp. 237–238). Additionally, the high interconnectivity of the Biscayne Aquifer facilitates the relatively rapid and extensive spread of contaminants well beyond their point of origin (Harvey et al. 2008, entire; Shapiro et al. 2008, entire).

Pharmaceuticals, pesticides, volatile organic compounds, excess nutrients, and excess trace elements are introduced into groundwater throughout Miami-Dade County by a variety of land uses associated with development, agriculture, and recreation. These contaminants are concentrated in canals and other water bodies from which they seep into the Biscayne Aquifer. A current and comprehensive regional assessment of groundwater contamination across the endemic range of Miami cave crayfish is not available; however, there are many sources of pollutants including human wastewater, agriculture, and golf courses, among others (Service 2022, pp. 59–61).

Using other crayfish and crustaceans as analogues, we predict that Miami cave crayfish likely experience increased morbidity, mortality, and reproductive loss when exposed to anthropogenic contaminants (Service 2022, p. 58). However, although pollutants may be a significant threat to the species, the scope and magnitude of this threat is not known because of the lack of information on the levels of pollutants across the range of the Miami cave crayfish.

Modification of Surface Cover

The subterranean communities supporting Miami cave crayfish are dependent on the influx of detritus from surficial sources. When surface vegetation is lost or is blocked by impermeable land cover from entering subterranean habitats, the food supply of the species can be compromised. The majority of the surface cover above

Miami cave crayfish habitat is impermeable cover (greater than 85 percent). Because of the large amount of impermeable cover above subterranean habitat, there is likely less detritus available for the Miami cave crayfish. However, the best available information does not indicate that the amount of detritus filtering down into Miami cave crayfish habitat has been significantly reduced because of impermeable cover.

Summary of Threats

The primary threat to the Miami cave crayfish is saltwater intrusion as a result of sea level rise, increased high tide flooding, increased intensity of storm events, groundwater pumping, and altered hydrologic flows. Saltwater intrusion results in a complete loss of habitat, which is significant because the Miami cave crayfish has a restricted range. Additional threats with greater uncertainty and likely less severity include mortality from groundwater pumps, water quality degradation, and impermeable surface cover limiting detritus flow into subterranean habitat.

Current Conditions

The current condition of the Miami cave crayfish is described in terms of population resiliency, redundancy, and representation across the species. The analysis of these conservation principles to understand the species' current viability is described in more detail in the Miami cave crayfish SSA report (Service 2022, pp. 78–93).

Historically, all Miami cave crayfish were likely part of one metapopulation that had some degree of connectivity. Currently, the Miami cave crayfish still exists in one population restricted to the Biscayne Aquifer along the Atlantic Coastal Ridge. However, a series of canals cross the Atlantic Coastal ridge reduce connectivity. For the purposes of this assessment, we divided the Atlantic Coastal Ridge into seven analysis units to assess resiliency of the Miami cave crayfish. Reduced connectivity from canals creates semi-isolated areas, which led us to delineating seven analysis units using the network of canals as boundaries (Service 2022, p. 22).

To determine the current resiliency for the seven analysis units, we assessed habitat metrics, such as freshwater availability, detritus availability, freshwater quality, and habitat quantity. For each metric if greater than 79 percent of the measured factor is in a natural, anthropogenically unaltered state it ranked as a high condition, 51–79 percent ranked as a moderate condition, and 50 percent or less ranked as a low condition.

Freshwater Availability

Saltwater intrusion is the primary threat to the Miami cave crayfish because it reduces the amount of freshwater available for the species' habitat. Currently, saltwater intrusion is affecting six of the seven analysis units for the Miami cave crayfish (Service 2022, p. 68; Prinos 2019, entire). Two units have greater than 50 percent of habitat affected by saltwater intrusion, four units have 17 to 26 percent of habitat affected, and two units have 0 to 5 percent of habitat affected (Service 2022, p. 88). Overall, a majority of Miami cave crayfish habitat is currently unaffected by saltwater intrusion and is considered to be in a high condition.

Availability of Detritus and Freshwater Quality

Currently, we have little to no information on whether the amount of detritus filtering down into Miami cave crayfish habitat has been significantly reduced because of impermeable cover; effects of pollution on water quality; or mortality resulting from groundwater pumping or subsurface modification activities, such as mining. While these stressors likely affect the resiliency of the Miami cave crayfish, we do not know the direct effects to the species and its needs.

Because we do not know the direct effects impermeable cover, pollutants, and activities that cause mortality have on the Miami cave crayfish, we estimated the magnitude of these stressors on the species and its needs based on indirect measures.

To assess the availability of detritus, we compared the amount of permeable cover currently above Miami cave crayfish habitat to the amount of permeable cover that was historically present. Each analysis unit has less than 37 percent surface area remaining that is permeable cover (Service 2022, p. 85). Permeable cover is defined as surface cover with vegetation that provides detritus directly into the subterranean habitat. All analysis units are considered in a low condition for the quality of surface cover. We acknowledge that we do not know the amount of detritus needed by the Miami cave crayfish nor the current amount of available detritus in the Biscayne Aquifer; therefore, there is significant uncertainty in this metric.

