

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, Government-to-Government Relations with Native American Tribal Governments (59 FR 22951), E.O. 13175, 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 are aware of two water howellia occurrences that occur on Tribal lands; we have notified the Tribes that may be affected by this rule and offered government-to-government consultation.

References Cited

A complete list of all references cited in this rule is available on the internet at <http://www.regulations.gov> at Docket No. FWS-R4-ES-2019-0073, or upon request from the Montana Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The authors of this final rule are staff members of the Montana Ecological Services Field Office and field and regional offices in California, Colorado, Idaho, Oregon, and Washington.

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.

§ 17.12 [Amended]

■ 2. Amend § 17.12(h) by removing the entry for “*Howellia aquatilis*” under FLOWERING PLANTS from the List of Endangered and Threatened Plants.

Martha Williams,

Principal Deputy Director, Exercising the Delegated Authority of the Director, U.S. Fish and Wildlife Service.

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DEPARTMENT OF THE INTERIOR**Fish and Wildlife Service****50 CFR Part 17**

[Docket No. FWS–R4–ES–2019–0073; FF09E22000 FXES1113090FEDR 212]

RIN 1018–BB83

Endangered and Threatened Wildlife and Plants; Removal of *Lepanthes eltoroensis* From the Federal List of Endangered and Threatened Plants

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service, are removing *Lepanthes eltoroensis* (no common name), an orchid species from Puerto Rico, from the Federal List of Endangered and Threatened Plants, due to recovery. This determination is based on a thorough review of the best available scientific and commercial information, which indicates that the threats to the species have been eliminated or reduced to the point that the species no longer meets the definition of an endangered or threatened species under the Endangered Species Act of 1973, as amended (Act). Accordingly, the prohibitions and conservation measures provided by the Act will no longer apply to this species.

DATES: This rule is effective July 16, 2021.

ADDRESSES: The proposed and final rules, the post-delisting monitoring plan, and the comments received on the proposed rule are available on the internet at <http://www.regulations.gov> in Docket No. FWS–R4–ES–2019–0073.

FOR FURTHER INFORMATION CONTACT: Edwin Muñoz, Field Supervisor, U.S. Fish and Wildlife Service, Caribbean Ecological Services Field Office (see **ADDRESSES**, above). If you use a telecommunications device for the deaf (TDD), please call the Federal Relay Service at (800) 877–8339.

SUPPLEMENTARY INFORMATION:**Executive Summary**

Why we need to publish a rule. Under the Act, a species may be delisted (*i.e.*, removed from the Federal Lists of Endangered and Threatened Wildlife and Plants (Lists)) if it is determined that the species has recovered and no longer meets the definition of an endangered or threatened species. Removing a species from the Lists can only be completed by issuing a rule.

What this document does. This rule removes *Lepanthes eltoroensis* from the Federal List of Endangered and Threatened Plants, based on its recovery.

The basis for our action. We may delist a species if we determine, after a review of the best scientific and commercial data, that: (1) The species is extinct; (2) the species does not meet the definition of an endangered species or a threatened species; or (3) the listed entity does not meet the statutory definition of a species (50 CFR 424.11(e)). Here, we have determined that the species may be delisted because it no longer meets the definition of an endangered species or a threatened species, as it has recovered.

Previous Federal Actions

On March 10, 2020, we published in the **Federal Register** (85 FR 13844) a proposed rule to remove *Lepanthes eltoroensis* (no common name) from the Federal List of Endangered and Threatened Plants (List). Please refer to that proposed rule for a detailed description of previous Federal actions concerning this species. The proposed rule and supplemental documents are provided at <http://www.regulations.gov> under Docket No. FWS–R4–ES–2019–0073.

Species Status Assessment Report

A team of Service biologists, in consultation with other species experts, prepared a species status assessment (SSA) report for *Lepanthes eltoroensis*. 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. We solicited independent peer review of the SSA report by five individuals with expertise in *L. eltoroensis* or similar epiphytic (*i.e.*, a plant that grows on another plant for support but not for food) orchid species' biology or habitat, or climate change. The final SSA, which supports this final rule, was revised, as appropriate, in response to the

comments and suggestions received from our peer reviewers. The SSA report and other materials relating to this rule can be found on the Service's Southeast Region website at <http://www.regulations.gov> under Docket No. FWS-R4-ES-2019-0073.

Summary of Changes From the Proposed Rule

In preparing this final rule, we reviewed and fully considered all comments we received during the comment period from the peer reviewers and the public on the proposed rule to delist *Lepanthes eltoroensis*. Minor, nonsubstantive changes and corrections were made throughout the document in response to comments. However, the information we received during the public comment period on the proposed rule did not change our determination that *L. eltoroensis* no longer meets the definition of endangered or threatened under the Act.

Species Information

A thorough review of the taxonomy, life history, and ecology of *Lepanthes eltoroensis* is presented in the SSA report (Service 2019, entire), which is available at <http://www.regulations.gov> under Docket No. FWS-R4-ES-2019-0073 and summarized in this final rule.

Species Description

Lepanthes eltoroensis is a member of a large genus of more than 800 orchid species. Approximately 118 species in this genus are from the Caribbean, and all but one are single-island endemics (Stimson 1969, p. 332; Barre and Feldmann 1991, p. 11; Tremblay and Ackerman 1993, p. 339; Luer 2014, p. 260). This species is a small, epiphytic orchid about 1.57 inches (in.) (4 centimeters (cm)) tall and is distinguished from other members of the genus by its obovate to oblanceolate leaves, ciliate sepals, and the length of the inflorescence (Vivaldi *et al.* 1981, p. 26; Luer 2014, p. 260). The inflorescence is a small (0.03 in.; 0.75 millimeters (mm)), peduncled raceme (flower cluster with flowers on separate short stalks) with reddish flowers. No more than two flowers are produced at the same time, and the flowers are open on the inflorescence for about 10 days (Meléndez-Ackerman and Tremblay 2017, p. 1).

Life History

We consider *Lepanthes eltoroensis* to be a single metapopulation, with the individual trees that host the *L. eltoroensis* plants as subpopulations, and the host tree aggregates as patches

(Service 2019, p. 16). A number of characteristics (see below) indicate that a metapopulation approach may be appropriate to understand orchid population dynamics (see Service 2019, pp. 14–15) and epiphytic species (Snall *et al.* 2003, p. 567; Snall *et al.* 2004, p. 758; Snall *et al.* 2005, pp. 209–210) like *L. eltoroensis*. Metapopulations are defined as a set of subpopulations with independent local dynamics occupying discrete patches (Hanski 1999, entire; Hanski and Gaggiotti 2004, pp. 3–22) so that simultaneous extinction of all subpopulations is unlikely.

Metapopulations of *Lepanthes* orchids exhibit high variance in reproductive potential, high variance in mean reproductive lifespan (Tremblay 2000, pp. 264–265), and few adults per subpopulation (Tremblay 1997a, p. 95). Less than 20 percent of individuals reproduce, and most subpopulations (60 percent of host trees) have fewer than 15 individuals. In addition, the distribution of individuals (seedling, juvenile, and adults) varies enormously among subpopulations (*i.e.* host trees) and is skewed towards few individuals per tree (Tremblay and Velazquez-Castro 2009, p. 214). The lifespan of *L. eltoroensis* can reach 30 to 50 years (Tremblay 1996, pp. 88–89, 114). However, the mean is 5.2 years, with an average percent mortality of 10 percent per year, although this varies greatly among life stages. Survival increases as individual orchids reach later life stages, but fewer plants reach adulthood and have the opportunity to contribute offspring to the next generation (Tremblay 2000, p. 265; Rosa-Fuentes and Tremblay 2007, p. 207). Because the species occurs within a protected National Forest, access to moss, dispersal ability, reproductive success, and lifespan influence survivorship more than other potential human-induced threats (Tremblay 2000, p. 265; Rosa-Fuentes and Tremblay 2007, p. 207).

