

composite directional antenna pattern (in relative field). The RMS value, for a composite antenna pattern specified in relative field values, may be determined from the following formula:

RMS = the square root of:

$$[(\text{relative field value } 1)^2 + (\text{relative field value } 2)^2 + \dots + (\text{last relative field value})^2]$$

total number of relative field values

(B) Where the relative field values are taken from at least 36 evenly spaced radials for the entire 360 degrees of azimuth. The application for license must also demonstrate that coverage of the community of license by the 70 dBu contour is maintained for stations authorized pursuant to § 73.215 on Channels 221 through 300, as required by § 73.315(a), while noncommercial educational stations operating on Channels 201 through 220 must show that the 60 dBu contour covers at least a portion of the community of license.

\* \* \* \* \*

■ 3. Effective July 11, 2022, amend § 73.1620 by revising paragraph (a)(3) to read as follows:

**§ 73.1620 Program tests.**

(a) \* \* \*

(3) FM licensees replacing a directional antenna pursuant to § 73.1690(c)(2) without changes which require a construction permit (*see* § 73.1690(b)) may immediately commence program test operations with the new antenna at one half (50%) of the authorized ERP upon installation. If the directional antenna replacement is an EXACT duplicate of the antenna being replaced (*i.e.*, same manufacturer, antenna model number, and measured or computer modeled composite pattern), program tests may commence with the new antenna at the full authorized power upon installation. The licensee must file a modification of license application on FCC Form 2100, Schedule 302-FM within 10 days of commencing operations with the newly installed antenna, and the license application must contain all of the exhibits required by § 73.1690(c)(2). After review of the modification-of-license application to cover the antenna change, the Commission will issue a letter notifying the applicant whether program test operation at the full authorized power has been approved for the replacement directional antenna.

\* \* \* \* \*

■ 4. Delayed indefinitely, amend § 73.1690 by revising paragraphs (c)(2) introductory text and (c)(2)(i) through (iii) to read as follows:

**§ 73.1690 Modification of transmission systems.**

\* \* \* \* \*

(c) \* \* \*

(2) Replacement of a directional FM antenna, where the measured or computer modeled composite directional antenna pattern does not exceed the licensed composite directional pattern at any azimuth, where no change in effective radiated power will result, and where compliance with the principal coverage requirements of § 73.315(a) will be maintained by the measured or computer modeled directional pattern. The antenna must be mounted not more than 2 meters above or 4 meters below the authorized values. The modification of license application on FCC Form 2100, Schedule 302-FM to cover the antenna replacement must contain all of the data in paragraphs (c)(2)(i) through (v) of this section. Program test operations at one half (50%) power may commence immediately upon installation pursuant to § 73.1620(a)(3). However, if the replacement directional antenna is an exact replacement (*i.e.*, no change in manufacturer, antenna model number, AND measured or computer modeled composite antenna pattern), program test operations may commence immediately upon installation at the full authorized power.

(i) A measured or computer modeled directional antenna pattern and tabulation on the antenna manufacturer's letterhead showing both the horizontally and vertically polarized radiation components and demonstrating that neither of the components exceeds the authorized composite antenna pattern along any azimuth.

(ii) Contour protection stations authorized pursuant to § 73.215 or § 73.509 must attach a showing that the RMS (root mean square) of the composite measured or computer modeled directional antenna pattern is 85% or more of the RMS of the authorized composite antenna pattern. *See* § 73.316(c)(9). If this requirement cannot be met, the licensee may include new relative field values with the license application to reduce the authorized composite antenna pattern so as to bring the measured or computer modeled composite antenna pattern into compliance with the 85 percent requirement.

(iii) A description from the manufacturer as to the procedures used to measure or computer model the directional antenna pattern. The antenna measurements or computer modeling must be performed with the antenna mounted on a tower, tower

section, or scale model equivalent to that on which the antenna will be permanently mounted, and the tower or tower section must include transmission lines, ladders, conduits, other antennas, and any other installations which may affect the measured or computer modeled directional pattern.

\* \* \* \* \*

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**DEPARTMENT OF THE INTERIOR**

**Fish and Wildlife Service**

**50 CFR Part 17**

[Docket No. FWS-R2-ES-2020-0130; FF09E21000 FXES1111090FEDR 223]

RIN 1018-BF21

**Endangered and Threatened Wildlife and Plants; Endangered Species Status for Arizona Eryngo and Designation of Critical Habitat**

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

**ACTION:** Final rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), determine endangered species status under the Endangered Species Act of 1973 (Act), as amended, for the Arizona eryngo (*Eryngium sparganophyllum*), a plant species native to Arizona and New Mexico in the United States, and to Sonora and Chihuahua in Mexico. We also designate critical habitat for the Arizona eryngo. In total, approximately 12.7 acres (5.1 hectares) in Pima and Cochise Counties, Arizona, fall within the boundaries of the critical habitat designation. This rule extends the protections of the Act to this species and its designated critical habitat.

**DATES:** This rule is effective July 11, 2022.

**ADDRESSES:** This final rule is available on the internet at <https://www.regulations.gov>. Comments and materials we received, as well as supporting documentation we used in preparing this rule, are available for public inspection at <https://www.regulations.gov> at Docket No. FWS-R2-ES-2020-0130.

For the critical habitat designation, the coordinates or plot points or both from which the maps are generated are included in the decision file and are available at <https://www.regulations.gov> at Docket No. FWS-R2-ES-2020-0130.

**FOR FURTHER INFORMATION CONTACT:** Heather Whitlaw, Arizona Ecological

Services Field Office, 9828 North 31st Ave. C3, Phoenix, AZ 85051–2517; telephone 602–242–0210. Individuals in the United States who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY, TDD, or TeleBraille) to access telecommunications relay services. Individuals outside the United States should use the relay services offered within their country to make international calls to the point-of-contact in the United States.

#### SUPPLEMENTARY INFORMATION:

##### Executive Summary

*Why we need to publish a rule.* Under the Act, a species warrants listing if it meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become endangered in the foreseeable future throughout all or a significant portion of its range). We have determined that the Arizona eryngo meets the definition of an endangered species; therefore, we are listing it as such and designating critical habitat for it. Both listing a species and designating critical habitat can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process.

*What this document does.* This rule makes final the listing of the Arizona eryngo as an endangered species and the designation of critical habitat for the species under the Act. We are designating critical habitat in two units, on private and public property, totaling 12.7 acres (5.1 hectares) in Pima and Cochise Counties, Arizona.

*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 Arizona eryngo is primarily at risk of extinction due to habitat changes: physical alteration of cienegas, water loss, and changes in co-occurring vegetation, all of which are exacerbated by the effects of climate change (Factors A).

Section 4(a)(3) of the Act requires the Secretary of the Interior (Secretary) to designate critical habitat concurrent with listing to the maximum extent prudent and determinable. Section 3(5)(A) of the Act defines critical habitat

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

##### Previous Federal Actions

Please refer to the March 4, 2021, proposed listing and critical habitat rule for the Arizona eryngo (86 FR 12563) for a detailed description of previous Federal actions concerning this species.

##### Supporting Documents

A species status assessment (SSA) team prepared an SSA report for the Arizona eryngo. 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 sought peer review of the SSA report. The Service sent the SSA report to eight independent peer reviewers and received four responses. The purpose of peer review is to ensure that our listing determinations and critical habitat designations are based on scientifically sound data, assumptions, and analyses. The peer reviewers have expertise in the biology, habitat, and threats to the species. The Service also sent the SSA report to 16 partners, including scientists with expertise in wetland management and conservation and plant ecology, for review. We received review from eight partners (Federal, State, and County governments, and universities).

##### Summary of Changes From the Proposed Rule

Based on information we received in the comments regarding proposed critical habitat, we are excluding all of proposed Unit 3 (Agua Caliente) from the critical habitat designation for the Arizona eryngo. This exclusion results in a decrease of approximately 0.33 acres (0.13 hectares) from the areas we proposed to designate as critical habitat for the species.

##### Summary of Comments and Recommendations

In the March 4, 2021, proposed rule to list the Arizona eryngo as an endangered species and designate critical habitat under the Act (86 FR 12563), we requested that all interested parties submit written comments on the proposal by May 3, 2021. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal. Newspaper notices inviting general public comment were published in the Arizona Daily Star. We did not receive any requests for a public hearing. All substantive information received during the comment period has either been incorporated directly into this final determination or is addressed below.

##### Peer Reviewer Comments

As discussed in Supporting Documents above, we received comments from four 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 information contained in the SSA report. The peer reviewers generally concurred with our methods and conclusions, and provided additional information, clarifications, and suggestions, including updates to the taxonomy of *Eryngium*, clarifications in terminology and discussions of genetic diversity, and other editorial suggestions. There was one comment on distribution records of the species in Mexico, which were further clarified in the SSA report for the species. 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, which was made available for public review at <https://www.regulations.gov> under Docket No. FWS–R2–ES–2020–0130 when the March 4, 2021, proposed rule published.

### Public Comments

(1) *Comment:* Several commenters requested that additional habitat be evaluated for designation as unoccupied critical habitat.

*Our response:* When designating critical habitat, we first evaluate areas occupied by the species and will only consider unoccupied areas to be essential where a critical habitat designation limited to geographical areas occupied would be inadequate to ensure the conservation of the species. We are not designating any areas currently unoccupied by *Arizona eryngo* because we cannot with reasonable certainty determine whether they will be essential for the conservation of the species. For long-term viability, the species will require the establishment and protection of additional resilient populations across its historical range to reduce its risk of extinction. While the species may need these areas, we do not have sufficient information at this time to identify specific locations outside the known historical distribution that have the potential conditions necessary to support the species or whether they would contribute to conservation. As has been recently demonstrated, attempts to establish the species at unoccupied locations thought to have appropriate habitat (e.g., Agua Caliente) have not been successful. Thus, at this time, we are unable to identify which cienegas not currently occupied by *Arizona eryngo* will be suitable for the reintroduction of the species at this time.

(2) *Comment:* Several commenters requested that we evaluate Las Cienegas National Conservation Area, St. David Cienega, and Historic Canoa Ranch as critical habitat.

*Our response:* Recent efforts have been made to establish the species at additional locations that were not historically occupied (e.g., Las Cienegas National Conservation Area, St. David Cienega, Historic Canoa Ranch). We support these efforts to increase species redundancy (i.e., increase the number of populations of *Arizona eryngo*). As required by the Act, we proposed as critical habitat the specific areas within the geographical area occupied by the species at the time of listing that contain the physical or biological features essential to the conservation of the species, which may require special management considerations or protection.

We have more clearly defined what it means for an area to be occupied by *Arizona eryngo* (see *Criteria Used To Identify Critical Habitat*, below) to mean the presence of mature adult plants.

Recent introductions have consisted of scattered seed or plantings of young plants, most of which did not survive. Without survival and recruitment, it is difficult to determine whether these sites provide the conditions that would support the species and contribute to long-term conservation. Because we do not intend to designate as critical habitat in areas that will not contribute to the conservation of the species, defining “occupied” in this manner will ensure only those areas with a significant likelihood of success will be included as critical habitat. Using this definition, Las Cienegas National Conservation Area, St. David Cienega, and Historic Canoa Ranch are not considered occupied by *Arizona eryngo* at this time. Section 4(a)(3)(A)(ii) of the Act allows us from time-to-time to revise critical habitat designations, as appropriate. Therefore, if we become aware of additional locations that meet the definition of critical habitat in the future, then we may revise critical habitat at that time.

(3) *Comment:* Several commenters requested the removal of Agua Caliente as critical habitat due to lack of physical or biological features essential to the conservation of the species present at this site and provided information on land-use and water diversion history for Agua Caliente Spring. This included Pima County, which owns Agua Caliente Park where this unit is located.

*Our response:* In our designation of critical habitat, we identified that Agua Caliente had the physical and biological features necessary for the conservation of the species. It contains two (saturated soils and areas of open canopy) of the three physical or biological features essential to the conservation of the *Arizona eryngo*. However, based on recent information on the status of the population, we are no longer certain the physical and biological features present at Agua Caliente are sufficient to support the species. Our analysis determined that excluding proposed Unit 3 (Agua Caliente) outweighs the benefit of inclusion and will not result in the extinction of the species.

(4) *Comment:* A commenter requested that in the interest of Fort Huachuca, Lewis Springs be excluded from critical habitat under section 4(a)(3)(B) of the Act due to economic impacts; however, the commenter did not provide any specific information as to what these economic impacts entailed.

*Our response:* Under section 4(a)(3)(B) of the Act, we do not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to

an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if we determine that such plan provides a benefit to the species for which critical habitat is proposed for designation. With regard to critical habitat at Lewis Springs, we cannot exempt this area from critical habitat under the Act’s section 4(a)(3)(B) because it is not owned or controlled by the Department of Defense, nor designated for its use, and is not subject to an integrated natural resources management plan.

Because the commenter references economic impacts, we considered whether they intended their comment to recommend that these lands be excluded under section 4(b)(2) rather than section 4(a)(3)(B). Based on our economic analysis, the estimated annual incremental costs of consultations for the Lewis Springs unit will be \$4,000. Because these costs are relatively minor, and the commenter did not provide any specific information regarding a basis for exclusion, we did not conduct an exclusion analysis.

(5) *Comment:* A commenter stated we must consider impacts to local governments and national defense and security, including economic impacts that would result from the proposed listing and critical habitat designation.

*Our response:* With regard to considering impacts of listing the *Arizona eryngo*, in making a determination as to whether a species meets the Act’s definition of an endangered or threatened species, under section 4(b)(1)(A) of the Act the Secretary is to make that determination based solely on the basis of the best scientific and commercial data available. The question of whether or not there may be impacts caused by the listing cannot by law enter into the determination. However, we conducted an evaluation of economic and other impacts in association with the designation of critical habitat under section 4(b)(2) of the Act (IEc 2020, entire). Therefore, we considered the potential economic impacts of the critical habitat designation, including the potential benefits of such designation. Costs of the critical habitat designation would manifest through Section 7 consultations on federally owned lands, with the total anticipated cost of these consultations over a 10-year period being no more than \$36,000 (IEc 2020, p. 13). As the critical habitat designations do not occur on military owned lands, it will not have an effect on national security. The economic analysis predicted the critical habitat designation was unlikely to trigger

additional State or local regulations (IEC 2020, p. 17).

(6) *Comment:* A commenter questioned the accuracy of our economic analysis and requested that an updated economic analysis be conducted that includes cumulative effects, fiscal burdens, and a quantification of impacts to water users.

*Our response:* Our economic analysis represents our best assessment of what the economic impacts may be of the critical habitat designation for the Arizona eryngo. Section 4(b)(2) of the Act requires the consideration of potential economic impacts associated with the designation of critical habitat. The regulatory effect of critical habitat designation under the Act directly impacts only Federal agencies, as a result of the requirement that those agencies avoid “adverse modification” of critical habitat. Specifically, section 7(a)(2) of the Act states that each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary to be critical habitat.

This requirement is the direct regulatory impact of a critical habitat designation and serves as the foundation of our economic analysis. We define it as an “incremental impact” because it is an economic impact that is incurred above and beyond the baseline impacts that may stem from the listing of the species (for example, costs associated with avoiding take under section 9 of the Act); thus, it incrementally adds to those baseline costs. However, in most cases, and especially where the habitat in question is already occupied by the listed species, if there is a Federal nexus, the action agency already consults with the Service to ensure its actions will not jeopardize the continued existence of the species; thus, the additional costs of consultation to further ensure the action will not destroy or adversely modify critical habitat are usually relatively minimal. Because the Act provides for the consideration of economic impacts associated only with the designation of critical habitat, and because the direct regulatory effect of critical habitat is the requirement that Federal agencies avoid destruction or adverse modification of critical habitat, the direct economic impacts of a critical habitat designation in occupied areas are generally limited to the costs of consultations on actions

with a Federal nexus, and rest squarely on Federal action agencies. The economic assessment did not find that designating critical habitat would have additional economic impacts beyond the costs of consultations (IEC 2020, entire).

(7) *Comment:* A comment was made that we failed to comply with the Data Quality Act (DQA), the Information Quality Guidelines, Presidential memoranda, and Secretarial orders on scientific integrity and transparency, and more time is required to collect data on the species to comply with the DQA.