To assess water quality, we estimated the number of potential sources of pollution within the range of the species. We categorized different land use types, such as agriculture, by the pollutants they may be inputting into the Biscayne Aquifer. Then, we

measured the amount of surface cover in each analysis unit that is likely inputting pollutants into the aquifer. Each analysis unit is in a low condition for water quality because of the large number of potential inputs of pollutants into Miami cave crayfish habitat. We acknowledge that we do not know the water quality parameters needed by the Miami cave crayfish nor the amount of pollution within the range of the species; therefore, there is significant uncertainty in this metric.

Habitat Quantity

To assess habitat quantity, we estimated the total physical volumetric habitat available to the species (*i.e.*, the total subterranean karstic limestone that is submerged in the Biscayne aquifer). We used the most recent available data for the depth of the Biscayne Aquifer on the Atlantic Coastal Ridge (Hughes and White 2016, p. 26) and subtracted out certain land uses, like limestone mines, and sewer line infrastructure (Miami-Dade County 2018, entire and Miami-Dade County 2021a, entire). We then compared the amount of subterranean, karstic limestone aquifer habitat currently available to the amount that was historically present. All analysis units are in a high condition relative to habitat quantity (Service 2022, p. 80).

Resiliency, Redundancy, and Representation

Although we found overall resilience to be low in all analysis units, we determined the Miami cave crayfish currently has sufficient resiliency to withstand environmental and demographic stochasticity. A majority of the Miami cave crayfish range is in a high condition for freshwater availability and habitat quantity is in a high condition for all seven analysis units. Our measures of available detritus and water quality are in a low condition across the range. However, we put greater weight on the freshwater availability and habitat quantity metrics because they are direct measures of the species' needs, whereas we put less weight on the availability of detritus and freshwater quality metrics because they are indirect measures of the species' needs with significant assumptions. We then assessed the best available demographic data for the Miami cave crayfish.

Surveys since 2000 indicate the species is present in all analysis units except for the one analysis unit most impacted by saltwater intrusion (Service 2022, p. 21). The most comprehensive surveys were completed in the period 2000–2004, confirming presence of the species distributed throughout the range

(Service 2022, p. 21). Subsequently, one anecdotal observation in 2009 along with a survey effort in 2018 confirmed presence in a total of four analysis units spread throughout the range (Service 2022, p. 21). The effects of impermeable land cover and pollution in the Biscayne Aquifer have been impacting the Miami cave crayfish for multiple decades; therefore, the continued presence of the species throughout the range indicates it currently has sufficient resiliency to these stressors.

In summary, the Miami cave crayfish currently has sufficient resiliency to withstand environmental and demographic stochasticity because there is enough freshwater and habitat available. Despite our measures of available detritus and water quality being in low condition, the Miami cave crayfish has consistently been found throughout its range through multiple decades of impermeable land cover and pollution in the Biscayne Aquifer, indicating that it currently has sufficient resiliency to these stressors. We combined our habitat metric analysis with the best available information on the demographics of the species to determine that the Miami cave crayfish currently has sufficient resiliency to withstand environmental and demographic stochasticity.

The Miami cave crayfish currently has limited ability to withstand catastrophic events and adapt to a changing environment because it has naturally low redundancy and representation due to its high level of endemism. The narrowly distributed, isolated nature of the single population of the species indicates it has limited ability to withstand stochastic or catastrophic events through dispersal. Because the species evolved in a unique subterranean aquifer system with little historical variation, we conclude that it has low potential to adapt to environmental changes to its habitat. As a single-aquifer endemic with no dispersal opportunities outside the current range, the species depends entirely on the continued availability of its habitat along the Atlantic Coastal Ridge. Even though redundancy and representation are inherently low for the Miami cave crayfish because of its endemism, they are both similar to historical levels.

Future Condition

In the SSA report, we analyzed four scenarios that incorporated changes in saltwater intrusion caused by sea level rise, urbanization, water quality condition caused by pollution, and water quantity condition caused by groundwater pumping. The main driver

of the future condition of the species is the movement of saltwater intrusion further inland because of sea level rise. Urbanization, pollution levels, and groundwater pumping levels do not change significantly into the future because they are already at high levels and there is limited capacity for more development, though they may increase if the limited available land is developed. Subsequently, we focus on the future effects of saltwater intrusion in this document. Further discussion of future changes in urbanization, water quality condition, and water quantity condition can be found in the SSA report (Service 2022, pp. 94–100).