The reproductive success of *Lepanthes eltoroensis* subpopulations is highly sensitive to temporal variation in environmental conditions (Tremblay and Hutchings 2002, entire). Further, reproductive success of *L. eltoroensis*, as in most orchids, is pollinator-limited (Tremblay *et al.* 2005, p. 6). This obligate cross-pollinated species (Tremblay *et al.* 2006, p. 78) uses a deceptive pollination system (the plants send false signals to the insects, imitating some rewarding conditions), typically characterized by very few reproductive events (~ less than 20 percent chance; Tremblay *et al.* 2005, p. 12). Although we do not know the pollinator for *L. eltoroensis*, elsewhere fungus gnats visit *Lepanthes* orchids

(Blanco and Barboza 2005, p. 765) and pollinate by pseudocopulation (*i.e.*, attempted copulation by a male insect with the orchid flower that resembles the female, carrying pollen to it in the process). Therefore, it is likely fungus gnats are a pollinator for *L. eltoroensis*. Fungus gnats do not travel far—perhaps tens of meters or even a few hundred meters (Ackerman 2018)—limiting pollen dispersal for *L. eltoroensis*. Most *L. eltoroensis* pollination occurs among individuals within a host tree, resulting in high inbreeding and low genetic variability (Tremblay and Ackerman 2001, pp. 55–58). The seeds of *L. eltoroensis* are wind-dispersed and require a mycorrhizal association for germination and survival until plants start photosynthesis (Tremblay and Ackerman 2001, p. 55; Tremblay 2008, p. 85).

Distribution and Abundance

Lepanthes eltoroensis is endemic to EYNF, Puerto Rico. It is restricted to one general area within the Sierra Palm, Palo Colorado, and dwarf forests of the El Toro and Trade Winds trails (Service 2015, p. 5) at elevations above 2,461 feet (750 meters) (Service 1996, p. 2). At the time of listing, the species consisted of an estimated 140 individual plants. Since then, surveys have located additional individuals and subpopulations (groups of *L. eltoroensis* on the same host tree), resulting in a much greater estimate of individuals than at the time of listing. Surveys for *L. eltoroensis* have been infrequent, sparse, and done with varying spatial spread and methodology, making the results difficult to compare over time (Service 2019, pp. 34–52). However, partial surveys conducted periodically from 2000 to 2018 have found greater numbers of *L. eltoroensis* (Service 2019, pp. 49–50). In addition, surveys conducted between 2000 and 2005 indicated the subpopulations surveyed along El Toro Trail and Trade Winds Trail were relatively stable over the 5-year period (Service 2019, p. 39). The best available metapopulation estimate is 3,000 individual plants (Tremblay 2008, p. 90; Service 2015, p. 5). Overall, data do not indicate a general pattern of decline, but rather natural fluctuations (Service 2019, p. 52).

The 3,000 plant population estimate was made prior to category 5 Hurricane Maria making landfall in 2017. A post-hurricane partial survey along the El Toro Trail was completed in 2018, and found 641 total plants, including over 300 that had not been previously identified (Meléndez-Ackerman 2018, pers. comm.). We note that this was only a partial survey; there has never

been a complete census of the entire metapopulation because most of the areas off the two main trails (El Toro and Trade Winds) are dangerous and inaccessible.

The forest types *Lepanthes eltoroensis* is most affiliated with—Palo Colorado, Sierra Palm, and Dwarf Forest—cover over 13,000 acres (5,261 hectares) within the EYNF (Service 2019, p. 8). Given the amount of unreachable habitat that has not been surveyed, all estimates are likely to underestimate the true abundance of the species (Service 2019, p. 50). Surveys of habitat outside traditionally surveyed sites (on or just off trails) could result in discovery of additional plants (Tremblay 2008, p. 90; Service 2019, pp. 18, 50, 73). In addition, since the time of listing, the species has faced multiple strong hurricanes (Hugo, Georges, Hortense, Irma, and Maria), while the species' abundance has remained stable (with all age classes represented and in good health); thus, we conclude the species has the ability to recover from stochastic disturbances (Service 2019, pp. 51–52). Therefore, although the species and its habitat were harmed by the recent hurricanes (namely Maria), the previous estimate of 3,000 individual plants is still our best estimate.

Habitat

Lepanthes eltoroensis occurs on moss-covered trunks (*i.e.*, host trees) within upper elevation cloud forests in the Sierra Palm, Palo Colorado, and Dwarf Forest associations of EYNF (Luer 2014, p. 260; Ewel and Whitmore 1973, pp. 41–49), where humidity ranges from 90 to 100 percent, and cloud cover is continuous, particularly during the evening hours (55 FR 41248; October 10, 1990). Important habitat components seem to be elevation, adequate temperature and moisture regimes, open/semi-open gaps in the canopy, and presence of moss.

Recovery and Recovery Plan Implementation

Section 4(f) of the Act directs us to develop and implement recovery plans for the conservation and survival of endangered and threatened species, unless we determine that such a plan will not promote the conservation of the species. Recovery plans are not regulatory documents. Rather, they are intended to establish goals for long-term conservation of a listed species and define criteria that are designed to indicate when the threats facing a species have been removed or reduced to such an extent that the species may no longer need the protections of the Act. Recovery plans also provide

guidance to our Federal, State, and other governmental and nongovernmental partners on methods to minimize threats to listed species.

There are many paths to accomplishing recovery of a species, and recovery may be achieved without all criteria being fully met. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished or become obsolete, yet we may judge that, overall, the threats have been minimized sufficiently, and the species is robust enough, to reclassify the species from endangered to threatened or perhaps delist the species. In other cases, recovery opportunities may be recognized that were not known at the time the recovery plan was finalized. These opportunities may be used instead of methods identified in the recovery plan.

Likewise, information on the species that was not known at the time the recovery plan was finalized may become available. The new information may change the extent that criteria need to be met for recognizing recovery of the species. Recovery of species is a dynamic process requiring adaptive management that may or may not fully follow the guidance provided in a recovery plan.

The following discussion provides a brief review of recovery planning and implementation for *Lepanthes eltoroensis* as well as an analysis of the recovery criteria and goals as they relate to evaluating the status of this orchid. *Lepanthes eltoroensis* was listed as an endangered species in 1991, due to its rarity (Factor E), its restricted distribution (Factor E), forest management practices (Factor A), impacts from hurricane damage (Factor E), and collection (Factor B) (56 FR 60933, November 29, 1991, p. 56 FR 60935). The most important factor affecting *L. eltoroensis* at that time was its limited distribution. Additionally, we concluded at the time that the species' rarity made it vulnerable to impacts from hurricanes, such as unfavorable microclimatic conditions resulting from numerous canopy gaps. Because so few individuals were known to occur, the risk of extinction was considered to be extremely high (56 FR 60933, November 29, 1991, p. 56 FR 60935).

The *Lepanthes eltoroensis* recovery plan was approved on July 15, 1996. The objective of the recovery plan is to provide direction for reversing the decline of this orchid and for restoring the species to a self-sustaining status, thereby permitting eventual removal from the Federal List of Endangered and

Threatened Plants (Service 1996, p. 8). However, the recovery plan provides only criteria for reclassifying the species from endangered to threatened (“downlisting”). The specific criteria are: (1) Prepare and implement an agreement between the Service and the USFS concerning the protection of *L. eltoroensis* within EYNF, and (2) establish new populations capable of self-perpetuation within protected areas (Service 1996, p. 8). The plan also includes the following recovery actions intended to address threats to the species:

- (1) Prevent further habitat loss and population decline;
- (2) Continue to gather information on the species' distribution and abundance;
- (3) Conduct research;
- (4) Establish new populations; and
- (5) Refine recovery criteria.