*Our response:* In making a determination as to whether a species meets the Act’s definition of an endangered species or a threatened species, under section 4(b)(1)(A) of the Act, the Secretary is to make that determination based solely on the basis of the best scientific and commercial data available. In addition, under section 4(b)(6)(A), the Act requires the Service to publish a final rule within 1 year from the date we propose to list a species, with certain exceptions. We are obligated to and have followed both of the aforementioned statutory requirements. Additionally, in accordance with the Information Quality Act, also referred to as the Data Quality Act (DQA) (Pub. L. 106–554), the Service has guidelines in place for use and review of data and publications. The Service has complied with these requirements.

(8) *Comment:* A comment was made that listing will further harm the species and hamper research, and that we must consider the benefits gained by not listing the species and weigh these against the dangers of an incorrect listing.

*Our response:* In making a determination as to whether a species meets the Act’s definition of an endangered species or a threatened species, under section 4(b)(1)(A) of the Act, the Secretary is to make that determination based solely on the basis of the best scientific and commercial data available. The question of whether or not there may be some negative or positive outcome to the listing cannot by law enter into the determination. On and after the effective date of this rule (see **DATES**, above), we are available to support and guide researchers in applying for recovery permits issued under section 10(a)(1)(A) of the Act to conduct research and implement actions to recover the species.

(9) *Comment:* Commenters requested a 90-day extension of the public comment period, and a commenter requested a 5-year extension on the final rule to gather more scientific

information on the species, specifically potential sites in Mexico.

*Our response:* We consider the 60-day comment period for the March 4, 2021, proposed rule to have provided the public a sufficient opportunity for submitting comments on our proposal. In addition, as noted in our response to (7) *Comment*, above, the Act requires the Service to publish a final rule within 1 year from the date we propose to list a species. This 1-year timeframe can only be extended if there is substantial disagreement regarding the sufficiency or accuracy of the available data relevant to the determination or revision concerned, but only for 6 months and only for purposes of soliciting additional data. Based on the comments we received and data evaluated, we did not identify substantial disagreement regarding the sufficiency or accuracy of the data. The comments expressing disagreement requested time to collect new data to inform this finding but did not provide conflicting or additional data that we did not consider in the proposed rule. Per section 4(b) of the Act and the Interagency Policy on Information Standards under the Act, we considered the best scientific and commercial data available regarding the Arizona eryngo to evaluate its potential status under the Act. We solicited peer review of our evaluation of the available data, and our peer reviewers supported our analysis. Science is a cumulative process, and the body of knowledge is ever-growing. In light of this, the Service will always take new research into consideration. If plausible new research supports amendment or revision of this rule in the future, the Service will modify the rule consistent with the Act and our established work priorities at that time.

(10) *Comment:* A commenter requested that we consider a rule issued under section 4(d) of the Act for this species that would facilitate propagation by nurseries and transportation of Arizona eryngo.

*Our response:* Section 4(d) of the Act directs the Service to issue regulations deemed necessary and advisable to provide for the conservation of threatened species. It allows the Service to promulgate rules for species listed as threatened (not endangered) that provide flexibility in implementing the Act. We are listing the Arizona eryngo as an endangered species; thus, we cannot apply a rule issued under section 4(d) of the Act for this species. However, a section 10(a)(1)(A) permit may be requested to support scientific research or propagation.

(11) *Comment:* A commenter stated that the Arizona eryngo was

photographed in 2019 in juniper oak pine woodland in Sonora and asked what is known of the species range in oak woodlands.

*Our response:* We contacted the observer who documented the specimen in Sonora because the species photographed did not appear to be *Arizona eryngo*. The observer subsequently visited the University of Arizona Herbarium to compare the species in question to specimens of *Arizona eryngo*. Upon careful examination, the observer determined that the species documented in the pine-oak woodland in Sonora was *E. longifolium*. SEINet now reflects this updated information (Record ID: e9c3315c-828f-4210-8fcd-d24451c712dd).

(12) *Comment:* A commenter inquired about the distribution of *Arizona eryngo* in Mexico, asked who has searched for the species there, and questioned the assertion of Stromberg *et al.* 2020 (entire) that reports of the species farther south in Mexico are likely not valid.

*Our response:* A researcher from Mexico, who received funding under the Act's section 6, searched 55 locations in Sonora and Chihuahua for six rare plants, including the *Arizona eryngo*. He found the species at 2 of 55 sites (Sánchez Escalante *et al.* 2019), which were the Rancho Agua Caliente and Ojo Vareleño sites discussed in the SSA report. This combined with Stromberg *et al.* 2020 (entire) represents the best scientific and commercial data available on the species' distribution in Mexico.

## I. Final Listing Determination

### Background

A thorough review of the taxonomy, life history, and ecology of the *Arizona eryngo* (*Eryngium sparganophyllum*) is presented in the SSA report, version 1.0 (Service 2020). The *Arizona eryngo* is an herbaceous perennial flowering plant in the Apiaceae (carrot) family that is native to Arizona and New Mexico in the United States, and to Sonora and Chihuahua in Mexico. The species occurs in moist, organic alkali soils found in spring-fed cienegas (aridland wetlands) supported by adequate groundwater.

*Arizona eryngo* grows to a height of about 1.5 meters (m) (5 feet (ft)) with long, linear, parallel-veined leaves that emerge from a basal rosette. The plant is conspicuous when flowering in June through September (Stromberg *et al.* 2020, p. 179; New Mexico Rare Plants 2013, p. 1). The flowers are cream-colored and clustered in dense heads.

Dry fruits ripen in September and October. The species is believed to live well over 10 years, and many pollinators have been documented interacting with the species. *Arizona eryngo* reproduces through pollination, creating genetically unique individuals, as well as vegetatively via rhizomes (underground stems) producing clones, which are genetically identical (Stromberg *et al.* 2020, p. 179).

The *Arizona eryngo* only occurs in spring-fed cienega wetlands and grows best in full sun in areas with few nonnative plant species, limited woody vegetation, or other vegetation that may shade or otherwise outcompete it. The species has been found in conditions from standing water up to 2 centimeters (cm) (0.8 inches (in)) deep to soil that is dry at the surface but is moist to saturated several centimeters into the soil (Stromberg *et al.* 2020, p. 177). It is hypothesized that flowering is determined, in part, by soil moisture availability (*i.e.*, plants do not flower in drier conditions when the plants are more stressed) and that ramets (clones) are produced during drier periods (Li 2019, p. 8; Stromberg *et al.* 2020, p. 179). Distribution of *Arizona eryngo* within cienegas appears to be associated with water availability; drier conditions favor the growth of trees that outcompete the species, and very wet conditions (*i.e.*, perennially standing water) favor the growth of bulrush (*Schoenoplectus americanus*) that similarly outcompetes *Arizona eryngo* (Li 2019, p. 4). Soils inhabited by *Arizona eryngo* are high in organic matter, saline, and alkaline, and have salts on soil surfaces in the seasonally dry periphery (Stromberg *et al.* 2020, p. 177).

The *Arizona eryngo* is known historically from six sites: three sites in Arizona and one in New Mexico in the United States, and one site in Sonora and one site in Chihuahua in Mexico (Sánchez Escalante *et al.* 2019, pp. 16–17; Stromberg *et al.* 2020, p. 175). Given the historical distribution of functional aridland cienegas (greater than 95 percent of the historical area of cienegas in the southwestern United States and northwestern Mexico is now dry (Cole and Cole 2015, p. 36)), it is likely that *Arizona eryngo* populations were historically more abundant, occurred closer to one another, and were more connected (through pollination) than they are currently.

The species has been extirpated from one site in Arizona and one site in New Mexico but remains extant at the other four sites (two in Arizona; one in Sonora, Mexico; and one in Chihuahua, Mexico). Additionally, efforts have been

on-going to reintroduce the species to the historical site in Arizona from which it was extirpated (Agua Caliente) and to introduce the species to new sites (Historic Canoa Ranch in Pima County, Arizona, and Las Cienegas National Conservation Area in Pima and Santa Cruz Counties, Arizona) within its general historical range (Li 2021a, p. 3; Li 2021b, pp. 6–12). A handful of plants now exist at some of these reintroduction sites, such as Agua Caliente, but these efforts have not yet been successful at establishing viable populations. With the exception of the reintroduced plants at Agua Caliente, which is about 6 kilometers (km) (3.7 miles (mi)) from the La Cebadilla population, other sites are about 90 to 335 km (56 to 208 mi) apart from one another.

Reports of the species farther south in the Mexican states of Durango, Jalisco, Nayarit, Zacatecas, Michoacán, and Guerrero are likely not valid because the herbarium specimen from Durango, Mexico, is morphologically different from northern specimens (Stromberg *et al.* 2019, p. 7). Additionally, a report of the species occurring in Zacatecas, Nayarit, and Jalisco lacks supporting herbaria records (Stromberg *et al.* 2020, p. 179), and specimens collected from Michoacán and Guerrero appear to be another distinct taxon due to differences in flower color, habitat, elevation, and flowering time (Stromberg *et al.* 2020, p. 179). Because the species is obvious (tall with conspicuous flowers and locally abundant) and most cienegas, particularly ones still extant in Arizona and New Mexico, have been surveyed (AGFD 2019, p. 7), it is unlikely that new populations will be found. The six historical and current populations are discussed in greater detail below:

*Las Playas, New Mexico, United States (Extirpated)*—The species historically occurred at Playas or Las Playas Springs in the Playas Basin, east of the Animas Mountains in Hidalgo County, but it has not been found since 1851, and is believed to be extirpated (Sivinski 2018, p. 21; Stromberg *et al.* 2020, p. 176). The springs were diminished, and Las Playas was found primarily dry by the mid to late 1950s (Sivinski 2018, p. 27; Stromberg *et al.* 2020, p. 176). The cienega at Las Playas is now considered dead (Sivinski 2018, p. 8) due to agricultural and industrial (*i.e.*, copper mining) dewatering (Stromberg *et al.* 2020, p. 176). “Dead cienegas” are historical cienegas that no longer have groundwater at or near the ground surface and likely have water tables so severely depleted that restoration, given today's techniques

and economics, is not feasible (Sivinski 2018, p. 14).

*Agua Caliente, Arizona, United States (Extirpated)*—Arizona eryngo historically occurred at the Agua Caliente Ranch east of Tucson in Pima County, Arizona, within the Santa Cruz River Basin (Stromberg *et al.* 2020, p. 176). This population was extirpated likely due to multiple manipulations of the site that eliminated cienega habitat, including, but not limited to, water diversion and vegetation clearing for agricultural activities, pond impoundment, groundwater pumping, and spring modification (Stromberg *et al.* 2020, p. 177; SWCA 2002, p. 11).

The property is now owned by Pima County Natural Resources, Parks and Recreation and is managed as a regional park (Pima County Parks and Recreation Department 1989, p. 2; Friends of Agua Caliente 2020, entire). Agua Caliente Regional Park includes human-made ponds that were once fed by water channeled from the springs. As a result of reduced spring flows and extended drought, in 2004, Pima County began pumping groundwater to maintain the main pond (Pond 1), a warm spring (Pima County 2021, p. 2). Restoration of Pond 1, which included the use of soil sealant to reduce seepage and conserve water, began in 2019, and was completed in 2020 (Pima County 2020a, entire). As part of the restoration, select palm trees (*Phoenix* spp.) and invasive cattails (*Typha* spp.) were removed to encourage growth of native species, and a small wetland on the northwest side of Pond 1 was created (Pima County 2020a, entire).

Experimental reintroductions of Arizona eryngo began in 2017, using plants grown in a nursery with seeds collected from La Cebadilla (Fonseca 2018, entire; Stromberg *et al.* 2020, p. 182). The initial reintroduction effort in 2017 of 20 plants had limited success due to javelina (*Tayassu tajacu*) damage, as well as placement of the plants at sites where they experienced water stress (Fonseca 2018, entire). The second effort in 2018 of 15 plants had improved success, but a number of plants were eaten by gophers (*Thomomys bottae*) (Li 2019, p. 6) or died of other causes. More recent reintroductions have resulted in the establishment of additional plants, including in the small wetland and wildlife island of Pond 1; however, efforts have not yet resulted in the establishment of a self-sustaining Arizona eryngo population.

*La Cebadilla, Arizona, United States (Extant)*—Arizona eryngo occurs in the La Cebadilla Cienega adjacent to the Tanque Verde Wash east of Tucson in

Pima County, Arizona, within the Santa Cruz River basin (Stromberg *et al.* 2020, p. 177). The cienega is located on lands owned by La Cebadilla Estates and the Pima County Regional Flood Control District; the majority of plants occur on the privately owned portion of the cienega. In 2019, Arizona eryngo was documented in a number of colonies with a total spatial extent of 0.4 hectares (1.11 acres) (Li 2020a, p. 1). Some colony boundaries are defined by the presence of bulrush and tree canopy (Li 2019, p. 1).

The Arizona eryngo population at La Cebadilla is estimated to be about 30,000 aggregates—groups of clones, which are genetically identical individuals that result from vegetative reproduction (Li 2020b, p. 1). Each clone has a unique basal stem, and multiple clones can form a clustered aggregate that resembles an individual plant (Li 2020a, p. 2). While this is the largest of the four extant populations, the plants occur in a very confined space.

The homeowners' association of La Cebadilla Estates manages the cienega (the portion not owned by the Pima County Regional Flood Control District) and nearby La Cebadilla Lake (also referred to as a pond, to the west of the cienega). The homeowners' association has enacted covenants that prevent development of the cienega or sale to private developers (La Cebadilla Estates 2005, entire). The spring is located on the western edge of the Cienega, and a concrete spring box diverts some water to sustain the lake (Fonseca 2019, p. 2; Stromberg *et al.* 2020, p. 177). Pima County Regional Flood Control District manages their portion of the cienega as natural open space, which has a restrictive covenant that limits development and protects natural resources on the property. Both La Cebadilla Estates and Pima County Regional Flood Control District are supportive of continued conservation of the cienega and have implemented or authorized conservation actions at the site.

*Lewis Springs, Arizona, United States (Extant)*—Arizona eryngo occurs in the Lewis Springs Cienega just to the east of the San Pedro River in Cochise County, within the San Pedro River Basin (Stromberg *et al.* 2020, p. 177). The cienega is located within the San Pedro Riparian National Conservation Area (SPRNCA) managed by the Bureau of Land Management (BLM). The San Pedro riparian area, containing about 64 km (40 mi) of the upper San Pedro River, was designated by Congress as a National Conservation Area in 1988. The primary purpose for the designation

is to conserve, protect, and enhance the desert riparian ecosystem, a rare remnant of what was once an extensive network of similar riparian systems throughout the Southwest.

The Lewis Springs Complex currently has five groundwater outflows and is comprised of multiple elongated wetlands generally oriented northwest-southeast along a slope, totaling 1.2 hectares (3 acres) (Radke 2013, entire; Simms 2019, entire; Stromberg *et al.* 2020, p. 177; Li 2020a, p. 2). As of September 2019, four of the eight wetlands support Arizona eryngo (Simms 2019, entire). Within these four wetlands, Arizona eryngo occurs in six colonies with discrete boundaries, the spatial extent of which was about 0.04 hectares (0.1 acres) in 2019 (Li 2020a, p. 1). Population estimates have been over 1,000 plants in recent years (Stromberg *et al.* 2020, p. 177; Li 2020a, p. 1; Li 2020b, p. 1), with the most recent estimate of 1,813 plants (Li 2020b, p. 1).

BLM has conducted some removal of the nonnative Johnsongrass (*Sorghum halepense*) at Lewis Springs and is planning for additional removal of the species. BLM is also planning experimental removal of the native upland plant baccharis (*Baccharis* spp.) at Lewis Springs, as well as establishment of additional populations and/or subpopulations of Arizona eryngo at suitable sites within Lewis Springs and the SPRNCA. BLM has collected seeds for propagation, banking, and seeding trials, and has conducted one seeding trial at Lewis Springs.