As sea level rises, more Miami cave crayfish habitat will become unsuitable because saltwater will intrude further inland into the Biscayne Aquifer. The Biscayne Aquifer has varied depth, ranging from 50 ft (15 m) in the most inland extent of the range to 90 ft (27 m) in the most coastal extent of the range (Hughes and White 2016, p. 26). Because the aquifer is deepest closer to the coast, there is more Miami cave crayfish habitat within this area. Coastal habitat will be increasingly impacted by saltwater intrusion, which is significant because the largest volume of habitat will be lost first.

For our evaluation of future condition, we used modeled projections of sea level rise (Sweet et al. 2017, entire; Sweet et al. 2018, entire). We modeled threats to the year 2070, representing a 50-year time horizon, corresponding to the range of available urbanization and climate change model forecasts (Carr and Zwick 2016, entire; Sweet et al. 2017, entire; Sweet et al. 2018, entire). In addition, 50 years represents an appropriate biological

timeframe during which responses of the species to potential changes in habitat can be reasonably assessed. Although the lifespan and generation time for Miami cave crayfish are currently unknown, estimates for these measures based on those reported for other subterranean crayfish taxa (Taylor et al. 1996, p. 27; Hury et al. 2008, pp. 1, 12–15; Longshaw and Stebbing 2016, p. 68) suggest that three generations of the species would likely be represented in a 50-year time span.

No projections currently exist that predict the extent of saltwater intrusion into the Biscayne Aquifer by 2070, so we estimated the inland movement of the saltwater interface from its 2018 position (Prinos 2019, unpaginated) based on the projections of regional sea level rise, the degree of aquifer drawdown, and anthropogenic interventions potentially altering saltwater intrusion. The regional sea level rise scenarios adopted from Sweet et al. (2017 and 2018) (e.g., Intermediate, Intermediate High, and Extreme scenarios) encompass the extent of sea level rise predicted by the low-end and high-end likely ranges for the representative concentration pathway (RCP) 4.5 and RCP 8.5 emissions scenarios for future global temperatures projected by the Intergovernmental Panel on Climate Change assessment report 5 (Sweet et al. 2018, p. 24).

After we had completed our SSA, version 1.0, new sea level rise projections were made publicly available (Sweet et al. 2022, entire). We compared the Sweet et al. (2017, entire) sea level rise projections to the new updated Sweet et al. (2022, entire) projections and added this comparison

summary as an appendix to the SSA report (Service 2023, version 1.1). The Sweet et al. (2022, entire) sea level rise scenarios project lower sea level rise in 2070 when compared to projections from Sweet et al. (2017, entire). However, including the additional effects of high tide flooding, similar loss of habitat would be expected as seen in our projections using Sweet et al. 2017.

The intermediate sea level rise scenario (1.41-ft (0.43-m) regional sea level rise projection) is represented in the SSA report by scenario 4; the intermediate-high sea level rise scenario (2.49-ft (0.76-m) regional sea level rise projection) is represented in the SSA report by scenarios 1 and 2; and the extreme sea level rise scenario (4.53-ft (1.38-m) regional sea level rise projection) is represented by scenario 3 (Sweet et al. 2017 and 2018, entire).

In scenario 4, saltwater intrusion will cause increased habitat loss in the two analysis units in a low condition and the one analysis unit in a moderate condition, while also causing one high condition unit to drop to a moderate condition (Service 2022, pp. 106–107; table 1). In scenarios 1 and 2, saltwater intrusion will cause two units to decrease from a high to moderate condition, one unit will decrease from a moderate to a low condition, and one unit will decrease from a low to extirpated condition. In scenario 3, saltwater intrusion will cause three units to be completely extirpated and the remaining four units to drop to a low condition, meaning over 50 percent of the habitat in those units would be lost (Service 2022, pp. 104–105; table 1). In all of our future scenarios, a significant loss of habitat would result from saltwater intrusion (table 1).

TABLE 1—CONDITION OF FRESHWATER AVAILABILITY FOR THE CURRENT CONDITION AND THE FUTURE CONDITION FOR EACH SCENARIO FOR EACH ANALYSIS UNIT OF THE MIAMI CAVE CRAYFISH

Analysis unit	Current condition: freshwater availability	Scenario 4: ¹ freshwater availability	Scenario 1: ² freshwater availability	Scenario 2: ² freshwater availability	Scenario 3: ³ freshwater availability
1	High	High	Moderate	Moderate	Low.
2	High	High	Moderate	Moderate	Low.
3	High	Moderate	Moderate	Low	Low.
4	High	High	High	High	Low.
5	Low	Low	Extirpated	Extirpated	Extirpated.
6	Moderate	Moderate	Low	Low	Extirpated.
7	Low	Low	Low	Low	Extirpated.

Scenarios 4 and 3 represent the upper and lower bounds of projected scenarios for the future condition of the species:

¹ Scenario 4: Intermediate sea level rise scenario (1.41-ft (0.43-m) regional sea level rise).

² Scenarios 1 and 2: Intermediate-high sea level rise scenario (2.49-ft (0.76-m) regional sea level rise).