The following discussion provides specific details for each of these actions and the extent to which the recovery criteria have been met.

Recovery Action 1: Prevent Further Habitat Loss and Population Decline

This action has been completed. In the past, the species' primary threat was identified as destruction and modification of habitat associated with forest management practices (*e.g.*, establishment and maintenance of plantations, selective cutting, trail maintenance, and shelter construction; 56 FR 60933, November 29, 1991). As described below under “Forest Management Practices,” the best available data indicate that forest management practices are no longer negatively affecting *Lepanthes eltoroensis*. The area where the species is found is within a protected area (EYNF), part of which is the El Toro Wilderness designated in 2005, where the land is managed to preserve its natural conditions and species like *L. eltoroensis* (USFS 2016, p. 32). We expect this wilderness area will remain permanently protected as a nature reserve and be managed for conservation. Additionally, because this area is within a National Forest, the National Forest Management Act of 1976 (16 U.S.C. 1600 *et seq.*) requires the USFS to develop management plans, and EYNF has. As noted below, the EYNF plan specifically includes a set of standards and guidelines to protect the natural resources within the El Toro Wilderness.

Moreover, Federal agencies are mandated to carry out programs for the conservation of endangered species under section 7 of the Act to ensure that any action authorized, funded, or carried out by a Federal agency is not

likely to jeopardize the continued existence of a federally listed species. The USFS consults with the Service as necessary to avoid and minimize impacts to listed species and their habitat at EYNF. *L. eltoroensis* shares habitat with other federally listed species (e.g., the endangered plants *Ilex sintenisii* (no common name) and *Ternstroemia luquillensis* (palo colorado), and the threatened elfin-woods warbler (*Setophaga angelae*)), so *L. eltoroensis* will benefit from efforts to conserve their habitat.

Recovery Action 2: Continue To Gather Information on the Species' Distribution and Abundance

This action has been completed. Since the species was listed in 1991, several surveys for *Lepanthes eltoroensis* have been conducted. Although these surveys have been done with varying spatial spread and methodology, making the results difficult to compare over time, even partial surveys have found greater numbers of *L. eltoroensis*. Surveys have indicated stable growth rates. While the best available estimate of the metapopulation is 3,000 individuals (Tremblay 2008, p. 90), surveys likely underestimate the species' true abundance, as suitable habitat off the two main trails is dangerous and mostly inaccessible, preventing additional surveys. Surveys of habitat outside traditional population sites may result in additional individuals.

Recovery Action 3: Conduct Research

Much research has been completed; however, we continue to conduct research on the species. Information has been collected throughout the years on the distribution and dispersion patterns of *Lepanthes eltoroensis* (Tremblay 1997a, pp. 85–96), variance in floral morphology (Tremblay 1997b, pp. 38–45), and genetic differentiation (Tremblay and Ackerman 2001, pp. 47–62). In 2016, the Service and the Puerto Rico Department of Natural and Environmental Resources (PRDNER) provided funding to researchers at the University to evaluate the current population status of *L. eltoroensis* and model its demographic variation in response to climatic variability (i.e., temperature and relative humidity). This research suggests that *L. eltoroensis* population growth rates are highly dynamic depending on drought conditions (Meléndez-Ackerman et al. 2018, entire). Partners continue analyzing the extent by which these changes may be related to changes in climatic variation in detail by analyzing data from meteorological stations in the region, and they recommend periodic

monitoring of *L. eltoroensis*'s population status (Meléndez-Ackerman et al. 2018, p. 10). The Service will address this recommendation as part of the post-delisting monitoring plan (PDM) and will include criteria to determine whether population trends allow for completion of monitoring, or if additional monitoring or a status review is needed. Moreover, the University, in collaboration with the USFS and the Service, developed a habitat model showing that further suitable habitat extends outside traditionally surveyed areas, including areas of Pico El Yunque and Pico del Este (Sparklin 2020, unpublished data). This model is still pending validation in the field. Despite species experts recording direct impacts to *L. eltoroensis* due to Hurricane Maria and high mortality of seedlings following the disturbance, they also recorded at least 16 previously unknown host trees with live plants (new populations), showing the species may be more widespread within its habitat (Hernández-Muñiz et al., accepted for publication, entire).

Recovery Action 4: Establish New Populations

This action has not been met but is no longer necessary. At the time of listing, only 140 plants were thought to exist; we now estimate a population size of 3,000 individuals (Tremblay 2008, p. 90). The 2015 5-year status review of *Lepanthes eltoroensis* states that the action to establish new populations is not necessary at this time for the recovery of the species because additional subpopulations and individuals have been found since the species was listed (Service 2015, p. 5). Additionally, relocation of plants from fallen trees onto standing trees following hurricane events was found to be an effective management strategy to improve and maximize survival and reproductive success (Benítez and Tremblay 2003, pp. 67–69). Recent work and habitat modeling also show that further suitable habitat extends outside traditionally surveyed areas, including areas of Pico El Yunque and Pico del Este.

Recovery Action 5: Refine Recovery Criteria

This action has not been met but will no longer be necessary. The recovery plan states that as additional information on *Lepanthes eltoroensis* is gathered, it will be necessary to better define, and possibly modify, recovery criteria. Based on the information compiled in the SSA report (Service 2019, entire), this orchid is projected to remain viable over time such that it no

longer meets the Act's definition of an endangered or threatened species (see Determination of Status of *Lepanthes eltoroensis*, below).

Recovery Criterion 1: Prepare and Implement an Agreement Between the Service and the USFS Concerning the Protection of Lepanthes Eltoroensis Within EYNF

This criterion has been met. Existing populations and the species' habitat are protected by the USFS. This orchid species occurs within the El Toro Wilderness Area where habitat destruction or modification is no longer considered a threat to the species or its habitat. Thus, although there is not a specific agreement between the Service and the USFS concerning the protection of *Lepanthes eltoroensis*, the intent of this criterion—to provide long-term protection for the species—has been met. The implementation of management practices in the forest has improved, no selective cutting is conducted, and the USFS coordinates with the Service to avoid impacts to listed species as part of their management practices. Furthermore, Commonwealth laws and regulations protect the species' habitat, as well as protect the species from collection and removal. There is no evidence that *L. eltoroensis* or its habitat is being negatively impacted by forest management. Due to the high level of protection provided by the wilderness designation and other protections, we have determined that an agreement between the Service and the USFS is no longer necessary for protecting this species. Incidentally, because this species overlaps with other listed species, the USFS will continue to consult on projects that may affect this area.

Recovery Criterion 2: Establish New Populations Capable of Self-Perpetuation Within Protected Areas

As stated above under Recovery Action 4, we have found that the action to establish new populations is no longer necessary because additional subpopulations and individuals have been found since the species was listed (Service 2015, p. 5). Further, suitable habitat extends outside traditionally surveyed areas, including areas of Pico El Yunque and Pico del Este. Additionally, relocation of plants is an effective management strategy to improve and maximize survival and reproductive success, as has been demonstrated after hurricane events (Benítez and Tremblay 2003, pp. 67–69).

Summary

The recovery plan for *Lepanthes eltoroensis* provided direction for reversing the decline of this species, thereby informing when the species may be delisted. The recovery plan outlined two criteria for reclassifying the species from endangered to threatened: (1) Prepare and implement an agreement between the Service and the USFS concerning the protection of *L. eltoroensis* within EYNF, and (2) establish new populations capable of self-perpetuation within protected areas. These criteria have either been met or are no longer considered necessary. This species is protected by Commonwealth law and regulations and will continue to be should the species no longer require Federal protection, and the species occurs within a protected wilderness area that will remain protected and managed using techniques that are beneficial for this species and co-occurring federally listed species. There is no evidence that *L. eltoroensis* or its habitat is being negatively impacted by forest management activities or will be in the future. Additionally, the designation of wilderness where the species occurs has eliminated the need for an agreement between the Service and the USFS to protect this species. Since the species was listed under the Act and the recovery plan was written, additional plants have been found, additional plants likely exist in areas that are unsuitable for surveying, and the best available information indicates that additional habitat likely exists. Therefore, establishment of new populations is not necessary for recovery of *L. eltoroensis* at this time. Additionally, the five recovery actions intended to address threats to the species have all been either met or determined no longer to be necessary for recovery.