*Rancho Agua Caliente, Sonora, Mexico (Extant)*—Arizona eryngo occurs in the Agua Caliente Cienega on the privately owned Rancho Agua Caliente east of Esqueda in the municipality of Nacozari de García (Sánchez Escalante *et al.* 2019, p. 16; Stromberg *et al.* 2020, p. 179). Rancho Agua Caliente is an active cattle ranch. Based on aerial photographs, the cienega appears to be about 5 hectares (12.3 acres) (Stromberg *et al.* 2020, p. 179); however, it may only be about 1.5 hectares (3.7 acres) (Sánchez Escalante 2019, pers. comm.).

This cienega is the only known site for Arizona eryngo in Sonora. In 2018, hundreds of Arizona eryngo, including juveniles, occurred along the marsh near the spring within a nearly 1-hectare (2.5-acre) area (Sánchez Escalante *et al.* 2019, p. 16; Sánchez Escalante 2019, pers. comm.). The estimated area occupied by Arizona eryngo is larger than the other sites, while the population estimate is quite low, thus indicating the population is more sparse or patchy than La Cebadilla or Lewis Springs. Based on photography of the

site, it appears that Rancho Agua Caliente currently supports areas with a range of soil moisture (from standing water to dry soils) and open sun conditions.

*Ojo Vareleño, Chihuahua, Mexico (Extant)*—Arizona eryngo occurs at a privately owned hot springs spa, El Ojo Vareleño, located northwest of the municipality of Casas Grandes in Chihuahua (Sánchez Escalante *et al.* 2019, p. 9; Stromberg *et al.* 2020, pp. 178). The site is within the San Miguel River Basin at the base of the Piedras Verdes Mountains (Stromberg *et al.* 2020, p. 178). The extent of the cienega is currently about 1 hectare (2.5 acres) and supports about 56 adult plants (Sánchez Escalante *et al.* 2019, p. 17) that occupy an area of about 0.075 hectares (0.18 acres) (Sánchez Escalante 2019, pers. comm.). No juveniles were documented.

Based on photography of the site, it appears that Ojo Vareleño currently supports areas with a range of soil moisture (from standing water to dry soils) and sunlight conditions (from open sun to highly shaded). The nonnative giant reed (*Arundo donax*) invasion at the site is creating conditions with high amounts of shade and little to no space for other plants. Springflow is collected in concrete spa ponds (Sánchez Escalante *et al.* 2019, p. 28), which likely affects the natural hydrology of the site.

## Regulatory and Analytical Framework

### Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an endangered species or a threatened species. The Act defines an “endangered species” as a species that is in danger of extinction throughout all or a significant portion of its range, and a “threatened species” as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act 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 itself.

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

The Act does not define the term “foreseeable future,” which appears in the statutory definition of “threatened species.” Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term “foreseeable future” extends only so far into the future as the Service can reasonably determine that both the future threats and the species’ responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. “Reliable” does not

mean “certain”; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species’ likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species’ biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

### Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an assessment of the potential threats to the species. The SSA report does not represent a decision by the Service on whether the species should be listed as an endangered or threatened species under the Act. It does, however, 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. 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-R2-ES-2020-0130 on <https://www.regulations.gov>.

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

described the beneficial and risk factors influencing the species' viability.

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

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

Using various timeframes and the current and projected future resiliency, redundancy, and representation, we describe the species' levels of viability over time. For the Arizona eryngo to maintain viability, its populations or some portion thereof must be resilient. A number of factors influence the resiliency of Arizona eryngo populations, including occupied area, abundance, and recruitment. Elements of the species' habitat that determine

whether Arizona eryngo populations can grow to maximize habitat occupancy influence those factors, thereby influencing the resiliency of populations. These resiliency factors and habitat elements are discussed in detail in the SSA report and summarized here.

### Species Needs

#### Abundance

Larger plant populations have a lower risk of extinction than smaller populations (Menges 2000, p. 78). Small populations are less resilient and more vulnerable to the effects of demographic, environmental, and genetic stochasticity and have a higher risk of extinction than larger populations (Matthies *et al.* 2004, pp. 481, 485). Small populations may experience increased inbreeding, loss of genetic variation, and ultimately a decreased potential to adapt to environmental change (Matthies *et al.* 2004, p. 481). When rare plant populations are very small (fewer than 100 individuals), they may suffer from inbreeding depression (Maschinski and Albrecht 2017, p. 392). Furthermore, fewer pollinators visit plants in small and isolated populations, which may lead to reduced pollination and lowered fecundity (Matthies *et al.* 2004, p. 482).

For populations of Arizona eryngo to be resilient, abundance should be high enough that local stochastic events do not eliminate all individuals, allowing the overall population to recover from any one event. A greater number of individuals in a population increases the chance that a portion of the population will survive. The necessary abundance or minimum viable population (MVP) size for Arizona eryngo is unknown; however, estimations can be attained from literature. For example, Pavlik (1996, p. 137) recommends MVP sizes ranging from 50 individuals to 2,500 individuals for the conservation of rare plants, depending on various life-history characteristics of the taxon. Some of the Arizona eryngo's life-history characteristics indicate that an MVP may require higher abundance, while other characteristics indicate that lower abundances may be sufficient. For example, the species is a perennial and commonly produces ramets, which means that fewer individuals are needed to achieve an MVP. Conversely, it is an herbaceous plant, which means that an MVP may require higher abundance. The other characteristics are unknown for this species. Based on our current understanding of the species' life history, we conclude that an initial MVP

in the middle of the spectrum provided by Pavlik (1996, p. 137) is appropriate. Therefore, a population size of 1,225 may be needed to achieve high resiliency for the Arizona eryngo.

Determinations of MVP usually take into account the effective population size, rather than total number of individuals; 10 genetically identical individuals (for example, clones or ramets) would have an effective population size of one. In the case of the Arizona eryngo, we have estimates of abundance of individuals for each population, but we do not know the ratio of ramets to genetically unique individuals, although evidence indicates the species is highly clonal. In cases like this, Tependino (2012, p. 946) suggests adjusting the stem counts of rare clonal species to adjust for the inflated population size from the inclusion of ramets. Therefore, to account for the clonal nature of the Arizona eryngo, to estimate our final MVP we added 50 percent to the estimated MVP, which resulted in a total of about 1,840 plants needed to be a highly resilient population.

#### Recruitment

Arizona eryngo populations must also reproduce and produce sufficient amounts of seedlings and ramets such that recruitment equals or exceeds mortality. Ideally, we would know key demographic parameters of the plant (*i.e.*, survival, life expectancy, lifespan, the ratio of ramets to genetically unique individuals) to estimate the percentage of juveniles required in a population to achieve population stability or growth. Because we currently do not know any of these parameters, we are using the presence of juveniles as an important demographic factor influencing resiliency, because it reflects successful recruitment.

Current population size and abundance reflects previous influences on the population and habitat, while reproduction and recruitment reflect population trends that may be stable, increasing, or decreasing in the future. For example, a large, dense population of Arizona eryngo that contains mostly old individuals may be able to withstand a single stochastic event over the short term, but it is not likely to remain large and dense into the future, as there are few young individuals to sustain the population over time. A population that is less dense but has many young individuals may be likely to grow denser in the future, or such a population may be lost if a single stochastic event affects many seedlings at once. Therefore, the presence of young individuals is an important

indicator of population resiliency into the future.

#### Occupied Area

Highly resilient Arizona eryngo populations must occupy cienegas large enough such that stochastic events and environmental fluctuations that affect individual plants or colonies do not eliminate the entire population. Repopulation through seed dispersal and germination and ramet production within the cienega can allow the population to recover from these events.

Larger functional cienegas are likely to support larger populations of Arizona eryngo and are more likely to provide patches of suitable habitat when small stochastic events and environmental fluctuations occur. For example, during drought years, areas closer to spring seeps and possibly areas with natural depressions (*i.e.*, topographic variation) may retain more moisture throughout the year than areas farther away from seeps and slightly higher in elevation. Conversely, during years with heavy rainfall, slightly higher elevation areas may retain moist soils that are not inundated year-round, providing suitable habitat for the species.

Areas currently occupied by Arizona eryngo range from about 0.04 hectares (0.1 acre) to 0.9 hectares (2.2 acres). Based on historical and current estimates of cienega size and area occupied by Arizona eryngo, we approximate that at minimum a resilient Arizona eryngo population should occupy greater than 1 hectare (2.5 acres) within a functional cienega.

#### Soil Moisture

Arizona eryngo populations also need moist to saturated soils year-round. Arizona eryngo has been documented in standing water up to 2 centimeters to soil that is dry at the surface but saturated several centimeters into the soil (Stromberg *et al.* 2020, p. 177). It is hypothesized that flowering is determined, in part, by soil moisture availability (*i.e.*, plants do not flower in drier conditions when the plants are more stressed) and that ramets are produced during drier periods (Li 2019, p. 8; Stromberg *et al.* 2020, p. 179). Seedling recruitment may be episodic, with greater recruitment success in wetter years. Soils must remain sufficiently moist for successful seedling recruitment, particularly in the hottest/driest time of the year (normally May/June). If soils become too dry, other more drought-tolerant species are likely to encroach and outcompete the Arizona eryngo (Simms 2019, p. 6; Li 2019, p. 1), or if or if it becomes very dry such that the roots are not in moist soil, the plant

is likely to die. If the soil is inundated with water (such that there is standing water on the surface) for too long, other species that grow more aggressively in mesic conditions are likely to outcompete the Arizona eryngo (Li 2020, p. 2).

#### Sunlight

Highly resilient Arizona eryngo populations require full sun. Under canopy cover, the species grows less densely, and flowering is reduced. Tall native and nonnative vegetation appears to outcompete and suppress growth of the Arizona eryngo. Additionally, dense vegetation appears to hinder seedling recruitment (Li 2021b, pp. 3–4). While these species may compete for sunlight, water, and nutrients, lack of sunlight may be a primary factor driving the absence or decreased abundance of the Arizona eryngo.

#### Risk Factors for the Arizona Eryngo

We reviewed the potential risk factors (*i.e.*, threats, stressors) that could be affecting the Arizona eryngo now and in the future. In this final rule, we will discuss only those factors in detail that could meaningfully impact the status of the species. Those risks that are not known to have effects on Arizona eryngo populations, such as overutilization for commercial and scientific purposes and disease, are not discussed here but are evaluated in the SSA report. The primary risk factors affecting the status of the Arizona eryngo are: (1) Physical alteration of cienegas (Factor A), (2) water loss (Factor A), and (3) changes in co-occurring vegetation (Factor A). These factors are exacerbated by the ongoing and expected effects of climate change. Direct harm or mortality due to herbivory or trampling (Factor C) may also affect individuals and the seedbank, but not at levels likely to affect species viability.

#### Physical Loss and Alteration of Cienega Habitat

Historically, cienegas were more common and larger than they are today. Greater than 95 percent of the historical area of cienegas in the southwestern United States and northwestern Mexico is now dry (Cole and Cole 2015, p. 36). Functional cienegas were much more common prior to the late 1800s, as evidenced by pollen and fire records, General Land Office survey notes, and early trapper and settler diaries (Hendrickson and Minckley 1985, p. 131; Fonseca 1998, p. 111; Cole and Cole 2015, p. 36; Brunelle *et al.* 2018, p. 2). Estimates of cienega abundance in the International Four Corners Region of

the Southwest (Arizona, Sonora, New Mexico, and Chihuahua) vary from hundreds to thousands (Cole and Cole 2015, p. 36; Sivinski 2018, entire). Of the 155 cienegas that Cole and Cole (2015, p. 36) identified in the International Four Corners Region, 87 (56 percent) are either dead or so severely compromised that there is no prospect for their restoration. In addition to the reduced abundance of cienegas in the International Four Corners Region, the remaining cienegas are greatly reduced in size, and due to many being severely incised, they are more similar to creeks than marshes (Cole and Cole 2015, p. 36).

A number of complex factors, many of which are interrelated, led to the historical loss and degradation of cienegas and continue to contribute to this loss today. The primary factors include intensive grazing of domestic livestock, the removal of beavers (*Castor canadensis*) from regional streams and rivers, and agricultural recontouring (Minckley *et al.* 2013a, p. 214; Cole and Cole 2015, p. 32). Intensive overgrazing by sheep and cattle from the late 1500s to the late 1800s led to barren soil, erosion, headcutting (erosional feature in a stream that contributes to lowering the water table of the surrounding system), and increased frequency of or intensity of destructive floods, all leading to the alteration or complete destruction (complete loss of ecological function) of cienegas (Minckley *et al.* 2013a, p. 214; Cole and Cole 2015, p. 32). Beaver dams, once numerous within the range of the Arizona eryngo, slowed water and created pools and wetlands along water courses, and enhanced groundwater recharge; however, high levels of beaver trapping in the 1800s resulted in increased erosion and channel cutting of these once complex, shallow wetlands (Gibson and Olden 2014, p. 395; Cole and Cole 2015, p. 32). Additionally, early settlers recontoured (*e.g.*, diverted, dammed, channelized) cienegas for agricultural, mining, disease control, and other purposes; this resulted in further channelization and concentrated flow, greatly reducing the size of cienegas and further lowering the water table (Cole and Cole 2015, p. 32; Minckley *et al.* 2013b, p. 78).

We expect that Arizona eryngo populations were more widespread and occurred at historical cienegas that have lost their ecological function due to physical alteration, such that populations were more abundant, occurred closer to one another, and were more connected (through pollination and seed dispersal) than they are currently. As a result of these

lost cienegas, the four extant Arizona eryngo populations are now disjunct.

Although grazing was one cause of the loss of historical cienega habitat, grazing and trampling by livestock occur only occasionally at the remaining Arizona eryngo populations. No grazing is authorized at Lewis Springs, and we are not aware of any grazing occurring at La Cebadilla and Ojo Vareleño. Trespass livestock could enter Lewis Springs and affect habitat in the cienega; although there was no evidence of cattle in 2018 or 2019, there was evidence (*i.e.*, scat and light trailing) of a trespass horse in the area when Service biologists visited the site in 2019. Cattle are present at Rancho Agua Caliente, Sonora, and the habitat is somewhat disturbed by cattle (Sánchez Escalante *et al.* 2019, p. 16). Livestock (*e.g.*, livestock trailing and gathering) can trample vegetation and expose and compact soil, resulting in habitat erosion and altered hydrological function, but the effects of livestock are dependent on many factors such as the intensity, duration, and timing of grazing. In the absence of other forms of disturbance (*e.g.*, fire), it is possible that selective, well-managed livestock grazing in the winter or spring could create habitat disturbance and open sun conditions favoring Arizona eryngo seedling establishment.

Other physical alterations that occurred in the past likely continue to affect extant populations of Arizona eryngo through changes in the natural hydrology of cienegas supporting the species. For example, a berm that has been present at La Cebadilla since at least 1941, as well as various houses and roads adjacent and near the cienega, all affect the natural hydrology of the site. Similarly, the railroad that runs parallel to Lewis Springs likely affects the hydrology of the cienega. Unlike the historical physical alterations that severely degraded cienegas, these alterations (berm, railroad, houses, etc.) have not destroyed cienega function.

#### Water Loss

Water loss in cienegas poses a significant threat to the Arizona eryngo. Causes of water loss are complex, but the primary causes at cienegas historically or currently supporting Arizona eryngo are: (1) Groundwater pumping/withdrawal, (2) spring modification, (3) water diversion, and (4) drought. These stressors are all exacerbated by climate change. Groundwater pumping or withdrawal leads to aquifer depletion and no or reduced outflow from springheads. Modification of springheads reduces or eliminates springflow. Water diverted from springheads reduces or eliminates

the amount of water supporting the cienega. Drought and warming also reduce springflow and the amount of water in cienegas. Reduction in winter rain particularly leads to reduced aquifer recharge. Climate change is expected to exacerbate drought conditions, increase surface temperatures and evapotranspiration, and reduce winter precipitation, all of which may lead to a reduction in aquifer recharge and increased cienega drying.

Water loss in cienegas reduces the quantity and quality of habitat for the Arizona eryngo. The species requires very moist to saturated soils and possibly some standing water for seed germination. As water is lost from cienegas, soils become drier, reducing habitat quality and allowing woody and/or invasive vegetation to establish, further reducing available habitat.