³ Scenario 3: Extreme sea level rise scenario (4.53-ft (1.38-m) regional sea level rise).

Resiliency, redundancy, and representation would all be reduced in the future because of habitat loss due to saltwater intrusion. With less habitat

available, Miami cave crayfish abundance would likely decline. Fewer Miami cave crayfish in the aquifer and less available habitat reduces the ability

of the species to withstand environmental and demographic stochasticity and also its ability to withstand catastrophic events. A lower

population size also reduces the genetic diversity of the species, further limiting its adaptive capacity. Additionally, the Miami cave crayfish has no ability to disperse outside of its current range, also limiting its ability to adapt to changing conditions. Overall, the Miami cave crayfish will likely be significantly more vulnerable to stressors in the future because of habitat loss due to increased impacts of saltwater intrusion due to sea level rise.

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have analyzed the cumulative effects of identified threats and conservation actions on the species. To assess the current and future condition of the species, we evaluate the effects of all the relevant 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

Regulations that help to protect Miami cave crayfish habitat include water management regulations that reduce groundwater withdrawal and pollution.

The South Florida Water Management District is responsible for water management in Miami-Dade County and regulates water use and production throughout the region. In 2007, the South Florida Water Management District passed a rule that prevents water consumers from sourcing new or additional supplies of freshwater that are recharged by the Everglades ecosystem. Water users are now required to use alternative sources, such as recycled water, treated wastewater pumped into the Biscayne Aquifer for recharge purposes, groundwater reserves in the Floridan aquifer system, or general water conservation practices (South Florida Water Management District 2008, entire; Hughes and White 2016, pp. 2–3). The measure has already resulted in decreased rates of public water withdrawal from the Biscayne Aquifer (Bradner et al. 2005, p. 1; Prinos et al. 2014, p. 7).

Another key regulation adopted by the South Florida Water Management District that counters freshwater withdrawal from the Biscayne Aquifer is its year-round landscape watering restrictions (Chapter 40E–24, Florida

Administrative Code). These restrictions stipulate specific times that landscape watering is permitted, thus restricting the amount of groundwater that can be withdrawn from those using public or privately owned water utility systems or wells. However, some large sources of water consumption are exempted by these regulations, namely athletic play areas (e.g., golf courses, sports facilities, equestrian and livestock arenas), agricultural operations with consumptive use permits, and water users practicing hand watering (e.g., with hoses) (South Florida Water Management District 2021a, unpaginated).

Biscayne Aquifer groundwater has limited protective benefits from pollution under Federal, State, and county regulations. Most regulatory protections focus on surface water quality, which offers indirect benefits to the quality of freshwater within the Biscayne Aquifer system. The primary laws and ordinances pertaining to water quality protection that directly or indirectly affect groundwater quality in the endemic range of Miami cave crayfish include (but are not limited to):

- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (the Superfund law) (42 U.S.C. 9601 *et seq.*): identifies, evaluates, and cleans up sites contaminated with hazardous substances.
- Resource Conservation and Recovery Act (42 U.S.C., ch. 82, sec. 6901 *et seq.*): establishes standards for the treatment, storage, and disposal of hazardous waste from municipal and industrial sources, including that contained in underground storage tanks.
- Safe Drinking Water Act (42 U.S.C. 300f): establishes national primary drinking water regulations for contaminants that may cause adverse public health effects, including mandatory requirements related to maximum contaminant levels and treatments.
- Clean Water Act of 1972 (33 U.S.C. 1251 *et seq.*): indirectly benefits groundwater quality by protecting the quality of surficial waters.
- The Everglades Forever Act (Section 373.4592(4)(f), F.S.): establishes best management practices in the Everglades Agricultural Area, which is underlain by the Biscayne Aquifer that indirectly benefits from these regulations.
- The Grizzle-Figg Statute (Section 403.086, F.S.): outlines requirements for safe sewage disposal facilities and treatment of discharges from these sewage facilities.

- Identification of Impaired Surface Waters (Section 62–303, F.S.): establishes water quality standards and protocols by which Florida assesses, lists, and delists impaired surface waters, which indirectly protects adjacent aquifer systems.

- Miami-Dade County Ordinance for Florida-Friendly Fertilizer Use for Urban Landscapes: regulates fertilizer application and use in the incorporated and unincorporated areas of the county.

- Miami-Dade County Wellfield Protection Regulations: prohibits or limits activities that use or store hazardous materials, generate hazardous waste, excavate to any depth, or require the installation of septic tanks within a wellfield protection area.

Currently, there are no conservation efforts specific to the Miami cave crayfish.

The Miami cave crayfish is listed in the State Wildlife Action Plan as a species of greatest concern (Florida Fish and Wildlife Conservation Commission 2019, p. 163).

Determination of Miami Cave Crayfish 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 in danger of extinction throughout all or a significant portion of its range, and a “threatened species” as a species 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 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.