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 consider these same five factors in reclassifying a species from endangered to threatened and in delisting a species (50 CFR 424.11(c)–(e)).

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

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

analysis and describing the expected effect on the species now and in the foreseeable future.

The Act does not define the term “foreseeable future,” which appears in the statutory definition of “threatened species.” Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term foreseeable future extends only so far into the future as the Services can reasonably determine that both the future threats and the species’ responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. “Reliable” does not mean “certain”; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

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

Given the average lifespan of the species (approximately 5 years), a period of 20 to 30 years allows for multiple generations and detection of any population changes. Additionally, the species has been listed for close to 30 years, so we have a baseline to understand how populations have performed in that period, which is a similar length of time as between now and mid-century. Therefore, the “foreseeable future” used in this determination is 20 to 30 years, which is the length of time into the future that the Service can reasonably determine that both the future threats and the species’ responses to those threats are likely.

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an assessment of the potential threats to the species. The SSA report does not represent our decision on whether the species should be reclassified as a threatened species or delisted 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 <http://www.regulations.gov> under Docket No. FWS-R4-ES-2019-0073.

To assess *Lepanthes eltoroensis* 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 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. *Lepanthes eltoroensis* was listed as an endangered species in 1991, due to its rarity (Factor E), its restricted distribution (Factor E), forest management practices (Factor A), impacts from hurricane damage (Factor E), and collection (Factor B) (56 FR 60933, November 29, 1991, p. 56 FR 60935). The most important factor affecting *L. eltoroensis* at that time was its limited distribution. Additionally, its rarity made the species vulnerable to

impacts from hurricanes, such as unfavorable microclimatic conditions resulting from numerous canopy gaps. Because so few individuals were known to occur, the risk of extinction was considered to be extremely high (56 FR 60933, November 29, 1991, p. 56 FR 60935).

Summary of Biological Status and Threats

In this section, 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.

Forest Management Practices

At the time of listing (1991), management practices such as establishment and maintenance of plantations, selective cutting, trail maintenance, and shelter construction were considered threats to *Lepanthes eltoroensis* (56 FR 60933, November 29, 1991, p. 56 FR 60935). The recovery plan further indicated that destruction and modification of habitat might be the most significant factors affecting the number of individuals and distribution of the species (Service 1996, p. 5).

Since the species was listed, several laws have been enacted that provide protections to this species. In 1999, Commonwealth Law No. 241 (New Wildlife Law of Puerto Rico or *Nueva Ley de Vida Silvestre de Puerto Rico*) was enacted to protect, conserve, and enhance native and migratory wildlife species (including plants). This law requires authorization from the PRDNER Secretary for any action that may affect the habitat of any species. Furthermore, part of EYNF (including the habitat where *Lepanthes eltoroensis* is currently known to occur) was congressionally designated as the El Toro Wilderness in 2005, to preserve its natural conditions, including species like *L. eltoroensis*, inhabiting the area (Caribbean National Forest Act of 2005 (Pub. L. 109–118); the Wilderness Act (16 U.S.C. 1131 *et seq.*); U.S. Forest Service (USFS) 2016, p. 32). The El Toro Wilderness consists of undeveloped USFS lands and is managed to preserve its natural conditions without any permanent improvements or human habitation (USFS 2016, p. 32). All known populations of *L. eltoroensis* occur within this wilderness area.

Scientists who have conducted research on *Lepanthes eltoroensis* do not consider destruction, curtailment, or modification of this species' habitat to be a factor threatening this species (Ackerman 2007, pers. comm.). In 2019,

the USFS finalized a revised land and resources management plan to guide the general direction of EYNF for the next 15 years. This plan specifically includes a set of standards and guidelines to protect the natural resources within the El Toro Wilderness, including listed species. Standards specific to the El Toro Wilderness include no salvaging of timber, no issuing permits for collection of plants or plant material unless for a scientific purpose, no new special-use permits for facilities or occupancy, managing recreation to minimize the number of people on the trails, and no construction of new trails (USFS 2019, pp. 1, 32–35). Standards and guidelines for at-risk (including listed) species detailed in the plan include not allowing collection of orchids unless approved for scientific purposes and making sure forest management activities are consistent with recovery plans (USFS 2019, p. 62). Implementation of management practices in EYNF has also improved; there is no selective cutting, and maintenance is minimal, as both El Toro and Trade Winds trails receive few visitors. Mostly researchers and forest personnel use El Toro and Trade Winds trails; therefore, few human encounters are expected (USFS 2016, p. 32). Additionally, the USFS coordinates with the Service to avoid or minimize impacts to a number of federally listed species (*e.g.*, the endangered plants *Ilex sintenisii* and palo colorado, and the threatened elfin-woods warbler) that co-occur with *L. eltoroensis* as part of their management practices in accordance with section 7 of the Act.

There is no evidence suggesting current forest management practices are negatively affecting the species or its specialized habitat (adequate temperature and moisture regimes, and presence of moss) (Service 2019, p. 24). Furthermore, based on existing laws, we expect EYNF will remain permanently protected as a nature reserve and be managed for conservation. Therefore, we no longer consider forest management practices or destruction and modification of habitat to be threats to the species.

Hurricanes

The restricted distribution of *Lepanthes eltoroensis* makes it particularly vulnerable to large-scale disturbances, such as hurricanes and tropical storms, that frequently affect islands of the Caribbean (NOAA 2018, unpaginated). Hurricanes are more frequent in the northeastern quadrant of Puerto Rico, where EYNF is located (White *et al.* 2014, p. 30). Current global climate models are rather poor at

simulating tropical cyclones; however, the Intergovernmental Panel on Climate Change's climate simulations project that the Caribbean will experience a decrease in tropical cyclone frequency, but the most intense events will become more frequent (PRCC 2013, p. 10; Service 2019, p. 56).

Cloud forests, where this species occurs, are much taller than other vegetation and are higher in elevation, making them more exposed and more easily affected by high winds, and they take more time to recover post-disturbance (Hu and Smith 2018, p. 827). Heavy rains and winds associated with tropical storms and hurricanes cause tree defoliation, habitat modification due to trees falling, and landslides (Lugo 2008, p. 368). Surveys in 2018 conducted along El Toro Trail following Hurricane Maria focused on assessing the impacts to the species and its host trees (subpopulations). Nineteen host trees were not found and assumed to be lost due to the hurricane. An additional nine host trees were found knocked down. In total, 641 plants, including seedlings, juveniles, and reproductive and non-reproductive adults, were found; 322 were found on previously marked host trees (including 191 individuals on those host trees that were knocked to the ground), and 319 were new individuals not previously surveyed (Melendez-Ackerman 2018, pers. comm.). Given that *Lepanthes eltoroensis* does not persist on felled or dead trees (Benítez and Tremblay 2003, pp. 67–69), we assume many of these 191 individuals (approximately 30 percent of individuals found) will not survive, resulting in the loss of those individuals from the metapopulation. However, individual plants moved to new host trees do quite well, highlighting the feasibility of relocation to increase the species' long-term viability in the context of severe hurricanes such as Hurricane Maria. University researchers translocated some of these 191 individuals, but because the translocations occurred months after the hurricane, we do not expect survival to be as high as if it had occurred immediately after the hurricane. Furthermore, this species has persisted from past hurricane events without active management of translocating species from felled host trees.