Water loss from cienegas caused the extirpation of the species at two of the six cienegas known to historically support the Arizona eryngo (Las Playas in New Mexico, and Agua Caliente in Arizona), and all populations continue to be exposed to water loss. The sources of water loss are discussed further below.

*Groundwater withdrawal*—The population at Las Playas was extirpated primarily due to groundwater pumping for agriculture and the Playas Smelter that caused the desiccation of the spring (Sivinski 2018, p. 27; Stromberg *et al.* 2020, p. 176). Groundwater withdrawal is also occurring near Lewis Springs, La Cebadilla, and Agua Caliente. The use of groundwater for agriculture, industry, and urban and rural development has enabled significant human population growth in the arid Southwest. Increased groundwater withdrawal can reduce or eliminate springflow, thereby eliminating wetlands altogether (Johnson *et al.* 2016, p. 52).

The largest municipalities in the Sierra Vista subwatershed, within which Lewis Springs occurs, are Sierra Vista, Bisbee, Tombstone, and Huachuca City. Within these areas, the human population is increasing, as is development distributed in rural parts of the subwatershed (Leake *et al.* 2008, p. 1). This growing population is dependent on groundwater to meet its water consumption needs. Water outflow from the subwatershed, including water withdrawn by pumping, exceeds natural inflow to the regional aquifer within the subwatershed (Leake *et al.* 2008, p. 2). As a result, groundwater levels in parts of the subwatershed are declining, and groundwater storage is being depleted (*i.e.*, a negative water budget).

Groundwater pumping in the area of Lewis Springs, up to several kilometers away, may be affecting the regional groundwater flow to the wetlands along the San Pedro River, including Lewis Springs (Stromberg *et al.* 2020, p. 181). The continued decline of groundwater levels upgradient from perennial river reaches will eventually diminish the base flow of the San Pedro River and impact the riparian ecosystem within the SPRNCA (Leake *et al.* 2008, p. 2). This groundwater use over the past century has been so profound that the effects of pumping over the past century will eventually capture and eliminate surface flow from the river, even if all groundwater pumping were to stop (Gungle *et al.* 2016, p. 29). Models show the area of Lewis Springs as being one of the areas of greatest groundwater loss in the basin (Leake *et al.* 2008, p. 14).

The aquifer supporting the La Cebadilla Springs could be reduced from numerous private wells (including the Tanque Verde Guest Ranch) producing water from the aquifer that feeds the springs (Eastoe and Fonseca 2019, pers. comm.). It is unknown how quickly pumping a mile or two away from the springs might affect the springs themselves (Eastoe and Fonseca 2019, pers. comm.).

We do not have information on the source of water supplying the springs or about the amount of groundwater use at Rancho Agua Caliente or Ojo Vareleño, both in Mexico.

*Spring modification*—The Arizona eryngo population at Agua Caliente was extirpated due to a number of manipulations of the site that eliminated cienega habitat, including, but not limited to, water diversion and vegetation clearing for agricultural activities, pond impoundment, groundwater pumping, and spring modification (*i.e.*, the springs were blasted in the 1930s and again in the 1960s) that significantly decreased the water flow (Stromberg *et al.* 2020, p. 177; Pima County 2021, p. 16; Friends of Agua Caliente 2020, entire; SWCA 2002, p. 11).

*Water diversion*—The Arizona eryngo population at La Cebadilla has been exposed to water diversion for many decades; this diversion may have led to a reduction in the size of the cienega, but enough water still flows to maintain the cienega and support the largest documented population (Fonseca 2019, p. 2; Stromberg *et al.* 2020, p. 177). Cienega habitat was eliminated from Agua Caliente due to multiple manipulations, including diversion of spring water via canals and pipes for agricultural purposes and pond

impoundment (Pima County 2021, p. 16).

Less is known about water loss associated with the cienegas supporting the Arizona eryngo in Mexico, but we are aware that the municipality of Casas Grandes is interested in installing a pipeline from the spring at El Ojo Vareleño to supply water to the Universidad Tecnológica de Casas Grandes. Currently at Ojo Vareleño, springflow is collected in concrete spa ponds, which likely affects the natural hydrology of the site.

**Drought and warming**—All Arizona eryngo populations are exposed to drought, as well as warming temperatures from climate change. Decreased precipitation and increased temperatures due to climate change will exacerbate declines in surface and groundwater levels, which will cause further drying of cienega habitat required by the Arizona eryngo.

Climate models indicate that the transition to a more arid climate is already underway and predict that in this century the arid regions of the southwestern United States will become drier (*i.e.*, decreased precipitation) and warmer (*i.e.*, increased surface temperatures), and have fewer frost days, decreased snow pack, increased frequency of extreme weather events (heat waves, droughts, and floods), declines in river flow and soil moisture, and greater water demand by plants, animals, and humans (Archer and Predick 2008, p. 23; Garfin *et al.* 2013, pp. 5–6). Increasing dryness in the southwestern United States and northern Mexico is predicted to occur as early as 2021–2040 (Seager *et al.* 2007, p. 1181). Climate modeling of the southwestern United States shows consistent projections of drying, primarily due to a decrease in winter precipitation (Collins *et al.* 2013, p. 1080). For both Pima and Cochise Counties, where the La Cebadilla and Lewis Springs populations occur, the average daily maximum temperature, under both lower (*i.e.*, representative concentration pathway (RCP) 4.5) and higher (*i.e.*, RCP 8.5) emissions scenarios, will increase by mid-century (Climate Explorer 2020).

Climate change over the 21st century is projected to reduce renewable surface water and groundwater resources in most dry subtropical regions (IPCC 2014, p. 69). Over the next 100 years, groundwater recharge in the San Pedro basin is expected to decrease 17 to 30 percent, depending on the climate scenario considered (Serrat-Capdevila *et al.* 2007, p. 63), and average annual base flow will be half the base flow in 2000. As the area gets drier, the San Pedro

aquifer groundwater overdraft will become more severe as recharge declines and groundwater pumping increases (Meixner *et al.* 2016, p. 135). For the purposes of our analysis, we chose RCP 4.5 and RCP 8.5 (IPCC 2014, p. 8) to assess future condition of the Arizona eryngo. These climate scenarios were incorporated into our future scenarios of the status of the Arizona eryngo in the SSA report.

**Summary of water loss**—In summary, water loss has caused the extirpation of two of six known populations of the Arizona eryngo and has affected the current viability of all extant populations. Both extant U.S. populations are exposed to water loss through groundwater withdrawal, and one of these (La Cebadilla) is also exposed to spring diversion. Groundwater withdrawal, particularly when exacerbated by climate change, is a primary threat to the survival of the Arizona eryngo at Lewis Springs and La Cebadilla. Less is known about water loss associated with the two populations in Mexico, but spring diversion is proposed at one site supporting the Arizona eryngo, and it is likely that the species is vulnerable to groundwater withdrawal. Drought and warming as a result of climate change affects all populations, particularly when combined with groundwater withdrawal and diversion.

#### Change in Vegetation at Cienegas

The invasion of vegetation that reduces full sun conditions poses a threat to the Arizona eryngo. Changes in vegetation at cienegas are primarily from fire suppression, introduction of nonnative plant species, decreased flood events, and changes in hydrology and climate. Prior to the arrival of European settlers, burning of cienegas by indigenous people was frequent enough to exclude most woody plants (*e.g.*, hackberry (*Celtis* spp.), buttonbush (*Cephalanthus* spp.), cottonwood (*Populus* spp.), ash (*Fraxinus* spp.), and willow (*Salix* spp.)) and suppress bulrush from cienegas and promote growth of native grasses (Davis *et al.* 2002, p. 1; Cole and Cole 2015, p. 32). Extant cienegas now have less diversity of annual and disturbance-adapted native understory species and an increase in native woody, clonal, and nonnative plants (Stromberg *et al.* 2017, p. 10). As water levels in cienegas decrease, woody plants invade without regular disturbance (*e.g.*, fires, floods) to the system (Huxman and Scott 2007, p. 1). Shifts from herbaceous wetland vegetation to more deeply rooted riparian trees have been well documented at wetlands with lowered

water tables (Stromberg *et al.* 2020, p. 182). These woody plants shade out Arizona eryngo and cause water level declines in cienegas through increased evapotranspiration, particularly in the summer (Johnson *et al.* 2016, p. 83).

Invasive, nonnative plants (*e.g.*, giant reed, Johnsongrass) are of concern because they often quickly colonize an area and aggressively compete with native species such as the Arizona eryngo for sunlight, water, and nutrients. Giant reed is a fast-growing, tall (up to 6 meters (m) (20 feet (ft))), perennial, hydrophytic (water-loving) grass that grows in riparian areas, streams, irrigation ditches, and wetlands. It is an aggressive invader that rapidly spreads into a thick monoculture that outcompetes and shades out other vegetation (Frandsen 1997, p. 245; DiPietro 2002, p. 9). Giant reed is fire-adapted and resprouts from extensive underground rhizomes even after very hot fires that kill native vegetation (DiPietro 2002, p. 9). Additionally, it uses large amounts of water, thereby reducing the amount of water available for native vegetation (DiPietro 2002, p. 10).

Johnsongrass is a fast-growing, tall, invasive perennial grass that thrives in a variety of environments and climates (Peerzada *et al.* 2017, p. 2). It mostly grows at moist sites (*e.g.*, irrigation canals, cultivated fields, field edges, pastures), and in Arizona, it is known as a riparian weed in the Sonoran and Chihuahuan Deserts. Johnsongrass impacts the growth of native plants; it is difficult to control and has become resistant to herbicides, particularly glyphosate (Peerzada *et al.* 2017, p. 2).

At three of four cienegas supporting the Arizona eryngo (Lewis Springs, La Cebadilla, and Ojo Vareleño), an increase in woody vegetation and nonnative plant species has been documented. This vegetation is outcompeting the Arizona eryngo for sunlight and space, likely causing a decrease in population size and extent at these sites. At Lewis Springs, Johnsongrass is aggressively invading and appears to be suppressing Arizona eryngo, particularly in the drier areas of the wetlands (Li 2019, entire; Simms 2019, entire). Johnsongrass has been present at this site since at least 2009. In the drier areas of the wetlands, baccharis is encroaching and appears to be suppressing Arizona eryngo; no Arizona eryngo plants have been found growing in the understory of baccharis (Li 2019, entire; Simms 2019, entire). At La Cebadilla, aerial imagery indicates that mesquite (*Prosopis* spp.) is invading the cienega, and cottonwood also appears to be shading out Arizona

eryngo (Fonseca 2019, entire). Velvet ash (*Fraxinus velutina*) trees are invading the cienega and shading out Arizona eryngo as well (Li 2020b, p. 3). At Ojo Vareleño, many nonnative plant species also occur, with a particularly aggressive invasion of giant reed (Sánchez Escalante *et al.* 2019, pp. 9–10).

In summary, nonnative Johnsongrass and giant reed are likely to continue to aggressively invade Lewis Springs and Ojo Vareleño. These nonnative plant species may contribute to the near-term extirpation of Arizona eryngo populations at these sites. Woody vegetation encroachment at La Cebadilla and Lewis Springs is also likely to continue, further degrading habitat conditions.

#### Direct Harm and Mortality

Livestock, such as cattle and horses, and native herbivores (both invertebrate and vertebrate) may cause harm or mortality to Arizona eryngo plants through trampling, herbivory, or uprooting. Because mature plants have large, fibrous leaves, cattle are more likely to consume young plants at an early growth stage. As discussed above, cattle are present at Rancho Agua Caliente, and trespass cattle and horses could enter Lewis Springs and trample plants, consume flowers, and reduce the seedbank of the Arizona eryngo. To our knowledge, no livestock are present at La Cebadilla or Ojo Vareleño. At the Agua Caliente reintroduction site in Arizona, javelina uprooted and killed young plants, and gophers ate young reintroduced plants (Fonseca 2018, p. 1; Li 2019, p. 6).

Many invertebrates have been observed on Arizona eryngo plants at La Cebadilla and Lewis Springs (Stromberg *et al.* 2020, p. 175; Li 2019, p. 2; Simms 2019, p. 1). Some of these invertebrates may be floral herbivores, but they do not appear to be of concern for the species' viability.

In summary, while herbivory and trampling may harm individual Arizona eryngo plants and the seedbank, they are not significant threats to the species.

#### Summary

Our analysis of the past, current, and future influences on the needs of the Arizona eryngo for long-term viability revealed that there are two that pose the greatest risk to future viability: water loss (groundwater withdrawal and water diversion) and invasion of nonnative and woody plant species, both of which are exacerbated by drought and warming caused by climate change. Water loss reduces the availability of moist soils, and nonnative and woody

plant species outcompete Arizona eryngo for sunlight, space, and water, thereby reducing the quantity and quality of habitat.

#### Species Condition

Here we discuss the current condition of the Arizona eryngo, taking into account the risks to those populations that are currently occurring. We consider climate change to be currently occurring and exacerbating effects of drought, warming, groundwater withdrawal, diversion, and invasion of nonnative and woody plant species. In the SSA report, for each population, we developed and assigned condition categories for three population factors and two habitat factors that are important for viability of the Arizona eryngo. The condition scores for each factor were then used to determine an overall condition of each population: high, moderate, low, or functionally extirpated. These overall conditions translate to our presumed probability of persistence of each population, with populations in high condition having the highest presumed probability of persistence over 30 years (greater than 90 percent), populations in moderate condition having a presumed probability of persistence that falls between 60 and 90 percent, and populations in low condition having the lowest probability of persistence (between 10 and 60 percent). Functionally extirpated populations are not expected to persist over 30 years or are already extirpated.

Overall, there are four remaining populations of Arizona eryngo, all restricted to small cienegas in the Sonoran and Chihuahuan Deserts in Arizona and Mexico. Historically, Arizona eryngo populations were likely connected to one another, but today they are small and isolated due to cienega loss throughout the region. Repopulation of extirpated locations is extremely unlikely without human assistance. Two populations are currently in moderate condition and two are in low condition, and two have been extirpated. The four extant populations are described below.

#### La Cebadilla

La Cebadilla contains the largest population of the Arizona eryngo, with a population estimate of over 30,000 individuals. However, this population occurs in a very small area; the occupied area is approximately 0.04 hectares (1.1 acres), and the population depends on stable groundwater to maintain springflow into the cienega. The cienega has been altered by increased presence of trees, bank

erosion, pasture grading, utility construction, and subdivision development (Fonseca 2019, p. 3). Historical images indicate that the cienega was more extensive in 1941, with fewer trees on some margins of the cienega and no forest on the southern margin of the cienega (Fonseca 2019, p. 1). Due to the encroachment of woody vegetation, this site has varied sunlight conditions, with more shade currently than in the past.

The cienega has been shrinking, indicating the aquifer is being depleted (Fonseca 2019, pers. comm.). The aquifer supporting the La Cebadilla springs supports numerous private wells (including the Tanque Verde Guest Ranch) (Eastoe and Fonseca 2019, pers. comm.). In addition to groundwater use, aquifer depletion could also result from increased evapotranspiration of tree cover and stream channel adjustments.

La Cebadilla Estates and the Pima County Regional Flood Control District (PCRFC) are committed to the conservation of the unique ecological diversity of La Cebadilla cienega and are working to reduce woody vegetation. The homeowners' association of La Cebadilla Estates manages their portion of the cienega as common property for the common use and enjoyment of its members. Under an agreement with Partners for Fish and Wildlife, in 2021, La Cebadilla Estates supported the experimental removal of young velvet ash trees encroaching on the cienega, which was successful at improving conditions for Arizona eryngo (Li 2021b, p. 1).

PCRFC manages their portion of the cienega as natural open space, which has a restrictive covenant that limits development and protects natural resources on the property. PCRFC has implemented actions to conserve Arizona eryngo at La Cebadilla, such as removing parts of a fallen cottonwood tree that were covering Arizona eryngo (Li 2020b, p. 2), and is planning additional actions.

Because of the small extent of the population and the encroachment of woody vegetation, the Arizona eryngo population is currently in moderate condition and is at risk of extirpation from decreased springflow due to continuing loss of groundwater from the aquifer.