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 impacts from saltwater intrusion caused by rising sea levels is the most substantial threat to the Miami cave crayfish viability. In the foreseeable future, we anticipate that saltwater intrusion will continue to move inland as climate-

change-induced sea level rise continues, causing the loss of Miami cave crayfish habitat and having the greatest influence on Miami cave crayfish viability. We also considered the effects of development, pollution in the Biscayne Aquifer, activities that can cause mortality, and minor threats including modification of subterranean limestone, competition and predation, disease, and overutilization for their cumulative effects.

The Miami cave crayfish exists in one population restricted to the Biscayne Aquifer along the Atlantic Coastal Ridge. Pollution and impermeable surface cover may be negatively affecting resiliency of the species by decreasing water quality and limiting the detritus filtering into the aquifer. However, these impacts are highly uncertain, so we put the greatest weight on habitat availability and available survey data. Currently, two analysis units are significantly (greater than 50 percent) affected by saltwater intrusion with five analysis units not significantly (0 to 26 percent) affected by saltwater intrusion. Overall, a majority of the Miami cave crayfish range is currently unaffected by saltwater intrusion and is considered to be in a high condition. Additionally, survey data indicate the Miami cave crayfish is present throughout the range despite multi-decadal threats impacting the species. We conclude that there is sufficient habitat available to the species and the Miami cave crayfish is still distributed throughout its range; therefore, it currently has a sufficient level of resiliency.

Based on its limited geographical range, redundancy and representation are inherently low for the Miami cave crayfish and likely similar to historical levels. Redundancy has been slightly reduced from historical levels because saltwater intrusion has reduced the available habitat near the coast, negatively impacted the ability of the species to withstand catastrophic events. Similarly, current representation has been slightly reduced from historical levels because habitat loss reduces the population size of the species, decreasing the amount of potential genetic diversity. Overall, redundancy and representation remain similar to historical levels. Given the current resiliency, redundancy, and representation of the Miami cave crayfish across its range, we conclude that the species is not currently in danger of extinction throughout its range.

We next considered whether the species is likely to become in danger of extinction within the foreseeable future

throughout all of its range. In considering the foreseeable future for the Miami cave crayfish, we analyzed expected changes in sea level rise and the resulting inland movement of saltwater intrusion out to 2070 (Service 2022, pp. 100–107). We determined that this timeframe represents a period for which we can reliably predict both the threats to the species and the species' response to those threats.

By 2070, the Miami cave crayfish is projected to lose significant amounts of habitat as saltwater encroaches further inland into the Biscayne Aquifer. Projected habitat losses range from losing close to 50 percent of the habitat in one additional analysis unit in the intermediate sea level rise scenario (scenario 4), to losing greater than 50 percent of all available habitat in the extreme sea level rise scenario (scenario 3). Intermediate scenarios 1 and 2 are projected to have only one remaining analysis unit in a high condition, one extirpated unit, and the remaining units being in either a moderate or low condition, meaning a majority of the habitat would be affected by saltwater intrusion. The Miami cave crayfish already has a limited range with naturally low redundancy and representation levels, ultimately making it completely dependent on the availability of its habitat. Therefore, the projected loss of habitat in the foreseeable future would leave the species extremely vulnerable to stochastic or catastrophic events. Additionally, the Miami cave crayfish has no ability to disperse outside of its current range and is unlikely to be able to adapt to a saltwater environment. Thus, after assessing the best available information, we conclude that the Miami cave crayfish is not currently in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range.

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 provision 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” (hereafter “Final Policy”; 79 FR 37578, July 1, 2014) that provided if the Services determine that a species is

threatened throughout all of its range, the Services will not analyze whether the species is endangered in a significant portion 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 this analysis for the Miami cave crayfish, we choose to address the status question first—we consider 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 Miami cave 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 the Miami cave 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.

We examined the following threats: saltwater intrusion, water quality degradation, groundwater pumping, and modification of surface cover resulting from urban development, including cumulative effects. The primary threat to the Miami cave crayfish is saltwater intrusion caused by rising sea levels, which is affecting the coastal analysis units the most currently. The other threats of water quality degradation, groundwater pumping, and modification of surface cover are largely having an effect across the range of the species. Therefore, we focused our evaluation on the threat of saltwater intrusion.

In considering whether the threats or their effects on the species are greater in any biologically meaningful portion of the species' range, there are two analysis units affected by saltwater intrusion more than the other units. Currently, these two analysis units (portion) are significantly (greater than 50 percent) affected by saltwater intrusion and the other five analysis units are not significantly (0 to 26 percent) affected by saltwater intrusion. We determined this portion may have a different status than the rest of the range and then considered whether this portion may be significant.

This portion is small in size relative to the entire range of the species; it represents less than 25 percent of the range. In addition, the habitat in this portion is neither unique or better quality compared to the rest of the range and most Miami cave crayfish have been observed farther inland. Therefore, we do not find this portion to be significant.