In addition, associated microclimate changes resulting from downed trees and landslides after severe storms (e.g., increased light exposure, reduction in relative humidity) may negatively affect the growth rate of *Lepanthes eltoroensis* populations (Tremblay 2008, pp. 89–90). Following Hurricane Georges in

1998, non-transplanted populations of *L. eltoroensis* had negative growth rates, while groups of plants that were transplanted to better habitats within the forest had positive growth rates (Benitez-Joubert and Tremblay 2003, pp. 67–69). Furthermore, based on data on related species, *L. eltoroensis* growth rates may be negatively affected by excess light from gaps caused by felled trees during hurricanes (Fernandez *et al.* 2003, p. 76).

The inherently low redundancy (the ability of a species to withstand catastrophic events) of *Lepanthes eltoroensis* due to its limited range makes hurricanes and tropical storms a primary risk factor. However, given the observed stable trend from past surveys and recent partial surveys in 2018 (Service 2019, pp. 39, 45–48), it appears that the species has the ability to recover from disturbances like hurricanes Hugo, Georges, Hortense, Irma, and Maria (Service 2019, pp. 51–52). Additionally, relocation has proven to be a viable conservation strategy for this species (Benítez and Tremblay 2003, pp. 67–69). Relocating plants from fallen trees to standing trees following hurricane events results in higher survival of those transplanted individuals. This management strategy can improve and maximize species' survival and reproductive success after hurricane events (Benítez and Tremblay 2003, pp. 67–69; Tremblay 2008, pp. 83–90). Following this recommendation after Hurricane Maria, researchers from the University translocated some *L. eltoroensis* individuals along the El Toro Trail. These individuals are currently being monitored to assess survival. In addition, since *L. eltoroensis* is part of the USFS' "Plant Species of Conservation Interest of El Yunque" (USFS 2018, p. 37) and is included in the 2016 revised land and resource management plan that details a management concept focused on conservation, particularly to protect unique ecological resources (USFS 2016, p. 1), the USFS will continue to implement conservation actions, such as habitat protection, enhancement, and relocation of *L. eltoroensis* individuals following hurricanes, as deemed necessary.

Collection

Collection for commercial or recreational purposes eliminated one population of *Lepanthes eltoroensis* prior to listing under the Act (56 FR 60933; November 29, 1991). The rarity of the species made the loss of even a few individuals a critical loss to the species as a whole.

The USFS regulations in title 36 of the Code of Federal Regulations at part 261, section 261.9 (36 CFR 261.9) prohibit damaging or removing any plant that is classified as a threatened, endangered, sensitive, rare, or unique species in wilderness areas. Additionally, since the species was listed under the Act in 1991, other laws have been enacted that provide protections to the species from collection or removal. Commonwealth Law No. 241 (New Wildlife Law of Puerto Rico or *Nueva Ley de Vida Silvestre de Puerto Rico*), enacted in 1999, protects, conserves, and enhances native and migratory wildlife species. Specifically, Article 5 of this law prohibits collection and hunting of wildlife species, including plants within the jurisdiction of Puerto Rico, without a permit from the PRDNER Secretary. In 2004, *Lepanthes eltoroensis* was included in the list of protected species of Regulation 6766 (*Reglamento 6766 para Regir el Manejo de las Especies Vulnerables y en Peligro de Extinción en el Estado Libre Asociado de Puerto Rico*), which governs the management of endangered and threatened species within the Commonwealth of Puerto Rico. Article 2.06 of this regulation prohibits collecting, cutting, and removing, among other activities, listed plant individuals within the jurisdiction of Puerto Rico.

Lepanthes eltoroensis will likely remain protected under Commonwealth laws and regulations after Federal delisting. Commonwealth Regulation 6766 provides protection to species that are not federally listed or that have been removed from the Federal Lists, and the species will remain protected under the wilderness provisions from the 2016 revised land and resource management plan for EYNF (USFS 2016, entire). According to this plan, any influences by humans on the natural process that take place in the wilderness area will be to protect endangered and threatened species in addition to human life (USFS 2016, p. 33). As such, the standards of the plan include conducting wildlife and plant habitat/population surveys and monitoring in a manner compatible with the goals and objectives of wilderness (USFS 2016, p. 34). Additional protection measures include not issuing forest product permits for collection of plants or plant material in wilderness areas (unless for scientific and educational purposes and approved by the forest biologist/ecologist), and management strategies to design, construct, and maintain trails to the appropriate trail standard in order to meet wilderness standards protections (USFS 2016, p. 34).

Despite the one documented instance of collection, the threat of collection is low, given that few people venture into the El Toro Wilderness (Tremblay 2007, pers. comm.) and that the small size (less than 2 in. (4 cm) tall) and inconspicuousness of this species makes it easy to overlook (Ackerman 2007, pers. comm.; Tremblay 2007, pers. comm.). Additionally, this species is not used for commercial or recreational purposes and is not considered to have ornamental value (Service 2015, p. 8). Despite photos of the species on the internet, there is no direct evidence that the species is in private collections or that it has been advertised for sale. In addition, since early 2017, researchers from the University monitored population trends on all known host trees on a monthly basis, and recorded no evidence of poaching (e.g., unusual missing plants or scars on the trees). Thus, there is no evidence that collection is currently impacting *Lepanthes eltoroensis* (Service 2019, p. 24) or is likely to do so in the future.

Small Population Size and Low Reproduction

The smaller the population, the greater the probability that fluctuations in population size from stochastic variation (e.g., reproduction and mortality) will lead to extirpation. There are also genetic concerns with small populations, including reduced availability of compatible mates, genetic drift, and inbreeding depression. Small subpopulations of *Lepanthes eltoroensis* are particularly vulnerable to stochastic events, thus contributing to lower species viability (Service 2019, p. 24).

Lepanthes eltoroensis may experience declining growth related to the uneven distribution of individuals among host trees and demographic processes (e.g., reproductive success, survival), which can be negatively influenced by environmental and catastrophic risks (Service 2019, p. 25). Fruit production is limited; therefore, opportunities for establishment are limited. Less than 20 percent of individuals reproduce, and most subpopulations (60 percent of host trees) have fewer than 15 individuals. In addition, the distribution of individuals (seedling, juvenile, and adults) varies enormously among trees and is skewed towards few individuals per tree (Tremblay and Velazquez-Castro 2009, p. 214). Despite small subpopulations of *L. eltoroensis* with limited distribution and naturally limited fruit production, this species has continued to recover even after regular exposure to disturbances. We now estimate the species population to be 3,000 individuals, which is a significant

increase from the 140 individuals known at the time of listing (Tremblay 2008, p. 90). This is because surveys have located additional individuals and subpopulations (groups of *L. eltoroensis* on the same host tree), resulting in a much greater estimate of individuals than at the time of listing. Therefore, the species' vulnerability to extinction due to catastrophic events is reduced.

Genetic Risks

The main genetic risk factor for the species is low genetic variability. The effective population size (number of individuals in a population that contribute offspring to the next generation) ranges from 3 to 9 percent of the standing population (number of individuals in a population) (Tremblay and Ackerman 2001, entire). In other words, for every 100 adults, maybe 9 will transfer genes to the next generation. In addition, although *Lepanthes eltoroensis* can survive for up to 50 years, most seedlings and juveniles die (Tremblay 2000, p. 264). Therefore, very few individuals are responsible for the majority of seed production, decreasing the genetic diversity as a whole in subpopulations (Meléndez-Ackerman and Tremblay 2017, pp. 5–6). Low genetic diversity may be reflected in reduced genetic and environmental plasticity, and, thus, low ability to adapt to environmental changes. However, *L. eltoroensis* has demonstrated the ability to withstand environmental change; therefore, low genetic diversity does not appear to be affecting the species' viability.