#### Lewis Springs

The population of Arizona eryngo in Lewis Springs, estimated at 1,813 plants, occurs along a very narrow cienega parallel to a railroad, occupying about 0.04 hectares (0.1 acres) (Li 2020a, p. 1). In 2005, there were more than a

dozen springs and seeps in the wetland complex; as of 2019, some of the wetland patches appear to be drying, with soil drier at several sites than it had been in 2005 (Simms 2019, entire). The water source of Lewis Springs Cienega is supplied by mountain front recharge (westward flow from the Mule Mountains and eastward flow from the Huachuca Mountains) (Baillie *et al.* 2007, p. 7; Stromberg *et al.* 2020, p. 177). Groundwater pumping up to several kilometers away may be affecting the regional groundwater flow to the wetlands along the San Pedro River, including Lewis Springs (Stromberg *et al.* 2020, p. 181).

Nonnative Johnsongrass is aggressively invading Lewis Springs and appears to be suppressing Arizona eryngo, particularly in the drier areas of the cienega (Simms 2019, p. 22; Li 2020a, p. 2). Similarly, baccharis has been invading and appears to be suppressing Arizona eryngo, as no Arizona eryngo plants were found growing in the understory of baccharis (Simms 2019, p. 6; Li 2019, p. 1). In the wetter areas of the cienega where the soil is saturated and surface water is generally present, common spikerush (*Eleocharis palustris*) and bulrush appear to suppress Arizona eryngo (Li 2020a, p. 2).

BLM has conducted some removal of Johnsongrass at Lewis Springs and is currently planning for additional removal of the species. BLM is also planning experimental removal of baccharis shrubs at Lewis Springs, and they are considering establishment of additional populations and/or subpopulations of Arizona eryngo at suitable sites within Lewis Springs and the SPRNCA. BLM is also collecting seeds for propagation and banking.

Because of the moderate population size, extremely small population extent, decreasing springflow and increased drying of soils, and plant species invasion, Lewis Springs is currently in moderate condition. The population is currently at risk of extirpation from drying due to drought, groundwater pumping, and invasion of nonnative Johnsongrass.

#### Rancho Agua Caliente, Mexico

The Arizona eryngo population at Rancho Agua Caliente occupies about 1 ha (2.5 acres). The population is estimated to be several hundred plants, including juveniles (Sánchez Escalante *et al.* 2019, p. 16; Sánchez Escalante 2019, pers. comm.). This cienega is the only known population of Arizona eryngo in Sonora.

Rancho Agua Caliente is an active cattle ranch, and Arizona eryngo habitat

is somewhat disturbed by cattle (Sánchez Escalante *et al.* 2019, p. 16), which may help create open sun conditions for the species. We have no information on the groundwater source for the spring.

Because of the small numbers of individuals at Rancho Agua Caliente, the population is currently in low condition and is at risk of extirpation due to drought and drying of habitat.

#### Ojo Vareleño, Mexico

The Arizona eryngo population at Ojo Vareleño contains about 56 adult plants (Sánchez Escalante *et al.* 2019, p. 17) in a 0.075-hectare (0.18-acre) area (Sánchez Escalante 2019, pers. comm.). No juveniles have been documented at this site.

Giant reed has been aggressively invading Ojo Vareleño (Sánchez Escalante *et al.* 2019, p. 10), and it appears that the site has variable soil moisture and sunlight conditions. The giant reed invasion is creating conditions with high amounts of shade and little to no space for other plants. Springflow is collected in concrete ponds (Sánchez Escalante *et al.* 2019, p. 28), which likely affects the natural hydrology of the site. Currently, we do not have information on the source of water supplying the springs or the amount of groundwater use at this site.

Because of the very low population numbers and the lack of juveniles, the population of Arizona eryngo at Ojo Vareleño is currently in low condition. A small change in the water levels at the cienega or further invasion by giant reed could cause the extirpation of the population in the near future.

#### Conservation Efforts and Regulatory Mechanisms

Conservation efforts are occurring at multiple sites supporting Arizona eryngo. As discussed above, for example, at Lewis Springs, BLM has been assessing and planning the removal of nonnative and select woody vegetation and has conducted some removal of Johnsongrass. BLM has collected seeds for propagation, banking, and seeding trials, and has conducted one seeding trial at Lewis Springs. Additionally, BLM has introduced Arizona eryngo to the Las Cienegas National Conservation Area. Pima County has been working to reintroduce Arizona eryngo to Agua Caliente and introduce it to Canoa Ranch. La Cebadilla Estates has been supportive of various survey, monitoring, and conservation actions on their property. These conservation efforts have significantly contributed to our knowledge of Arizona eryngo and

conservation of the species; however, at this time, these efforts are inadequate to prevent the need for listing because major threats, such as water loss and drought and climate change, are still present.

#### Determination of Arizona Eryngo's Status

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of an endangered species or a threatened species. The Act defines an "endangered species" as a species 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 endangered species or threatened species because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

#### Status Throughout All of Its Range

After evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we found that the Arizona eryngo has declined in abundance and distribution. At present, most of the known populations exist in very low abundances, and all populations occur in extremely small areas. Furthermore, existing available habitats are reduced in quality and quantity, relative to historical conditions. Our analysis revealed three primary threats that caused these declines and pose a meaningful risk to the viability of the species. These threats are primarily related to habitat changes (Factor A from the Act): Physical alteration of cienegas, water loss, and changes in co-occurring vegetation, all of which are exacerbated by the effects of climate change.

Because of historical and current modifications of cienegas and groundwater withdrawals from the aquifers supporting occupied cienegas, Arizona eryngo populations are now fragmented and isolated from one another and unable to recolonize following extirpations. These populations are largely in a state of

chronic degradation due to water loss and changes in co-occurring vegetation, affecting soil moisture and open canopy conditions and limiting the species' resiliency. Given the high risk of a catastrophic drought or groundwater depletion, both of which are exacerbated by climate change, all Arizona eryngo populations are at a high or moderate risk of extirpation. Historically, the species, with a larger range of likely interconnected populations, would have been more resilient to stochastic events because even if some populations were extirpated by such events, they could be recolonized over time by dispersal from nearby surviving populations. This connectivity, which would have made for a highly resilient species overall, has been lost, and with two populations in low condition and two in moderate condition, the remnant populations are all at risk of loss.

Our analysis of the Arizona eryngo's current conditions, using the best available information, shows that the Arizona eryngo is in danger of extinction throughout all of its range due to the severity and immediacy of threats currently impacting the species. We find that a threatened species status is not appropriate because of the Arizona eryngo's currently contracted range, because the species' populations are fragmented from one another, and because the threats to the species are currently ongoing and occurring across its entire 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. We have determined that the Arizona eryngo is in danger of extinction throughout all of its range and accordingly did not undertake an analysis of any significant portions of its range. Because the Arizona eryngo warrants listing as endangered throughout all of its range, our determination is consistent with the decision in *Center for Biological Diversity v. Everson*, 2020 WL 437289 (D.D.C. Jan. 28, 2020), in which the court vacated the aspect of the Final Policy on Interpretation of the Phrase "Significant Portion of Its Range" in the Endangered Species Act's Definitions of "Endangered Species" and "Threatened Species" (79 FR 37578; July 1, 2014) that provided the Services do not undertake an analysis of significant portions of a species' range if the

species warrants listing as threatened throughout all of its range.

#### *Determination of Status*

Our review of the best available scientific and commercial information indicates that the Arizona eryngo meets the Act's definition of an endangered species. Therefore, we are listing the Arizona eryngo as an endangered species in accordance with sections 3(6) 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, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness, and conservation by Federal, State, Tribal, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and other countries and calls for recovery actions to be carried out for listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. 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 recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning consists of preparing draft and final recovery plans, beginning with the development of a recovery outline and making it available to the public within 30 days of a final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery plan also identifies recovery criteria for review of when a species may be ready for reclassification from endangered to

threatened ("downlisting") or removal from protected status ("delisting"), and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our website (<https://www.fws.gov/endangered>), or from our Arizona 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.

Following publication of this final rule, 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 States of Arizona and New Mexico will be eligible for Federal funds to implement management actions that promote the protection or recovery of the Arizona eryngo. Information on our grant programs that are available to aid species recovery can be found at: <https://www.fws.gov/grants>.

Please let us know if you are interested in participating in recovery efforts for the Arizona eryngo. Additionally, we invite you to submit any new information on this species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations

implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of any endangered or threatened species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

Federal agency actions within the species' habitat that may require conference or consultation or both as described in the preceding paragraph include management and any other landscape-altering activities on Federal lands administered by the BLM or groundwater use by Fort Huachuca or other Federal agencies (or permitted or funded by a Federal agency) within the hydrological influence of Lewis Springs or La Cebadilla.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to endangered plants. The prohibitions of section 9(a)(2) of the Act, codified at 50 CFR 17.61, make it illegal for any person subject to the jurisdiction of the United States to: import or export; remove and reduce to possession from areas under Federal jurisdiction; maliciously damage or destroy on any such area; remove, cut, dig up, or damage or destroy on any other area in knowing violation of any law or regulation of any State or in the course of any violation of a State criminal trespass law; deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of a commercial activity; or sell or offer for sale in interstate or foreign commerce an endangered plant. Certain exceptions apply to employees of the Service, the National Marine Fisheries Service, other Federal land management agencies, and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered plants under certain circumstances. Regulations governing permits are codified at 50 CFR 17.62. With regard to endangered plants, a permit may be issued for scientific purposes or for enhancing the propagation or survival of the species. There are also certain statutory exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum

extent practicable at the time a species is listed, those activities that will or will not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a final listing on proposed and ongoing activities within the range of a listed species. Based on the best available information, the following actions are unlikely to result in a violation of section 9, if these activities are carried out in accordance with existing regulations and permit requirements; this list is not comprehensive:

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

(2) Normal residential landscaping activities on non-Federal lands; and

(3) Recreational use with minimal ground disturbance.

Based on the best available information, the following activities may potentially result in a violation of section 9 of the Act if they are not authorized in accordance with applicable law; this list is not comprehensive:

(1) Unauthorized handling, removing, trampling, or collecting of the Arizona eryngo on Federal land; and

(2) Removing, cutting, digging up, or damaging or destroying the Arizona eryngo in knowing violation of any law or regulation of the State of Arizona or in the course of any violation of a State criminal trespass law.

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

## II. Critical Habitat

### Background

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

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species, and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are

essential for the conservation of the species.

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

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

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

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

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. The implementing regulations at 50 CFR 424.12(b)(2) further delineate unoccupied critical habitat by setting out three specific parameters: (1) When designating critical habitat, the Secretary will first evaluate areas occupied by the species; (2) the Secretary will only consider unoccupied areas to be essential where a critical habitat designation limited to geographical areas occupied by the species would be inadequate to ensure the conservation of the species; and (3) for an unoccupied area to be considered essential, the Secretary must determine that there is a reasonable certainty both that the area will contribute to the conservation of the species and that the area contains one or more of those physical or biological features essential to the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106-554; H.R. 5658)), and our associated Information Quality Guidelines provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

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

As the regulatory definition of "habitat" reflects (50 CFR 424.02), habitat is dynamic, and species may move from one area to another over time. We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) Conservation actions implemented under section 7(a)(1) of the Act; (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to ensure their actions are not likely to jeopardize the continued existence of any endangered or threatened species; and (3) the prohibitions found in section 9 of the Act. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of this species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of these planning efforts calls for a different outcome.

#### **Physical or Biological Features Essential to the Conservation of the Species**

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12(b), in determining which areas

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

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

#### *Summary of Essential Physical or Biological Features*

We derive the specific physical or biological features essential to the

conservation of the Arizona eryngo from studies of the species' habitat, ecology, and life history as described below. Additional information can be found in the SSA report (Service 2020, entire; available on <https://www.regulations.gov> under Docket No. FWS-R2-ES-2020-0130).

We have determined that the following physical or biological features are essential to the conservation of Arizona eryngo:

(1) Cienegas within the Chihuahuan and Sonoran Deserts:

(a) That contain permanently moist to saturated, organic, alkaline soils with some standing water in winter and that are moist at or just below the surface in summer; and

(b) That have functional hydrological processes and are sustained by springflow via discharge of groundwater.

(2) Areas of open canopy throughout the cienega.

#### Special Management Considerations or Protection

When designating critical habitat, we assess whether the specific areas within the geographical area occupied by the species at the time of listing contain features which are essential to the conservation of the species and which may require special management considerations or protection. The features essential to the conservation of this species may require special management considerations or protection to reduce the following threats: physical alteration of cienegas, water loss, and changes in co-occurring vegetation. Management activities that could ameliorate these threats include, but are not limited to: Use best management practices (BMPs) to minimize erosion and sedimentation; remove and control invasive, nonnative species (e.g., Johnsongrass) that encroach on critical habitat; selectively manage woody vegetation that encroaches on critical habitat; exclude livestock, or in some instances where such management would further the conservation of cienega habitat and the species, use highly managed grazing; avoid or minimize groundwater withdrawal to maintain adequate springflow to maintain cienegas; and avoid springflow diversion and springhead modification to maintain springflow to cienegas.

#### Criteria Used To Identify Critical Habitat

As required by section 4(b)(2) of the Act, we use the best scientific data

available to designate critical habitat. In accordance with the Act and our implementing regulations at 50 CFR 424.12(b), we review available information pertaining to the habitat requirements of the species and identify specific areas within the geographical area occupied by the species at the time of listing and any specific areas outside the geographical area occupied by the species to be considered for designation as critical habitat. Arizona eryngo is well-established at two historical locations, Lewis Springs and La Cebadilla, has been reintroduced at another historical location where it was extirpated (Agua Caliente), and has been introduced at several cienegas lacking historical records of occupancy. Introductions have recently been initiated at several additional locations, with the spreading of seeds and planting of seedlings. However, we do not consider these introductions to result in occupancy until fully mature, reproductive plants and production of seedlings have become established. Therefore, areas occupied at the time of listing include three locations: Lewis Springs, La Cebadilla, and Agua Caliente. Other sites, such as Las Cienegas National Conservation Area and St. David Cienega, where plantings or seed scattering recently occurred but no adult plants have become established, are considered to be unoccupied. Because we lack information on the environmental conditions of these (or any other) unoccupied sites to help us determine whether they can support the Arizona eryngo, we cannot determine that they will contribute to the long-term conservation of the species. Therefore, we are not designating any areas outside the geographical area occupied by the species as critical habitat.

In summary, for areas within the geographic area occupied by the species at the time of listing, we delineated critical habitat unit boundaries using the following criteria:

Evaluate habitat suitability of cienegas within the geographic area occupied at the time of listing, and retain those cienegas that contain some or all of the physical or biological features that are essential to support life-history processes of the species.

When determining critical habitat boundaries, we made every effort to avoid including developed areas such as lands covered by buildings, pavement, and other structures because such lands lack physical or biological features necessary for the Arizona eryngo. The

scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed lands. Any such lands inadvertently left inside critical habitat boundaries shown on the maps of this rule have been excluded by text in the rule and are not designated as critical habitat. Therefore, a Federal action involving these lands will not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification unless the specific action will affect the physical or biological features in the adjacent critical habitat.

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

Units are designated based on one or more of the physical or biological features being present to support the Arizona eryngo's life-history processes. Some units contain all of the identified physical or biological features and support multiple life-history processes. Some units contain only some of the physical or biological features necessary to support the Arizona eryngo's particular use of that habitat.

The critical habitat designation is defined by the map or maps, as modified by any accompanying regulatory text, presented at the end of this document under Regulation Promulgation. We include more detailed information on the boundaries of the critical habitat designation in the preamble of this document. We will make the coordinates or plot points or both on which each map is based available to the public on <https://www.regulations.gov> under Docket No. FWS-R2-ES-2020-0130, and on our internet site <https://www.fws.gov/southwest/es/arizona/>.

#### Final Critical Habitat Designation

We are designating approximately 12.7 acres (5.1 hectares) in two units as critical habitat for the Arizona eryngo. The two units we designate as critical habitat are: (1) Lewis Springs, and (2) La Cebadilla. The critical habitat areas we list in the table below constitute our current best assessment of areas that meet the definition of critical habitat for the Arizona eryngo. Table 1 shows the land ownership, size, and occupancy of the areas that meet the definition of critical habitat for the Arizona eryngo.