Therefore, no portion of the species' range provides a basis for determining that the species is in danger of extinction in a significant portion of its range, and we determine that the 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.

Determination of Status

Our review of the best available scientific and commercial information indicates that the Miami cave crayfish meets the definition of a threatened species. Therefore, we propose to list the Miami cave crayfish as a 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.

The recovery planning process begins with development of a recovery outline made available to the public soon after a final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions while a recovery plan is being developed. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) may be established to develop and implement recovery plans. The recovery planning process involves the identification of actions that are necessary to halt and reverse the species' decline by addressing the threats to its survival and recovery. The recovery plan 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. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery outline, draft recovery plan, final recovery plan, and any revisions will be available on our website as they are completed (<https://ecos.fws.gov/ecp/species/9832>), or from our Florida 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 range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

If this species is listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost-share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the State of Florida would be eligible for Federal funds to implement management actions that promote the protection or recovery of the Miami cave crayfish. Information on our grant programs that are available to aid species recovery can be found at: <https://www.fws.gov/service/financial-assistance>.

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

Section 7 of the Act is titled Interagency Cooperation and mandates all Federal action agencies to use their existing authorities to further the conservation purposes of the Act and to ensure that their actions are not likely to jeopardize the continued existence of listed species or adversely modify critical habitat. Regulations implementing section 7 are codified at 50 CFR part 402.

Section 7(a)(2) states that each Federal action agency shall, in consultation with the Secretary, ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Each Federal agency shall review its action at the earliest possible time to determine whether it may affect listed species or critical habitat. If a determination is made that the action may affect listed species or critical habitat, formal consultation is required (50 CFR 402.14(a)), unless the Service concurs in writing that the action is not likely to adversely affect listed species or critical

habitat. At the end of a formal consultation, the Service issues a biological opinion, containing its determination of whether the Federal action is likely to result in jeopardy or adverse modification.

In contrast, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action which *is likely* to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of critical habitat proposed to be designated for such species. Although the conference procedures are required only when an action is likely to result in jeopardy or adverse modification, action agencies may voluntarily confer with the Service on actions that may affect species proposed for listing or critical habitat proposed to be designated. In the event that the subject species is listed or the relevant critical habitat is designated, a conference opinion may be adopted as a biological opinion and serve as compliance with section 7(a)(2).

Examples of discretionary actions for the Miami cave crayfish that may be subject to conference and consultation procedures under section 7 are land management or other landscape-altering activities on Federal lands administered by the U.S. Army Corps of Engineers, U.S. Coast Guard, U.S. Department of Transportation, and U.S. Department of Housing and Urban Development as well as 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. Federal agencies should coordinate with the local Service Field Office (see **FOR FURTHER INFORMATION CONTACT**) with any specific questions on section 7 consultation and conference requirements.

It is the policy of the Services, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the extent known at the time a species is listed, specific activities that will not be considered likely to result in violation of section 9 of the Act. To the extent possible, activities that will be

considered likely to result in violation will also be identified in as specific a manner as possible. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing. Although most of the prohibitions in section 9 of the Act apply to endangered species, sections 9(a)(1)(G) and 9(a)(2)(E) of the Act prohibit the violation of any regulation under section 4(d) pertaining to any threatened species of fish or wildlife, or threatened species of plant, respectively. Section 4(d) of the Act directs the Secretary to promulgate protective regulations that are necessary and advisable for the conservation of threatened species. As a result, we interpret our policy to mean that, when we list a species as a threatened species, to the extent possible, we identify activities that will or will not be considered likely to result in violation of the protective regulations under section 4(d) for that species.

At this time, we are unable to identify specific activities that will or will not be considered likely to result in violation of section 9 of the Act beyond what is already clear from the descriptions of prohibitions and exceptions established by protective regulation under section 4(d) of the Act.

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

II. Proposed 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 species. The U.S. Supreme Court has noted that statutory language similar to the language in section 4(d) of the Act authorizing the Secretary to take action that she “deems necessary and advisable” affords a large degree of deference to the agency (see *Webster v. Doe*, 486 U.S. 592, 600 (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 one or more of 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, as a valid exercise of agency authority, rules developed under section 4(d) that included limited prohibitions against takings (see *Alesea Valley Alliance v. Lautenbacher*, 2007 WL 2344927 (D. Or. 2007); *Washington Environmental Council v. National Marine Fisheries Service*, 2002 WL 511479 (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).

The provisions of this proposed 4(d) rule would promote conservation of the Miami cave crayfish by encouraging projects and activities that would prevent increased saltwater intrusion into Miami cave crayfish habitat, improve water quality in the aquifer, and promote surface cover permeability. The provisions of this proposed rule are one of many tools that we would use to promote the conservation of the Miami cave crayfish. This proposed 4(d) rule would apply only if and when we make final the listing of the Miami cave crayfish as a threatened species.