There is evidence of low gene flow in the species. Estimated gene flow in *Lepanthes eltoroensis* is less than two effective migrants per generation (Tremblay and Ackerman 2001, p. 54). This result implies that most mating is among individuals within a host tree, potentially resulting in high inbreeding, low genetic variability, and inbreeding depression (Tremblay and Ackerman 2001, pp. 55–58). If there are high rates of inbreeding, this could lead to inbreeding depression, and could have profound long-term negative impacts to the viability of the species (Service 2019, pp. 28–29). However, the species is likely an obligate cross-pollinated species (Tremblay *et al.* 2006, p. 78), which is a mechanism to reduce inbreeding. Although the effects of potential inbreeding in the future is possible, the species has demonstrated the ability to adapt to changing environmental conditions (*i.e.*, natural disturbances) over time (Service 2019, p. 54). Thus, both low genetic diversity and low gene flow do not appear to be affecting species' viability currently, nor

do we believe it will in the foreseeable future.

Effects of Climate Change

The average temperatures at EYNF have increased over the past 30 years (Jennings *et al.* 2014, p. 4; Khalyani *et al.* 2016, p. 277). Climate projections indicate a 4.6 to 9 degrees Celsius (°C) (8.2 to 16.2 degrees Fahrenheit (°F)) temperature increase for Puerto Rico from 1960–2099 (Khalyani *et al.* 2016, p. 275). Additionally, projections indicate a decrease in precipitation and acceleration of the hydrological cycles resulting in wet and dry extremes (Jennings *et al.* 2014, p. 4; Cashman *et al.* 2010, pp. 52–54). In one downscaled model, precipitation is projected to decrease faster in wetter regions like the Luquillo Mountains, where EYNF is located, and the central mountains of Puerto Rico (Khalyani *et al.* 2016, p. 274). In contrast, higher elevations may have a buffering effect on declining trends in precipitation (Bowden 2018, pers. comm.; Service 2019, pp. 65–66).

Downscaled modeling for Puerto Rico was based on three Intergovernmental Panel on Climate Change global emissions scenarios from phase 3 of the Coupled Model Intercomparison Project (the CMIP3 data set): Mid-high (A2), mid-low (A1B), and low (B1) as the CMIP5 data set was not available for Puerto Rico at that time (Khalyani *et al.* 2016, p. 267 and 279–280). These scenarios are generally comparable and span the more recent representative concentration pathways (RCP) scenarios from RCP4.5 (B1) to RCP8.5 (A2) (IPCC 2014, p. 57). Under all of these scenarios, emissions increase, precipitation declines, temperature and total dry days increase, and portions of subtropical rain and wet forests (that *Lepanthes eltoroensis* occupies) are lost, while all wet and moist forest types decrease in size in Puerto Rico; the differences in the scenarios depends on the extent of these changes and the timing of when they are predicted to occur (Service 2019, p. 67).

In general, projections show similar patterns of changes in precipitation and drought intensity and extremes, although total changes were greater for the A2 scenario (Khalyani *et al.* 2016, pp. 272–273, 274; Service 2019, pp. 59–60). Under scenarios A2, A1B, and B1, annual precipitation is projected to decrease. Current annual precipitation in Puerto Rico averages 745 to 4,346 mm (29 to 171 in.). However, differences in precipitation between the three scenarios were greater after mid-century, as was uncertainty of species' response to the various scenarios past mid-century (Khalyani *et al.* 2016, p.

274). Before then, decreases in rainfall are expected to be far less; rainfall decreases are expected to be 0.0012 to 0.0032 mm per day per year through 2050 (PRCC 2013, p. 7). Additionally, for all three climate scenarios, significant decreases in precipitation for the northern wet forests (like EYNF) are not predicted until after 2040 (Service 2019, p. 60). Furthermore, the U.S. Geological Survey projection for Puerto Rico predicts an overall drying of the island and a reduction in extreme rainfall occurrence; however, this model suggests higher elevations, like those supporting *L. eltoroensis*, may have a buffering effect on declining trends in precipitation (Bowden 2018, pers. comm.). Therefore, precipitation declines are not likely to occur in the area supporting *L. eltoroensis* during the foreseeable future. On the other hand, drought intensity increased steadily under all three scenarios (Khalyani *et al.* 2016, pp. 274–275). This increase is linear for all three scenarios. Given that the projections for precipitation and drought diverge significantly after midcentury, it is difficult to reasonably determine the species' response to the coming changes.

All three scenarios predict increases in temperature (Khalyani *et al.* 2016, p. 275). However, like with precipitation, projected increases in temperature are not substantial until after 2040. Projections show only a 0.8 °C (1.4 °F) increase by mid-century under all three scenarios. These scenarios differentiate the most from each other in later time intervals (after 2040) (Khalyani *et al.* 2016, pp. 275, 277). Also, we are not aware of any information that indicates these air temperature increases will influence formation of the cloud cover over EYNF in the foreseeable future, which could in turn impact interior temperatures and humidity of the forest where *Lepanthes eltoroensis* is found. The divergence of all scenarios after 2040 makes it difficult to predict the species' likely future condition; therefore, we are relying on species' response 20 to 30 years into the future.

Climatic changes are projected in the life zone distributions in Puerto Rico, although the changes vary by life zone and are predicted to be much more significant after mid-century. Because life zones are derived from climate variables (*e.g.*, precipitation and temperature), general changes in life zone distribution are similar to changes in climatic variables. For example, annual precipitation changes will result in shifts from wet and moist zones to drier zones (Khalyani *et al.* 2016, p. 275), and changes in temperature will result in changes from subtropical to

tropical. Under all three scenarios, models show decreasing trends in size for areas currently classified as wet and moist zones, while increasing trends were observed in the size covered by dry zones (Khalyani *et al.* 2016, pp. 275, 279). Therefore, under all scenarios, reduction of the size of areas covered by subtropical rain and wet forests are anticipated. Nonetheless, the loss of wet and moist zones in the northeastern mountain area that supports *Lepanthes eltoroensis* is not predicted to be substantial, and the area is predicted to remain relatively stable until after 2040 (Service 2019 p. 69). This may be due to possible buffering effects of elevation across the island.

This projected shift of the life zones of Puerto Rico from humid to drier is the most important potential risk to *Lepanthes eltoroensis*. This includes changes in relative area and distribution pattern of the life zones, and the disappearance of humid life zones (Khalyani *et al.* 2016, p. 275). Decreased rainfall in northeastern Puerto Rico could cause migration, distribution changes, and potential extirpation of many species that depend on the unique environmental conditions of the rain forest (Weaver and Gould 2013, p. 62). These projections may have direct implications for *L. eltoroensis* because the acreage of the lower montane wet forest life zone it occupies could decrease, resulting in less habitat being available for the species. Epiphytes like *L. eltoroensis* could experience moisture stress due to higher temperatures and less cloud cover with a rising cloud base, affecting their growth and flowering (Nadkarni and Solano 2002, p. 584). Due to its specialized ecological requirements and restricted distributions within the dwarf forest, *L. eltoroensis* could be more adversely impacted by the effects of climate change than other species with wider distribution (*e.g.*, lower elevation species) and greater plasticity, thus reducing its viability. However, predictions of life zone changes are not expected to affect resiliency of *L. eltoroensis* within the foreseeable future (Service 2019, p. 69).

Overall, we anticipate the range of *Lepanthes eltoroensis* could contract due to changes in climatic variables leading to loss of wet and tropical montane habitats. Although changes to precipitation and drought, temperature, life zones, and hurricane severity are expected to occur on Puerto Rico, thereby affecting the species' habitat, they are not predicted to be substantial over the next 20 to 30 year foreseeable future. Modeling shows the divergence in these projections increases

substantially after mid-century, making projections beyond 20 to 30 years more uncertain; as a result, the species' response to those changes beyond 30 years into the future is also uncertain (Khalyani *et al.* 2016, p. 275).