TABLE 1—AREAS THAT MEET THE DEFINITION OF CRITICAL HABITAT FOR THE ARIZONA ERYNGO  
 [Area estimates reflect all land within critical habitat unit boundaries]

| Critical habitat unit                 | Land ownership by type                                | Size of unit in acres (hectares)                                 | Occupied? |
|---------------------------------------|-------------------------------------------------------|------------------------------------------------------------------|-----------|
| 1. Lewis Springs .....                | Federal (BLM) .....                                   | 9.6 (3.9) .....                                                  | Yes.      |
| 2. La Cebadilla .....                 | Private, Pima County Regional Flood Control District. | 3.1 (1.3) .....                                                  | Yes.      |
| Agua Caliente [proposed Unit 3] ..... | Pima County Natural Resources, Parks and Recreation.  | N/A: Excluded from designation under section 4(b)(2) of the Act. | Yes.      |
| Total .....                           | .....                                                 | 12.7 (5.2) .....                                                 |           |

**Note:** Area sizes may not sum due to rounding.

We present brief descriptions of the two units we are designating, and reasons why they meet the definition of critical habitat for Arizona eryngo, below. For a description of proposed Unit 3 (Agua Caliente), which we are excluding from this designation, please see *Exclusions Based on Other Relevant Impacts*, later in this document.

*Unit 1: Lewis Springs*

Unit 1 consists of 9.6 acres (3.9 hectares) encompassing the wetlands at Lewis Springs just to the east of the San Pedro River in Cochise County, within the San Pedro River Basin. The unit is located within the SPRNCA, which is owned and managed by the BLM to conserve, protect, and enhance a rare remnant of desert riparian ecosystem. The unit is occupied by the species and contains all the physical or biological features essential to the conservation of the Arizona eryngo. The Lewis Springs Unit is being affected by drought, nonnative species invasion, woody vegetation encroachment, and ongoing human demand for water resulting in declining groundwater levels. Therefore, special management considerations may be required to reduce invasion of nonnative species and encroachment of woody vegetation and to improve groundwater levels to support continued springflow.

*Unit 2: La Cebadilla*

Unit 2 consists of 3.1 acres (1.3 hectares) of cienega habitat at La Cebadilla Cienega, adjacent to the Tanque Verde Wash east of Tucson in Pima County, within the Santa Cruz River Basin. The majority of the unit is located on lands owned by La Cebadilla Estates, with a smaller portion of the unit located on lands owned and managed by PCRFC. The homeowners' association of La Cebadilla Estates manages their portion of the cienega as common property for the common use and enjoyment of its members. PCRFC manages their portion of the cienega as natural open space, which has a

restrictive covenant that limits development and protects natural resources on the property. The La Cebadilla Unit is occupied by the species and contains all the physical or biological features essential to the conservation of the Arizona eryngo. The unit is located in a rural neighborhood and is being affected by drought, woody vegetation encroachment, and ongoing human demand for water resulting in declining groundwater levels. Therefore, special management may be required to reduce encroachment of woody vegetation and to improve groundwater levels to support continued springflow.

**Effects of Critical Habitat Designation**

*Section 7 Consultation*

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

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

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Examples of actions that are subject to the section 7 consultation process are actions on State, Tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (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.

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

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

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

- (1) Can be implemented in a manner consistent with the intended purpose of the action,
- (2) Can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction,
- (3) Are economically and technologically feasible, and
- (4) Would, in the Service Director's opinion, avoid the likelihood of jeopardizing the continued existence of the listed species and/or avoid the likelihood of destroying or adversely modifying critical habitat.

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

Regulations at 50 CFR 402.16 set forth requirements for Federal agencies to reinstate formal consultation on previously reviewed actions. These requirements apply when the Federal agency has retained discretionary involvement or control over the action (or the agency's discretionary involvement or control is authorized by law) and, if subsequent to the previous consultation: (1) If the amount or extent of taking specified in the incidental take statement is exceeded; (2) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (4) if a new species is listed or critical habitat designated that may be affected by the identified action.

In such situations, Federal agencies sometimes may need to request reinitiation of consultation with us, but the regulations also specify some exceptions to the requirement to reinstate consultation on specific land management plans after subsequently listing a new species or designating new critical habitat. See the regulations for a description of those exceptions.

#### *Application of the "Adverse Modification" Standard*

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

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

Activities that the Services may, during a consultation under section 7(a)(2) of the Act, consider likely to destroy or adversely modify critical habitat include, but are not limited to:

(1) Actions that would alter the hydrology of the cienega. Such activities

could include, but are not limited to, springflow diversion, springhead modification, groundwater withdrawal, and physical alteration of the cienega. These activities could change the hydrological processes of the cienega, reducing or eliminating habitat for the Arizona eryngo.

(2) Actions that promote the growth of nonnative plant species and canopy cover. Such actions include, but are not limited to, planting of nonnative plant species and woody vegetation, and seed spread through livestock and tire treads. These activities could reduce or eliminate habitat for the Arizona eryngo.

(3) Actions that result in further fragmentation of Arizona eryngo habitat. Such actions include, but are not limited to, development of fuel breaks, roads, and trails. These activities could reduce or eliminate habitat for the Arizona eryngo.

#### **Exemptions**

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

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

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

Section 4(b)(2) of the Act states that the Secretary shall designate and make revisions to critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if she determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless she determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species. In making the determination to exclude a particular area, the statute on its face, as well as the legislative history, are clear that the Secretary has broad

discretion regarding which factor(s) to use and how much weight to give to any factor.

Under section 4(b)(2) of the Act, we may exclude an area from designated critical habitat based on economic impacts, impacts on national security, or any other relevant impacts. In considering whether to exclude a particular area from the designation, we identify the benefits of including the area in the designation, identify the benefits of excluding the area from the designation, and evaluate whether the benefits of exclusion outweigh the benefits of inclusion. If the analysis indicates that the benefits of exclusion outweigh the benefits of inclusion, the Secretary may exercise discretion to exclude the area only if such exclusion would not result in the extinction of the species. We describe below the process that we undertook for taking into consideration each category of impacts and our analyses of the relevant impacts.

##### *Exclusions Based on Economic Impacts*

Section 4(b)(2) of the Act and its implementing regulations require that we consider the economic impact that may result from a designation of critical habitat. In order to consider economic impacts, we prepared an incremental effects memorandum (IEM) and screening analysis which, together with our narrative and interpretation of effects, we consider our draft economic analysis (DEA) of the critical habitat designation and related factors (IEC 2020, entire). The analysis, dated November 16, 2020 (IEC 2020, entire), was made available for public review from March 4, 2021, through May 3, 2021 (see 86 FR 12563; March 4, 2021). The DEA addressed probable economic impacts of critical habitat designation for Arizona eryngo. Following the close of the March 4, 2021, proposed rule's comment period, we reviewed and evaluated all information submitted during the comment period that may pertain to our consideration of the probable incremental economic impacts of this critical habitat designation. During the public comment period on the proposed rule, we received a comment on our economic analysis, which we address in our response to (6) *Comment* under Summary of Comments and Recommendations, above. Additional information relevant to the probable incremental economic impacts of critical habitat designation for the Arizona eryngo is summarized below and available in the screening analysis for the Arizona eryngo (IEC 2020, entire), available at <https://>

*www.regulations.gov*. We are adopting the DEA as the final economic analysis.

In occupied areas, any actions that may affect the species or its habitat will also likely affect critical habitat, and it is unlikely that any additional conservation efforts will be recommended to address the adverse modification standard over and above those recommended as necessary to avoid jeopardizing the continued existence of the Arizona eryngo. Therefore, only administrative costs are expected as a result of the critical habitat designation. While this additional analysis will require time and resources by both the Federal action agency and the Service, it is believed that, in most circumstances, these costs will predominantly be administrative in nature and will not be significant.

The probable incremental economic impacts of this critical habitat designation for the Arizona eryngo are expected to be limited to additional administrative effort as well as minor costs of conservation efforts resulting from a small number of future section 7 consultations. Because both of the critical habitat units are occupied by the species, incremental economic impacts of critical habitat designation, other than administrative costs, are unlikely. At approximately \$5,300 or less per consultation, this designation is expected to result in 12 to 17 consultations in 10 years for a maximum total estimated cost of \$36,000 over this time period (IEc 2020, p. 12). Thus, the annual administrative burden is unlikely to reach or exceed \$100 million in any single year; therefore, the economic impacts are not significant. The Service considered the economic impacts of the critical habitat designation. The Secretary is not exercising her discretion to exclude any areas from this designation of critical habitat for the Arizona eryngo based on economic impacts.

#### *Exclusions Based on Impacts on National Security and Homeland Security*

In preparing this rule, we determined that none of the lands within the designated critical habitat for the Arizona eryngo are owned or managed by the Department of Defense or Department of Homeland Security, and, therefore, we anticipate no impact on national security or homeland security. We did not receive any additional information during the public comment period for the proposed critical habitat designation regarding impacts of the designation on national security or homeland security that would support excluding any specific areas from the

final critical habitat designation under authority of section 4(b)(2) and our implementing regulations at 50 CFR 424.19.

#### *Exclusions Based on Other Relevant Impacts*

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

When identifying the benefits of inclusion for an area, we consider the additional regulatory benefits that area would receive due to the protection from destruction or adverse modification as a result of actions with a Federal nexus, the educational benefits of mapping essential habitat for recovery of the listed species, and any benefits that may result from a designation due to State or Federal laws that may apply to critical habitat.

When considering the benefits of exclusion, we consider, among other things, whether exclusion of a specific area is likely to result in conservation, or in the continuation, strengthening, or encouragement of partnerships. Additionally, continued implementation of an ongoing management plan that provides equal to or more conservation than a critical habitat designation would reduce the benefits of including that specific area in the critical habitat designation.

After identifying the benefits of inclusion and the benefits of exclusion, we carefully weigh the two sides to evaluate whether the benefits of exclusion outweigh those of inclusion. If our analysis indicates that the benefits of exclusion outweigh the benefits of inclusion, we then determine whether exclusion would result in extinction of the species. If exclusion of an area from critical habitat will result in extinction, we will not exclude it from the designation.

Based on the information provided in the public comments, including those from the landowner (Pima County) and

the best scientific data available, we evaluated whether lands in the proposed critical habitat Unit 3 (Agua Caliente) are appropriate for exclusion from the final designation under section 4(b)(2) of the Act. If the analysis indicates that the benefits of excluding lands from the final designation outweigh the benefits of designating those lands as critical habitat, then the Secretary may exercise her discretion to exclude the lands from the final designation. In the paragraphs below, we provide a detailed balancing analysis of the areas being excluded under section 4(b)(2) of the Act.

#### *Description of Proposed Unit 3: Agua Caliente*

Proposed Unit 3 consists of three subunits totaling 0.3 acres (0.1 hectares), all within the Agua Caliente Regional Park. The park is located east of Tucson in Pima County within the Santa Cruz River Basin (Stromberg *et al.* 2020, p. 177) and is owned and managed by Pima County Natural Resources, Parks and Recreation. The Arizona eryngo historically occurred at this site, but the population was extirpated, likely due to multiple manipulations of the site that eliminated cienega habitat, including, but not limited to, water diversion and vegetation clearing for agricultural activities, pond impoundment, groundwater pumping, and spring modification (Stromberg *et al.* 2020, p. 177; SWCA 2002, p. 11). Reintroduction efforts for the species began in 2017, with 20 individuals planted that year and another 15 in 2018. Most of these plants have died, with at most 1 to 3 individuals maturing into adult plants. Seedling production has been observed on occasions, but none have survived to reach reproductive maturity. The limited success of this reintroduction and the comments provided by Pima County raise uncertainty as to whether this site could be restored to contain sufficient physical or biological features essential to the conservation of the species. Soils at this site are saturated, and there are areas of open canopy (two of three physical or biological features we identified as essential to Arizona eryngo), but this is a heavily manipulated waterway that does not function like an unaltered cienega. It lacks functional hydrological processes, which ultimately may limit the ability of the soils to maintain appropriate moisture levels for the species. Even though this unit is currently occupied, the limited recruitment and extensive die-off of reintroduced individuals is evidence that the habitat may not be fully restorable at this site.

*Private or Other Non-Federal Conservation Plans or Agreements and Partnerships, in General*

We sometimes exclude specific areas from critical habitat designations based in part on the existence of private or other non-Federal conservation plans or agreements and their attendant partnerships. A conservation plan or agreement describes actions that are designed to provide for the conservation needs of a species and its habitat, and may include actions to reduce or mitigate negative effects on the species caused by activities on or adjacent to the area covered by the plan. Conservation plans or agreements can be developed by private entities with no Service involvement, or in partnership with the Service.

We evaluate a variety of factors to determine how the benefits of any exclusion and the benefits of inclusion are affected by the existence of private or other non-Federal conservation plans or agreements and their attendant partnerships when we undertake a discretionary section 4(b)(2) exclusion analysis. A non-exhaustive list of factors that we will consider for non-permitted plans or agreements is shown below. These factors are not required elements of plans or agreements, and all items may not apply to every plan or agreement.

(i) The degree to which the plan or agreement provides for the conservation of the species or the essential physical or biological features (if present) for the species.

(ii) Whether there is a reasonable expectation that the conservation management strategies and actions contained in a management plan or agreement will be implemented.

(iii) The demonstrated implementation and success of the chosen conservation measures.

(iv) The degree to which the record of the plan supports a conclusion that a critical habitat designation would impair the realization of benefits expected from the plan, agreement, or partnership.

(v) The extent of public participation in the development of the conservation plan.

(vi) The degree to which there has been agency review and required determinations (e.g., State regulatory requirements), as necessary and appropriate.

(vii) Whether National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) compliance was required.

(viii) Whether the plan or agreement contains a monitoring program and adaptive management to ensure that the

conservation measures are effective and can be modified in the future in response to new information.

*Agua Caliente Protections, Including the Sonoran Desert Conservation Plan*

Pima County is a long-term conservation partner and leader, and Pima County and the Service have a memorandum of understanding (MOU) to work collaboratively and cooperatively to implement meaningful conservation and mitigation as part of the Sonoran Desert Conservation Plan (Pima County 2020b). A portion of Agua Caliente Regional Park is identified in the Sonoran Desert Conservation Plan as an Important Riparian Area and as a Biological Core Management Area. The western-most parcel that includes Agua Caliente Wash is encumbered with a restrictive covenant as mitigation land for the County's and Flood Control District's Multi-Species Conservation Plan (MSCP) section 10 permit. The MSCP is the part of the Sonoran Desert Conservation Plan that addresses endangered species compliance. Because the Arizona *eryngo* was not listed when the MSCP was developed, it was not explicitly included as part of the MSCP and so is not covered by the section 10 permit. Therefore, we considered the conservation activities Pima County has identified in the Sonoran Desert Conservation Plan in assessing critical habitat designation for Agua Caliente.

The conservation goals of the MOU include ensuring the long-term survival of the full spectrum of plants and animals that are indigenous to Pima County through maintaining or improving the habitat conditions and ecosystem functions necessary for their survival. Objectives under this goal include:

(1) Promote recovery of federally listed and candidate species;

(2) Where feasible and appropriate, reintroduce and recover species that have been extirpated from this region;

(3) Maintain or improve the status of unlisted species whose existence in Pima County is vulnerable;

(4) Identify biological threats to the region's biodiversity posed by introduced and nonnative species of plants and animals, and develop strategies to reduce these threats and avoid additional invasive species in the future;

(5) Identify causes that disrupt ecosystem functions within target plant communities selected for their biological significance, and develop strategies to reverse or mitigate them; and

(6) Promote long-term viability and mitigate for impacts to species, environments, and biotic communities that have special significance to people in this region because of their aesthetic or cultural values, regional uniqueness, or economic significance.

These goals align with several of the factors we may consider for basing an exclusion on a conservation plan.