As mentioned previously in Available Conservation Measures, section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they 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

designated critical habitat of such species. In addition, even before the listing of any species or the designation of its critical habitat is finalized, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of critical habitat proposed to be designated for such species.

These requirements are the same for a threatened species with a species-specific 4(d) rule. For example, as with an endangered species, if a Federal agency determines that an action is “not likely to adversely affect” a threatened species, it will require the Service’s written concurrence (50 CFR 402.13(c)). Similarly, if a Federal agency determines that an action is “likely to adversely affect” a threatened species, the action will require formal consultation with the Service and the formulation of a biological opinion (50 CFR 402.14(a)).

Provisions of the Proposed 4(d) Rule

Exercising the Secretary’s authority under section 4(d) of the Act, we have developed a proposed rule that is designed to address the Miami cave crayfish’s conservation needs. As discussed previously in Summary of Biological Status and Threats, we have concluded that the Miami cave crayfish is likely to become in danger of extinction within the foreseeable future primarily due to saltwater intrusion caused by sea level rise. Section 4(d) requires the Secretary to issue such regulations as she deems necessary and advisable to provide for the conservation of each threatened species and authorizes the Secretary to include among those protective regulations any of the prohibitions that section 9(a)(1) of the Act prescribes for endangered species. We find that, if finalized, the protections, prohibitions, and exceptions in this proposed rule as a whole satisfy the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of the Miami cave crayfish.

The protective regulations we are proposing for the Miami cave crayfish incorporate prohibitions from section 9(a)(1) to address the threats to the species. Section 9(a)(1) prohibits the following activities for endangered wildlife: importing or exporting; take; possession and other acts with unlawfully taken specimens; delivering, receiving, carrying, transporting, or shipping in interstate or foreign

commerce in the course of commercial activity; or selling or offering for sale in interstate or foreign commerce. This proposed protective regulation includes all of these prohibitions because the Miami cave crayfish is at risk of extinction in the foreseeable future and putting these prohibitions in place will help to prevent further degradation of habitat and decrease synergistic, negative effects from other ongoing or future threats.

In particular, this proposed 4(d) rule would provide for the conservation of the Miami cave crayfish by prohibiting the following activities, unless they fall within specific exceptions or are otherwise authorized or permitted: importing or exporting; take (as set forth at 50 CFR 17.21(c)(1) with exceptions as discussed below); possession and other acts with unlawfully taken specimens; delivering, receiving, carrying, transporting, or shipping in interstate or foreign commerce in the course of commercial activity; or selling or offering for sale in interstate or foreign commerce.

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 regulations at 50 CFR 17.3. Take can result knowingly or otherwise, by direct and indirect impacts, intentionally or incidentally. Regulating take would help preserve the species’ one population and decrease synergistic, negative effects from other ongoing or future threats. Therefore, we propose to prohibit take of the Miami cave crayfish, except for take resulting from those actions and activities specifically excepted by the 4(d) rule.

Exceptions to the prohibition on take would include all of the general exceptions to the prohibition on take of endangered wildlife, as set forth in 50 CFR 17.21 and additional exceptions, as described below.

The proposed 4(d) rule would also provide for the conservation of the species by allowing exceptions that incentivize conservation actions or that, while they may have some minimal level of take of the Miami cave crayfish, are not expected to rise to the level that would have a negative impact (*i.e.*, would have only de minimis impacts) on the species’ conservation. The proposed exceptions to these prohibitions include activities that will prevent further saltwater intrusion into the Biscayne Aquifer and water management activities that improve water quality or enhance natural infiltration into the Biscayne Aquifer:

(1) Activities that will prevent further saltwater intrusion into the Biscayne Aquifer include coastal resiliency projects and canal maintenance or construction that prevent backflow of salt water, and

(2) Water management activities or coastal wetland restoration projects that improve freshwater and estuarine habitats; improve salinity distribution and reestablish productive nursery habitat along the shoreline; restore the quantity, quality, timing, and distribution of freshwater to Biscayne Bay and Biscayne National Park; restore the spatial extent of natural coastal glades habitat; or enhance natural infiltration into the Biscayne Aquifer.

Despite these prohibitions regarding threatened species, we may under certain circumstances issue permits to carry out one or more otherwise-prohibited activities, including those described above. The regulations that govern permits for threatened wildlife state that the Director may issue a permit authorizing any activity otherwise prohibited with regard to threatened species. These include permits 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 (50 CFR 17.32). 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 must 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, would be able to conduct activities designed to conserve the Miami cave crayfish that may result in otherwise prohibited take without additional authorization.

Nothing in this proposed 4(d) rule would 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 our ability to enter into partnerships for the management and protection of the Miami cave crayfish. However, interagency cooperation may be further streamlined through planned programmatic consultations for the species between us and other Federal agencies, where appropriate. We ask the public, particularly State agencies and other interested stakeholders that may be affected by the proposed 4(d) rule, to provide comments and suggestions regarding additional guidance and methods that we could provide or use, respectively, to streamline the implementation of this proposed 4(d) rule (see Information Requested, above).