Climate change is a primary risk factor to the species; however, under all climate emission scenarios, *Lepanthes eltoroensis* is projected to remain moderately resilient within the foreseeable future. There is very little projected contraction of the wet and moist forests 30 years into the future. Although increasing catastrophic hurricanes are possible, relocation of plants and appropriate forest management can ameliorate some of these impacts. Overall, the viability of the species is predicted to remain stable despite climate change impacts.

Cumulative Effects

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.

Summary of Current Condition

Viability is defined as the ability of the species to sustain populations in the wild over time. To assess the viability of *Lepanthes eltoroensis*, we used the three conservation biology principles of resiliency, representation, and redundancy (Shaffer and Stein 2000, pp. 306–310).

Factors that influence the resiliency of *Lepanthes eltoroensis* include abundance and growth trends within host trees; habitat factors such as elevation, slope, aspect, precipitation, temperature, and canopy cover; and presence of moss, mycorrhizal fungi, and pollinators. Influencing those factors are elements of *L. eltoroensis*'s ecology that determine whether

populations can grow to maximize habitat occupancy, thereby increasing resiliency. Stochastic factors that have the potential to affect *L. eltoroensis* include impacts to its habitat from hurricanes and effects of climate change (*i.e.*, changes in temperature and precipitation regimes). Beneficial factors that influence resiliency include the protected status of the species' habitat, as the known range of the species is entirely within the El Toro Wilderness and, therefore, protected from human-caused habitat loss and collection.

The number of *Lepanthes eltoroensis* individuals is greater than at the time of listing (Tremblay 2008, p. 90), approximately 3,000 individual plants currently. The distribution of *L. eltoroensis* has not been investigated outside of traditional areas (*i.e.*, just off El Toro and Trade Wind trails); however, additional populations may occur within suitable habitat outside El Toro Trail. In fact, additional individuals have been found near, but outside of, El Toro Trail (Tremblay 2008, p. 90). Assuming a metapopulation size of 3,000 individuals and observed stable subpopulations from past surveys (including recent partial surveys in 2018), these numbers indicate that the species has the ability to recover from normal stochastic disturbances; thus, we consider the species to be moderately resilient.

We lack the genetic and ecological diversity data to characterize representation for *Lepanthes eltoroensis*. In the absence of species-specific genetic and ecological diversity information, we typically evaluate representation based on the extent and variability of habitat characteristics across the geographical range. Because the species does not appear to have much physiological flexibility given that it has a rather restricted distribution (cloud forests on ridges), representative units were not delineated for this species. Available data suggest that conditions are present for genetic drift and inbreeding depression (Tremblay 1997a, p. 92). However, the most updated *L. eltoroensis* information shows that the species survived the almost entire deforestation of the lowlands of EYNF (habitat surrounding the known localities of *L. eltoroensis*) and the associated changes in microhabitat conditions, and thus the species has the ability to adapt to changing environmental conditions (*i.e.*, natural disturbances) over time and does not appear to be affected by genetic drift at present. Furthermore, some of the factors that we concluded would reduce representation at the time of

listing, such as habitat destruction and collection, are no longer acting as stressors upon the species. Finally, because the population is significantly larger than was known at the time of listing, representation has improved. Redundancy for *Lepanthes eltoroensis* is the total number and resilience of subpopulations and their distribution across the species' range. This species is endemic to EYNF, and it has not been introduced elsewhere. Despite the presence of multiple subpopulations (*i.e.*, host trees), these subpopulations are located within a narrow/restricted range at El Toro Wilderness and are all exposed to similar specific habitat and environmental conditions. Although redundancy is naturally low due to the narrow range that the species inhabits, it has recovered from past natural disturbances (*i.e.*, hurricanes, tropical storms, etc.) and is considered more abundant within its habitat than previously documented, as noted above.

Projected Future Status

Lepanthes eltoroensis only occurs within the protected EYNF lands where stressors—including forest management practices, urban development surrounding EYNF, and overcollection—are not expected to be present or are expected to remain relatively stable. Because *L. eltoroensis* occurs on protected lands managed by the USFS, it will benefit from their ongoing conservation practices, which include the relocation of plants from fallen host trees after a hurricane, as deemed necessary, to alleviate the negative impacts of these storm events. The effect of genetic drift on the species into the future is unknown, but *L. eltoroensis* has thus far demonstrated the ability to adapt to changing environmental conditions (*i.e.*, natural disturbances) over time (Service 2019, pp. 51–52). The primary stressors affecting the future condition of *L. eltoroensis* are current and ongoing climate change (Meléndez-Ackerman and Tremblay 2017, p. 1) and the associated shifts in rainfall, temperature, and storm intensities. These stressors account for indirect and direct effects at some level to all life stages and across the species' range.

To examine the potential future condition of *Lepanthes eltoroensis*, we used three future scenarios based on climate change predictions for Puerto Rico (Khalyani *et al.* 2016, entire), which used global emission scenarios (mid-high (A2), mid-low (A1B), and low (B1) (Nakicenovic and Swart 2000, entire)) to capture a range of possible scenarios. Our assessment of future viability includes qualitative

descriptions of the likely impacts of climate change under the above three scenarios from the literature and is intended to capture the uncertainty in the species' response to climate stressors as well as capture our lack of information on abundance and growth rates relative to each scenario.

Although modeling projects large changes in temperature and precipitation to Puerto Rico through 2100, the divergence in these projections increases substantially after mid-century, making projections beyond 20 to 30 years more uncertain (Khalyani *et al.* 2016, p. 275). By mid-21st century, Puerto Rico is predicted to be subject to a decrease in rainfall, along with increase drought intensity, particularly in wetter regions like EYNF (Khalyani *et al.* 2016, pp. 265, 274–275). Given the average lifespan of the species (approximately 5 years), a period of 20 to 30 years allows for multiple generations and detection of any population changes.

In summary, changes to precipitation and drought, temperature, and life zones are expected to occur on Puerto Rico, but are not predicted to be substantial within the foreseeable future. Although modeling shows changes to Puerto Rico through 2100, the divergence in these projections increases after mid-century, making projections beyond 20 to 30 years more uncertain; as a result, the species' response beyond 20 to 30 years is also uncertain.

These projected changes may have direct or at least indirect effects on *Lepanthes eltoroensis*; however, viability of the species under all scenarios is expected to remain stable within the foreseeable future (Service 2019, p. 71). Potential direct effects include a reduced number of seedlings as the number of dry days increase, a reduced number of fruits as minimum average temperature increases, and a reduced number of adults as maximum temperature increases (Olaya-Arenas *et al.* 2011, p. 2042). Indirect effects are related to potential changes in moss cover and composition due to temperature and precipitation changes. Data from related species showed that orchid density, growth, and establishment were positively associated with moss species richness (Crain 2012, pp. 15–16; Garcia-Cancel *et al.* 2013, p. 6). Therefore, a change in forest temperature and humidity could affect the establishment and distribution of moss and also *L. eltoroensis* (Service 2019, p. 11).

Persistence of the species through repeated past hurricanes and other storms indicates that the species has the ability to recover and adapt from

disturbances. In fact, many researchers at EYNF have concluded that hurricanes are the main organizing force of the forests (Service 2019, p.71). The forests go through a cycle that averages 60 years, starting with great impact by winds and rain of a hurricane, and then 60 years of regrowth (Lugo 2008, p. 371). In those 60 years of regrowth, complete changes in the species that dominate the landscape can occur. Although the hurricane appears destructive, it can be constructive because it makes the area more productive—it rejuvenates the forest (Service 2019, p. 71). Currently, EYNF is at the initial phase of early succession following Hurricane Maria (2017), which produced severe tree mortality and defoliation, including *Lepanthes eltoroensis* host trees.