As a designated County park, Agua Caliente is owned and managed by Pima County for recreational opportunities, habitat, scenery, and resource protection. Additionally, Agua Caliente Ranch Historic Landscape is listed in the National Register of Historic Places, the Arizona Register of Historic Places, and Pima County's Register of Historic Places, which affords both recognition and certain protections. The landscape of the County park includes certain trees, buildings, and ponds that are contributing elements as a National Register District, and Pima County designated the entire historic park as a Sonoran Desert Conservation Plan "Priority Cultural Resource" to be managed for preservation and conservation. Consequently, the County has invested grant funds and bond funds in ensuring these resources are protected and appropriately rehabilitated.

*Benefits of Inclusion—Agua Caliente (Proposed Unit 3)*

The principal benefit of including an area in critical habitat designation is the requirement of Federal agencies to ensure that actions that they fund, authorize, or carry out are not likely to result in the destruction or adverse modification of any designated critical habitat, which is the regulatory standard of section 7(a)(2) of the Act under which consultation is completed. Federal agencies must consult with the Service on actions that may affect a listed species, and refrain from actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some cases, the outcome of these analyses will be similar, because effects to habitat will often result in effects to the species. However, the regulatory standard is different, as the jeopardy analysis investigates the action's impact to survival and recovery of the species, while the adverse modification analysis investigates the action's effects to the designated critical habitat's contribution to conservation. Thus, critical habitat

designation may provide greater benefits to the recovery of a species than listing would alone. Therefore, critical habitat designation may provide a regulatory benefit for the Arizona eryngo on lands within the Agua Caliente Regional Park.

Another possible benefit of including lands in critical habitat is public education regarding the potential conservation value of an area that may help focus conservation efforts on areas of high conservation value for certain species. We consider any information about the Arizona eryngo and its habitat that reaches a wide audience, including parties engaged in conservation activities, to be valuable. Designation of critical habitat would provide educational benefits by informing Federal agencies and the public about the presence of the species in this unit.

However, we also acknowledge the limited benefit of including this unit to the conservation of the species. The limited success of the reintroduction of Agua Caliente indicates that the conservation benefits of including this site as critical habitat are not high. The current condition of the population indicates the habitat is not sufficient to contribute to the long-term conservation of the species.

*Benefits of Exclusion—Agua Caliente (Proposed Unit 3)*

The benefits of excluding 0.3 acre (0.1 hectare) of land within the Agua Caliente Regional Park, owned and managed by Pima County Natural Resources, Parks and Recreation, from the designation of critical habitat for the Arizona eryngo are substantial and include: (1) Continuance and strengthening of our effective partnership with Pima County to promote voluntary, proactive conservation of the Arizona eryngo and its habitat; (2) allowance for continued meaningful collaboration and cooperation in working toward species recovery, including conservation benefits that might not otherwise occur, such as reintroducing the species at Agua Caliente or other sites; and (3) encouragement of developing and implementing conservation and management plans in the future for the Arizona eryngo or other federally listed and sensitive species.

Pima County has been a long-term conservation partner and has led multiple efforts to conserve the Arizona eryngo, including working to reestablish the species at Agua Caliente and two other sites. The Arizona eryngo reintroduction effort at Agua Caliente is still in an experimental phase, and a viable population has not yet been established. Supporting Pima County to

continue leading conservation efforts for the species without the regulatory burdens of critical habitat is important. Excluding Agua Caliente from the critical habitat designation will allow the County the ability to focus on their ongoing, voluntary conservation efforts.

Also, Agua Caliente Regional Park is a highly manipulated system that is subjected to substantial management from Pima County. Due to alterations of the habitat and hydrology, Agua Caliente no longer functions like a natural, unaltered cienega. Managers continue to experiment with the system to provide conditions appropriate for species such as the Arizona eryngo. Establishing critical habitat on a specific area of the park may limit Pima County's ability to adjust their management in a manner that may ultimately benefit the species in the long term, allowing them to determine through trial and error which locations in the park are able to be managed for the species, providing the necessary features and establishing a new population. To date, introduction of the Arizona eryngo to the park has not been successful in establishing a population, and most individuals have experienced mortality due to inadequate conditions. Excluding this park from critical habitat provides Pima County the flexibility to conduct management that will promote recovery on their lands for the long-term benefit of the species.

Additionally, many landowners perceive critical habitat as an unfair and unnecessary regulatory burden. According to some researchers, the designation of critical habitat on private lands significantly reduces the likelihood that landowners will support and carry out conservation actions (Main et al. 1999, p. 1,263; Bean 2002, p. 2). The magnitude of this negative outcome is greatly amplified in situations where active management measures (such as reintroduction, fire management, and control of invasive species) are necessary for species conservation (Bean 2002, pp. 3–4). We believe the exclusion of this specific area of non-federally owned lands from the critical habitat designation for Arizona eryngo can contribute to the species' recovery and provide a superior level of conservation than critical habitat can provide. The Service believes that, where consistent with the discretion provided by the Act, it is necessary to implement policies that provide positive incentives to non-Federal landowners to voluntarily conserve natural resources and that remove or reduce disincentives to conservation (Wilcove et al. 1996, pp. 1–15; Bean 2002, pp. 1–7). Partnerships

with non-Federal landowners are vital to the conservation of listed species, especially on non-Federal lands; therefore, the Service is committed to supporting and encouraging such partnerships through the recognition of positive conservation contributions. In the case considered here, excluding this area from critical habitat designation will help foster the partnership that Pima County has developed with the Service; will encourage the continued implementation of voluntary conservation actions for the benefit of the Arizona eryngo and its habitat on these lands; and may also serve as a model and aid in fostering future cooperative relationships with other parties here, and in other locations, for the benefit of other endangered or threatened species.

*Benefits of Exclusion Outweigh the Benefits of Inclusion—Agua Caliente (Proposed Unit 3)*

We evaluated the exclusion of 0.3 acre (0.1 hectare) of County land within the boundaries of the Agua Caliente Regional Park, under a long-term conservation partnership and MOU, from our designation of critical habitat, and we determined the benefits of excluding these lands outweigh the benefits of including them as critical habitat for the Arizona eryngo.

The Service concludes the additional regulatory and educational benefits of including these lands as critical habitat are relatively small, because of the unlikelihood of a Federal nexus on these County lands. Examining the eight factors that may be considered under a discretionary section 4(b)(2) exclusion analysis for a non-permitted conservation plan (see *Private or Other Non-Federal Conservation Plans or Agreements and Partnerships, in General*), we found the conservation plan developed by Pima County satisfies several that would promote the conservation of the species. Specifically, the plan has objectives to promote recovery of federally listed species and promote long-term viability of native species, which would satisfy factor (i). The benefits of critical habitat designation are further reduced because the existence of a long-term conservation partnership and MOU between Pima County and the Service, as well as numerous land protections, discussed above, at Agua Caliente Regional Park. Given Pima County's history of conservation, this satisfies factor (iii) of the section 4(b)(2) exclusion analysis. In addition, the plan includes multiple objectives that would satisfy factor (viii) by promoting monitoring and adaptive management to

ensure conservation measures are effective. We anticipate that there will be little additional Federal regulatory benefit to the taxon on County land because there is a low likelihood that those areas will be negatively affected to any significant degree by Federal activities requiring section 7 consultation, and ongoing management activities indicate there would be no additional requirements pursuant to a consultation that addresses critical habitat.

Furthermore, the potential educational and informational benefits of critical habitat designation on lands containing the physical or biological features essential to the conservation of the Arizona eryngo would be minimal, because Pima County has been a leader in conservation of the Arizona eryngo and demonstrated their knowledge of the species and its habitat needs throughout their partnership with the Service. Additionally, the current active conservation efforts on County lands contribute to our knowledge of the species through reintroduction efforts, monitoring, and scientific research.

In contrast, the benefits derived from excluding Agua Caliente and enhancing our partnership with Pima County are significant. Because voluntary conservation efforts for the benefit of listed species on non-Federal lands are so valuable, the Service considers the maintenance and encouragement of conservation partnerships to be a significant benefit of exclusion. Excluding these areas from critical habitat will help foster the partnership Pima County has developed with the

Service and will encourage the continued implementation of voluntary conservation actions for the benefit of the Arizona eryngo and its habitat on these lands.

We find that excluding areas from critical habitat that are receiving both long-term conservation and management for the purpose of protecting the habitat that supports the Arizona eryngo will preserve our partnership with Pima County and encourage future collaboration towards conservation and recovery of listed species. The partnership benefits are significant and outweigh the small potential regulatory, educational, and ancillary benefits of including the land in the critical habitat designation for the Arizona eryngo. Therefore, the conservation partnership between Pima County and the Service provides greater protection of habitat for the Arizona eryngo than could be gained through the project-by-project analysis of a critical habitat designation.

*Exclusion Will Not Result in Extinction of the Species—Agua Caliente (Proposed Unit 3)*

We determined that the exclusion of 0.3 acre (0.1 hectare) of land within the boundaries of the Agua Caliente Regional Park owned and managed by Pima County Natural Resources, Parks and Recreation will not result in extinction of the taxon. Protections afforded the taxon and its habitat by the long-term Pima County and Service conservation partnership, MOU, and various land protections provide assurances that the taxon will not go

extinct as a result of excluding these lands from the critical habitat designation.

An important consideration as we evaluate these exclusions and their potential effect on the species in question is that critical habitat does not carry with it a regulatory requirement to restore or actively manage habitat for the benefit of listed species; the regulatory effect of critical habitat is only the avoidance of destruction or adverse modification of critical habitat should an action with a Federal nexus occur. It is, therefore, advantageous for the conservation of the species to support the proactive efforts of non-Federal landowners who are contributing to the enhancement of essential habitat features for listed species through exclusion. The jeopardy standard of section 7 of the Act will also provide protection in these occupied areas when there is a Federal nexus. Therefore, based on the above discussion, the Secretary is exercising her discretion to exclude 0.3 acre (0.1 hectare) of land from the designation of critical habitat for the Arizona eryngo.

*Summary of Exclusions*

As discussed above, based on the information provided by entities seeking exclusion, as well as any additional public comments we received, we evaluated whether certain lands in our proposed critical habitat designation were appropriate for exclusion from this final designation pursuant to section 4(b)(2) of the Act. We are excluding the following areas from critical habitat designation for the Arizona eryngo:

TABLE 2—AREAS EXCLUDED FROM CRITICAL HABITAT DESIGNATION BY CRITICAL HABITAT UNIT

| Proposed unit          | Specific area                    | Areas meeting the definition of critical habitat, in acres (hectares) | Areas excluded from critical habitat, in acres (hectares) |
|------------------------|----------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------|
| 3. Agua Caliente ..... | 3a. Pond 1 Wetland .....         | 0.04 (0.02)                                                           | 0.04 (0.02)                                               |
|                        | 3b. Pond 1 Wildlife Island ..... | 0.2 (0.07)                                                            | 0.2 (0.07)                                                |
|                        | 3c. Pond 2 .....                 | 0.09 (0.04)                                                           | 0.09 (0.04)                                               |

**Required Determinations**

*Regulatory Planning and Review (Executive Orders 12866 and 13563)*

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

Executive Order 13563 reaffirms the principles of E.O. 12866 while calling for improvements in the nation’s

regulatory system to promote predictability, to reduce uncertainty, and to use the best, most innovative, and least burdensome tools for achieving regulatory ends. The executive order directs agencies to consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public where these approaches are relevant, feasible, and consistent with regulatory objectives. E.O. 13563 emphasizes further that regulations must be based

on the best available science and that the rulemaking process must allow for public participation and an open exchange of ideas. We have developed this rule in a manner consistent with these requirements.

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

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 et seq.), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996

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

According to the Small Business Administration, small entities include small organizations such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; and small businesses (13 CFR 121.201). Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than \$5 million in annual sales, general and heavy construction businesses with less than \$27.5 million in annual business, special trade contractors doing less than \$11.5 million in annual business, and agricultural businesses with annual sales less than \$750,000. To determine if potential economic impacts to these small entities are significant, we considered the types of activities that might trigger regulatory impacts under this designation as well as types of project modifications that may result. In general, the term “significant economic impact” is meant to apply to a typical small business firm’s business operations.

Under the RFA, as amended, and as understood in light of recent court decisions, Federal agencies are required to evaluate the potential incremental impacts of rulemaking on those entities directly regulated by the rulemaking itself; in other words, the RFA does not require agencies to evaluate the potential impacts to indirectly regulated entities. The regulatory mechanism through which critical habitat protections are realized is section 7 of the Act, which requires Federal agencies, in consultation with the Service, to ensure that any action authorized, funded, or carried out by the agency is not likely to destroy or adversely modify critical habitat.

Therefore, under section 7, only Federal action agencies are directly subject to the specific regulatory requirement (avoiding destruction and adverse modification) imposed by critical habitat designation. Consequently, it is our position that only Federal action agencies will be directly regulated by this critical habitat designation. There is no requirement under the RFA to evaluate the potential impacts to entities not directly regulated. Moreover, Federal agencies are not small entities. Therefore, because no small entities will be directly regulated by this rulemaking, the Service certifies that this critical habitat designation will not have a significant economic impact on a substantial number of small entities.

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

*Energy Supply, Distribution, or Use—  
Executive Order 13211*

Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare Statements of Energy Effects when undertaking certain actions. In our economic analysis, we did not find that this critical habitat designation will significantly affect energy supplies, distribution, or use, as the areas identified as critical habitat are in cienegas in mostly remote areas with little energy supplies, distribution, or infrastructure in place. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

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

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

(1) This rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or Tribal governments, or the private sector, and includes both “Federal intergovernmental mandates” and “Federal private sector mandates.” These terms are defined in 2 U.S.C. 658(5)–(7). “Federal intergovernmental mandate” includes a regulation that

“would impose an enforceable duty upon State, local, or Tribal governments” with two exceptions. It excludes “a condition of Federal assistance.” It also excludes “a duty arising from participation in a voluntary Federal program,” unless the regulation “relates to a then-existing Federal program under which \$500,000,000 or more is provided annually to State, local, and Tribal governments under entitlement authority,” if the provision would “increase the stringency of conditions of assistance” or “place caps upon, or otherwise decrease, the Federal Government’s responsibility to provide funding,” and the State, local, or Tribal governments “lack authority” to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; Aid to Families with Dependent Children work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. “Federal private sector mandate” includes a regulation that “would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance or (ii) a duty arising from participation in a voluntary Federal program.”

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

(2) We do not believe that this rule will significantly or uniquely affect small governments because the lands within the critical habitat designation that are owned by Pima County are already subject to a restrictive covenant that limits development and protects

natural resources on the property, and small governments will be affected only to the extent that any programs having Federal funds, permits, or other authorized activities must ensure that their actions will not adversely affect the critical habitat. Therefore, a Small Government Agency Plan is not required.

#### *Takings—Executive Order 12630*

In accordance with E.O. 12630 (Government Actions and Interference with Constitutionally Protected Private Property Rights), we have analyzed the potential takings implications of designating critical habitat for the Arizona eryngo in a takings implications assessment. The Act does not authorize the Service to regulate private actions on private lands or confiscate private property as a result of critical habitat designation. Designation of critical habitat does not affect land ownership, or establish any closures, or restrictions on use of or access to the designated areas. Furthermore, the designation of critical habitat does not affect landowner actions that do not require Federal funding or permits, nor does it preclude development of habitat conservation programs or issuance of incidental take permits to permit actions that do require Federal funding or permits to go forward. However, Federal agencies are prohibited from carrying out, funding, or authorizing actions that would destroy or adversely modify critical habitat. A takings implications assessment has been completed for this designation of critical habitat for the Arizona eryngo, and it concludes that this designation of critical habitat does not pose significant takings implications for lands within or affected by the designation.

#### *Federalism—Executive Order 13132*

In accordance with E.O. 13132 (Federalism), this rule does not have significant federalism effects. A federalism summary impact statement is not required. In keeping with Department of the Interior and Department of Commerce policy, we requested information from, and coordinated development of this critical habitat designation with, appropriate State resource agencies. From a federalism perspective, the designation of critical habitat directly affects only the responsibilities of Federal agencies. The Act imposes no other duties with respect to critical habitat, either for States and local governments, or for anyone else. As a result, this final rule does not have substantial direct effects either on the States, or on the relationship between the national

government and the States, or on the distribution of powers and responsibilities among the various levels of government. The designation may have some benefit to these governments because the areas that contain the features essential to the conservation of the species are more clearly defined, and the physical or biological features of the habitat necessary for the conservation of the species are specifically identified. This information does not alter where and what federally sponsored activities may occur. However, it may assist State and local governments in long-range planning because they no longer have to wait for case-by-case section 7 consultations to occur.