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.

We have found critical habitat to be prudent and determinable for the Miami cave crayfish and have developed a proposed critical habitat rule for this species. On August 29, 2023, we were informed that the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget (OMB) determined that our proposed critical habitat rule is significant under Executive Order 12866. Therefore, we will publish a proposed critical habitat rule for the Miami cave crayfish following interagency review of the proposed critical habitat rule.

Required Determinations

Clarity of the Rule

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

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

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

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

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), E.O. 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 Secretaries' 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.

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 Florida Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this proposed rule are the staff members of the Fish and Wildlife Service's Species Assessment Team and the Florida 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.

Proposed Regulation Promulgation

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

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

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

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

■ 2. In § 17.11, amend paragraph (h) by adding an entry for “Crayfish, Miami cave” to the List of Endangered and Threatened Wildlife in alphabetical order under CRUSTACEANS 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, Miami cave	<i>Procambarus milleri</i>	Wherever found	T	[Federal Register citation when published as a final rule]; 50 CFR 17.46(e); ^{4d}
*	*	*	*	*

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

§ 17.46 Special rules—crustaceans.

* * * * *

(e) Miami cave crish (*Procambarus milleri*).

(1) *Prohibitions.* The following prohibitions that apply to endangered wildlife also apply to the Miami cave crayfish. Except as provided under paragraph (e)(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.
- (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 a 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 (4) for endangered wildlife.
- (iii) Take, as set forth at § 17.31(b).
- (iv) Possess and engage in other acts with unlawfully taken wildlife, as set forth at § 17.21(d)(2) for endangered wildlife.

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

(A) Activities that will prevent further saltwater intrusion into the Biscayne Aquifer, such as coastal resiliency projects and canal maintenance or construction that prevent backflow of salt water; or

(B) Water management activities or coastal wetland restoration projects that improve freshwater and estuarine habitats; improve salinity distribution and reestablish productive nursery habitat along the shoreline; restore the quantity, quality, timing, and distribution of freshwater to Biscayne Bay and Biscayne National Park; restore the spatial extent of natural coastal glades habitat; or enhance natural infiltration into the Biscayne Aquifer.

Martha Williams,

Director, U.S. Fish and Wildlife Service.

[FR Doc. 2023–20293 Filed 9–19–23; 8:45 am]

BILLING CODE 4333–15–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[**FF09E21000 FXES1111090FEDR 234**]

Endangered and Threatened Wildlife and Plants; One Species Not Warranted for Delisting and Six Species Not Warranted for Listing as Endangered or Threatened Species

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notification of findings.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce findings that one species is not warranted for delisting and six species are not warranted for listing as endangered or threatened species under the Endangered Species Act of 1973, as amended (Act). After a thorough review of the best available scientific and commercial information, we find that it is not warranted at this time to delist the southern sea otter (*Enhydra lutris nereis*). We also find that is not warranted at this time to list the

Cascades frog (*Rana cascadae*), plains spotted skunk (*Spilogale interrupta*, formerly recognized as one of three subspecies of eastern spotted skunk (*Spilogale putorius interrupta*)), sicklefin chub (*Macrhybopsis meeki*), sturgeon chub (*Macrhybopsis gelida*), Tennessee cave salamander (*Gyrinophilus palleucus*), and Yazoo crayfish (*Faxonius hartfieldi*, formerly *Orconectes hartfieldi*). However, we ask the public to submit to us at any time any new information relevant to the status of any of the species mentioned above or their habitats.

DATES: The findings in this document were made on September 20, 2023.

ADDRESSES: Detailed descriptions of the bases for these findings are available on the internet at <https://www.regulations.gov> under the following docket numbers:

Species	Docket No.
Cascades frog	FWS–R1–ES–2023–0127.
Plains spotted skunk	FWS–R3–ES–2023–0128.
Sicklefin chub	FWS–R6–ES–2023–0130.
Southern sea otter	FWS–R8–ES–2023–0132.
Sturgeon chub	FWS–R6–ES–2023–0131.
Tennessee cave salamander.	FWS–R4–ES–2023–0133.
Yazoo crayfish	FWS–R4–ES–2023–0134.

Those descriptions are also available by contacting the appropriate person as specified under **FOR FURTHER INFORMATION CONTACT**. Please submit any new information, materials, comments, or questions concerning this finding to the appropriate person, as specified under **FOR FURTHER INFORMATION CONTACT**.

FOR FURTHER INFORMATION CONTACT:

Species	Contact information
Cascades frog	Jeff Dillon, Endangered Species Division Manager, Oregon Fish and Wildlife Office, jeffrey_dillon@fws.gov , 503–231–6179.
Plains spotted skunk	John Weber, Field Supervisor, Missouri Field Office, John_S_Weber@fws.gov , 573–825–6048.