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

#### *Civil Justice Reform—Executive Order 12988*

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

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

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

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

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses pursuant to the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 et seq.) in connection with regulations adopted pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County v. Babbitt*, 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

#### *Government-to-Government Relationship With Tribes*

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

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

#### **Authors**

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

**List of Subjects in 50 CFR Part 17**

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

**Regulation Promulgation**

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the

Code of Federal Regulations, as set forth below:

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

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

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

■ 2. Amend § 17.12, in paragraph (h), by adding an entry for “*Eryngium sparganophyllum*” to the List of Endangered and Threatened Plants in alphabetical order under FLOWERING PLANTS to read as follows:

**§ 17.12 Endangered and threatened plants.**

\* \* \* \* \*

(h) \* \* \*

| Scientific name                      | Common name               | Where listed              | Status    | Listing citations and applicable rules                                                                                    |
|--------------------------------------|---------------------------|---------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------|
| FLOWERING PLANTS                     |                           |                           |           |                                                                                                                           |
| *<br><i>Eryngium sparganophyllum</i> | *<br>Arizona eryngo ..... | *<br>Wherever found ..... | *<br>E    | *<br>87 FR [INSERT <b>Federal Register</b> PAGE WHERE THE DOCUMENT BEGINS], June 10, 2022; 50 CFR 17.96(a). <sup>CH</sup> |
| * * * * *                            | * * * * *                 | * * * * *                 | * * * * * | * * * * *                                                                                                                 |

■ 3. Amend § 17.96, in paragraph (a), by adding an entry for “Family Apiaceae: *Eryngium sparganophyllum* (Arizona eryngo)” in alphabetical order to read as follows:

**§ 17.96 Critical habitat—plants.**

(a) *Flowering plants.*

\* \* \* \* \*

Family Apiaceae: *Eryngium sparganophyllum* (Arizona eryngo)

(1) Critical habitat units are depicted for Pima and Cochise Counties, Arizona, on the maps in this entry.

(2) Within these areas, the physical or biological features essential to the conservation of Arizona eryngo consist of the following components:

(i) Cienegas within the Chihuahuan and Sonoran Deserts:

(A) That contain permanently moist to saturated, organic, alkaline soils with some standing water in winter and that are moist at or just below the surface in summer; and

(B) That have functional hydrological processes and are sustained by springflow via discharge of groundwater.

(ii) Areas of open canopy throughout the cienega.

(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on July 11, 2022.

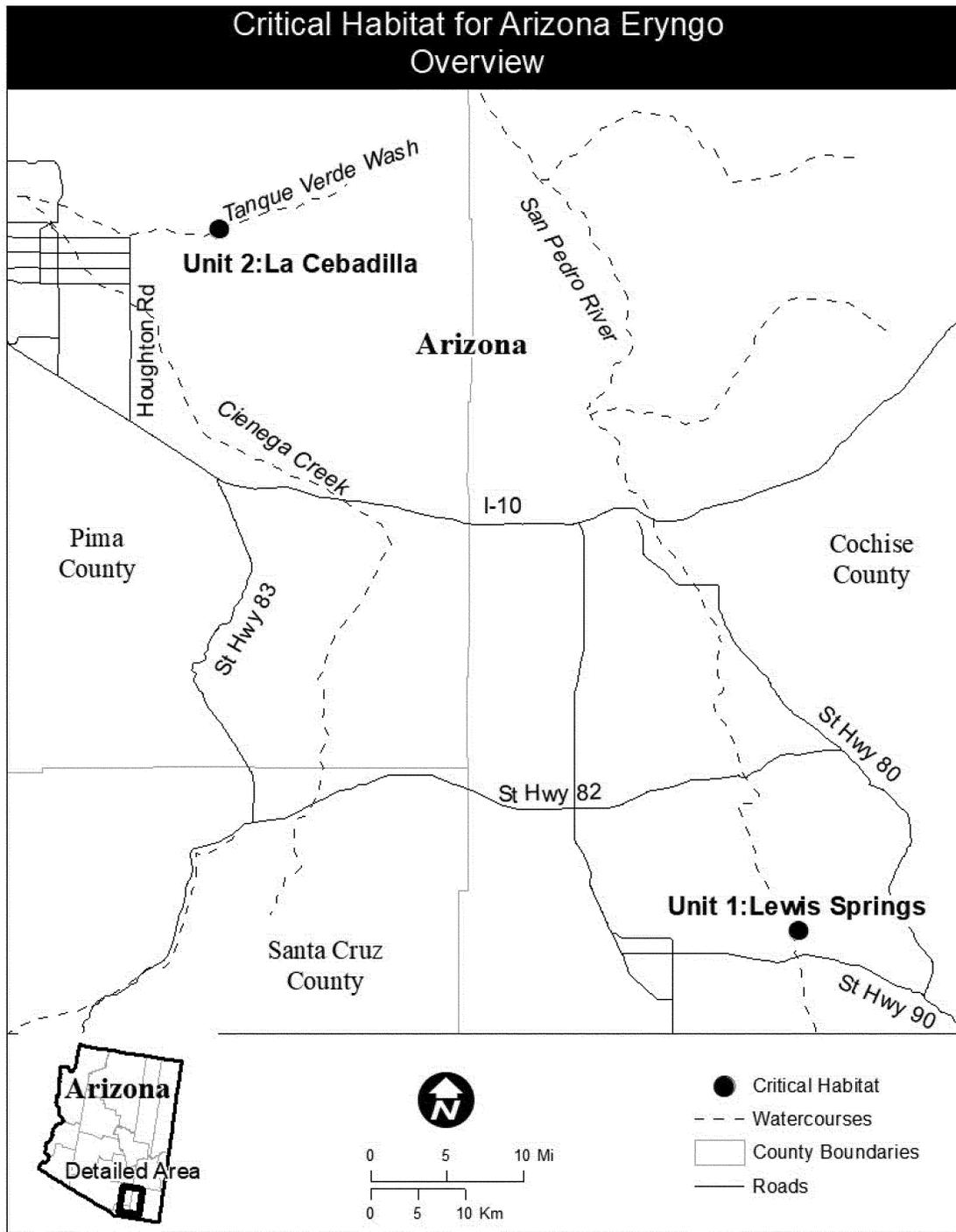
(4) Data layers defining map units were created on a base of U.S. Geological Survey digital ortho-photo quarter-quadrangles, and critical habitat

units were then mapped using Universal Transverse Mercator (UTM) Zone 15N coordinates. The maps in this entry, as modified by any accompanying regulatory text, establish the boundaries of the critical habitat designation. The coordinates or plot points or both on which each map is based are available to the public at the Service’s internet site at <https://www.fws.gov/southwest/es/arizona/>, at <https://www.regulations.gov> at Docket No. FWS–R2–ES–2020–0130, and at the field office responsible for this designation. You may obtain field office location information by contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) *Note:* Index map follows:

**BILLING CODE 4333–15–P**

**Figure 1 for Family Apiaceae: *Eryngium sparganophyllum* (Arizona eryngo) paragraph (5)**



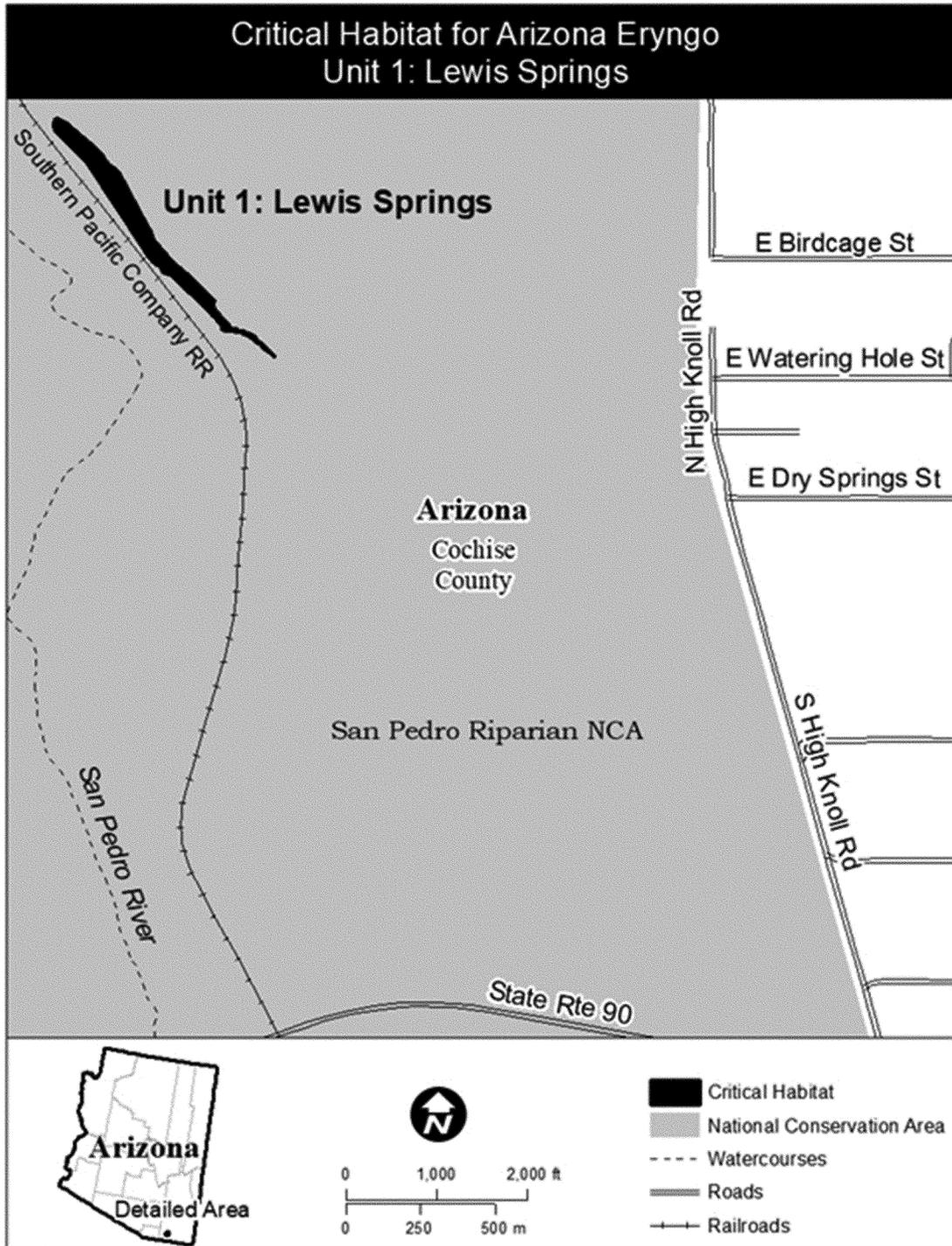
(6) Unit 1: Lewis Springs, Cochise County, Arizona.  
 (i) Unit 1 consists of 9.6 acres (3.9 hectares) encompassing the wetlands at

Lewis Springs just to the east of the San Pedro River in Cochise County, within the San Pedro River Basin. The unit is located within the San Pedro Riparian

National Conservation Area, which is owned and managed by the Bureau of Land Management.

(ii) Map of Unit 1 follows:

Figure 2 for Family Apiaceae: *Eryngium sparganophyllum* (Arizona eryngo) paragraph (6)(ii)



(7) Unit 2: La Cebadilla, Pima County, Arizona.

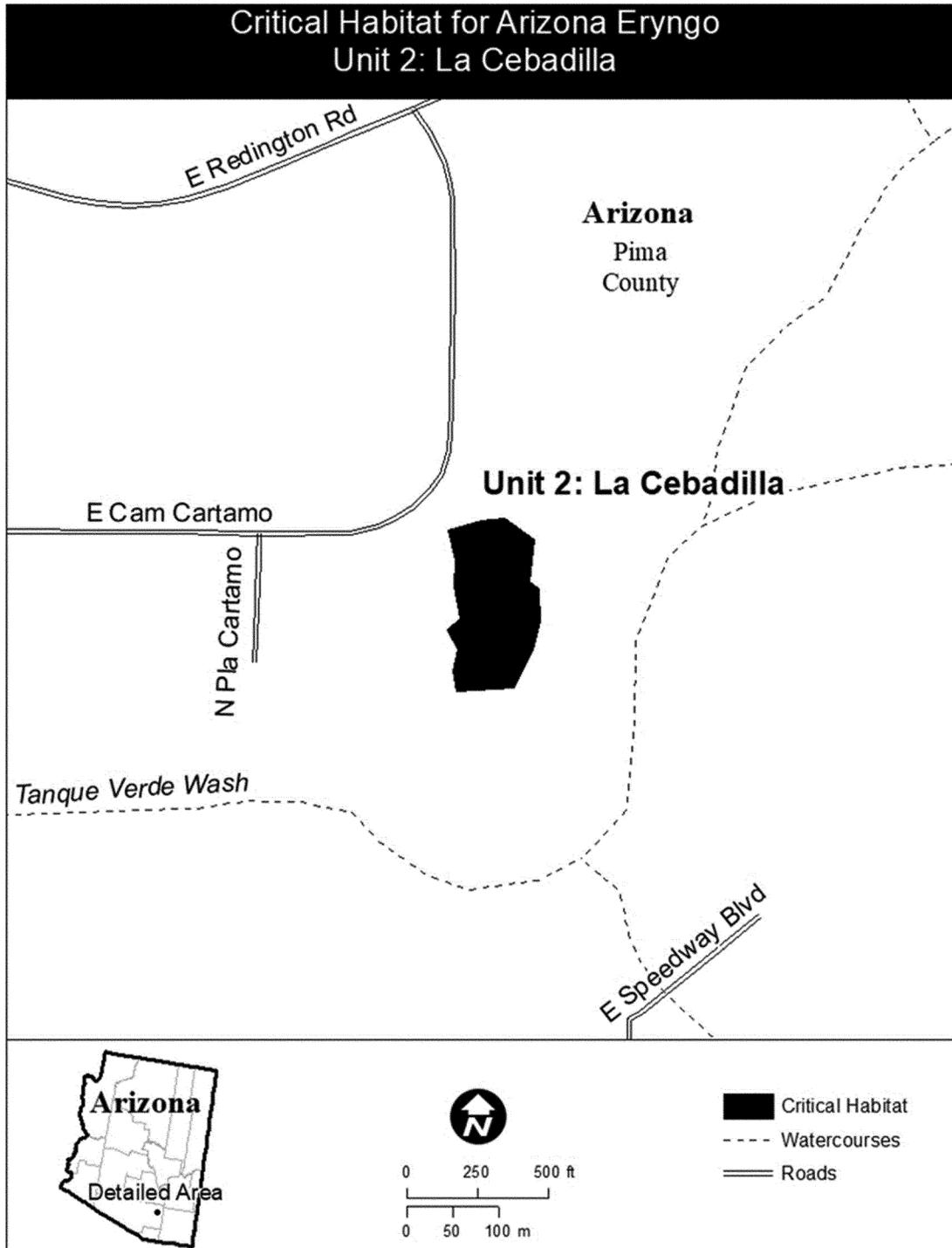
(i) Unit 2 consists of 3.1 acres (1.3 hectares) of cienega habitat at La Cebadilla Cienega, adjacent to the

Tanque Verde Wash east of Tucson within the Santa Cruz River Basin. The majority of the unit is located on lands owned by La Cebadilla Estates, with a smaller portion of the unit located on

lands owned and managed by the Pima County Regional Flood Control District.

(ii) Map of Unit 2 follows:

Figure 3 for Family Apiaceae: *Eryngium sparganophyllum* (Arizona eryngo) paragraph (7)(ii)



\* \* \* \* \*

Martha Williams,  
Director, U.S. Fish and Wildlife Service.  
[FR Doc. 2022-12521 Filed 6-9-22; 8:45 am]  
BILLING CODE 4333-15-C