In general, we anticipate the range of the species may contract somewhat due to changes in climatic variables, although the loss of wet and moist zones in the northeastern mountain area that supports *Lepanthes eltoroensis* is not predicted to be substantial within the foreseeable future (Service 2019, p. 66). Any range contraction may be exacerbated by an increase in the frequency and severity of hurricanes. However, as the species occurs within EYNF, synergistic negative effects of development and deleterious forest management practices are unlikely threats to the species in the future. *Lepanthes eltoroensis* and its habitat at the EYNF are protected by congressional designation of El Toro Wilderness Area (Forest Plan 2016, p. 32), thus precluding human disturbance. Because the EYNF management plan includes a set of standards and guidelines to protect the natural resources within the El Toro Wilderness, including co-occurring federally listed species (e.g., *Ilex sintenisii* and palo colorado) (Service 2019, pp. 1, 32–35), the Service anticipates continued implementation of conservation and management practices to improve the habitat of all species within the area, including actions to mitigate hurricane impacts.

To summarize the future viability of *Lepanthes eltoroensis*, resiliency is projected to remain moderate through at least the next 20 to 30 years under all future scenarios. As mentioned above, very little contraction of the wet and moist forests is predicted within this timeframe. Although increasing catastrophic hurricanes are possible, relocation of plants can ameliorate some of these impacts. Redundancy is expected to remain stable under all scenarios for the next 20 to 30 years. However, *Lepanthes eltoroensis* has persisted through catastrophic events in

the past, and we expect it to remain viable within the foreseeable future. Because the species has a rather restricted distribution, representative units were not delineated for this species. The current condition of low genetic and environmental diversity, and little breadth to rely on if some plants are lost, is expected to continue under all scenarios, at least through the next 20 to 30 years. Available data suggest that conditions are present for genetic drift and inbreeding. However, *Lepanthes eltoroensis* has demonstrated the ability to adapt to changing environmental conditions (i.e., natural disturbances) over time and does not appear to be affected by genetic drift.

Summary of Comments and Recommendations

In the proposed rule published on March 10, 2020 (85 FR 13844), we requested that all interested parties submit written comments on the proposed delisting of *Lepanthes eltoroensis* and the draft post-delisting monitoring (PDM) plan by May 11, 2020. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal and plan. A newspaper notice inviting general public comments was published in *Primera Hora* (major local newspaper) and also announced using online and social media sources. We did not receive any requests for a public hearing.

Peer Review

In accordance with our joint policy on peer review published in the **Federal Register** on July 1, 1994 (59 FR 34270), and the Service's August 22, 2016, Director's Memo on the Peer Review Process, we sought the expert opinions of five appropriate and independent specialists regarding the SSA report for *Lepanthes eltoroensis*. These peer reviewers have expertise in *L. eltoroensis* or similar epiphytic orchid species' biology or habitat, or climate change. We received comments from one of the five peer reviewers. The purpose of peer review is to ensure that our decisions are based on scientifically sound data, assumptions, and analyses.

We reviewed all comments received from the peer reviewer for substantive issues and new information contained in the *Lepanthes eltoroensis* SSA report. The peer reviewer generally concurred with our methods and conclusions, and provided additional information, clarifications, and suggestions to improve the final SSA report. We revised the final SSA, which supports

this final rule, as appropriate, in response to the comments and suggestions we received from the peer reviewer.

Public Comments

We reviewed all public comments for substantive issues and new information regarding the species. Substantive comments we received during the comment period are addressed below and, where appropriate, are incorporated directly into this final rule.

(1) *Comment*: One commenter indicated that the species should not be delisted because the population growth rate is highly variable, and the population is generally decreasing; further, seedling individuals are slowly decreasing, and plant mortality is slowly increasing following Hurricane Maria in September 2017.

Our Response: The commenter did not provide substantial new information to support this comment. In addition, we do not have evidence indicating the species shows a long-term (over the past three decades) decreasing trend. In fact, the overall number of individuals detected has increased since the time of listing (1991) from 140 to approximately 3,000 individuals estimated along the Trade Winds Trail (Tremblay 2008, p. 90). Further populations (host trees) are expected to occur within suitable habitat just outside this trail in areas that have not yet been surveyed due to the inaccessibility and steepness of the terrain (Tremblay 2008, p. 90). Thus, the species' viability is supported by information showing an increased number of individuals over the past three decades.

The species' mean lifespan is approximately 5.2 years, with an average annual mortality rate of 10 percent; however, this mortality rate varies greatly among life stages, with increased survival of older stages (adults) (Tremblay 2000, p. 265; Rosa-Fuentes and Tremblay 2007, p. 207). This relatively short lifespan coupled with a relatively high mortality rate indicates that the species probably would have gone extinct were it not currently viable.

A seasonal decrease in number of seedlings may also be associated with transition to more mature stages (juveniles and non-reproductive adults). As expected, a higher mortality of seedlings (80.3 percent) was found 6 months after Hurricane Maria due to the changes in canopy structure and associated microhabitat conditions that promoted drought stress (Melendez-Ackerman et al. 2019, p. 4). However, an overall survival rate for monitored plants was found to be approximately

80 percent (Melendez-Ackerman et al. 2019, p. 5). In addition, in August 2018, at least 1,105 live individuals (768 in the El Toro trail and 337 in a portion of the Trade Winds trail) distributed across 61 phorophytes (host trees) were recorded after Hurricane Maria. While the surveyed number (1,105 individuals) is less than the estimated 3,000 population size, this is the result of monitoring of accessible habitat following the hurricane, and there is a consensus among experts that the species' distribution extends beyond the surveyed areas.

(2) *Comment:* Several commenters indicated that the species should not be delisted based on the impacts from hurricanes, including expected higher frequency and intensity of hurricanes associated with climate change. Commenters indicated that the species' habitat is still recovering from the impacts of Hurricane Maria in 2017, as shown by low percentage of forest cover (34 percent in June 2019), increase in higher monthly averages in minimum temperatures, and lower number of moss species. One commenter expressed that, in general, the occurrences of *Lepanthes* spp. are correlated with high levels of moss cover, moss cover seems to be important for orchid growth and survival, and moss cover was affected by the hurricane. The commenter also mentioned that the *L. eltoroensis* population is still at pre-hurricane levels, having only added 100 individuals during surveys conducted post-hurricane and comparing with the numbers obtained as part of the assessments commissioned by the Service prior to Hurricane Maria.

Our Response: As recognized in the proposed rule and the SSA report, we acknowledge the impacts from hurricanes and their expected higher frequency due to climate change. *Lepanthes eltoroensis* is endemic to El Toro and Trade Winds trails at El Yunque National Forest (EYNF), an area subject to recurrent hurricanes and storms. The continued presence and viability of the species through repeated past hurricanes (e.g., Hugo, Hortense, Georges, Irma, and Maria) shows the species has the ability to overcome and adapt from such disturbances. In fact, the species survived the peak in deforestation in Puerto Rico, including deforestation of the lowlands of EYNF, and the impact of Hurricane San Felipe II in 1928, the only category 5 hurricane on record to directly impact Puerto Rico. Thus, the species has been exposed to extreme natural disturbance and landscape modification via forest cover loss and moss reduction at EYNF that likely resulted in changes in

microhabitat conditions (i.e., higher temperature and evapotranspiration) caused by these disturbances and stochastic events.

As addressed in the *Lepanthes eltoroensis* SSA report (Service 2019, p. 73), hurricanes are the main organizing force of the forests of EYNF, and the forests goes through a cycle that averages 60 years (Lugo 2008, p. 383). The cycle starts with great impact from winds and rain of a hurricane followed by 60 years of regrowth. Thus, *L. eltoroensis* is naturally adapted to hurricane disturbance, and we expected it to remain viable in habitats subject to such intermittent disturbances (e.g., hurricanes) (Crain et al. 2019, p. 89).

Direct impacts to *L. eltoroensis* occurred from Hurricane Maria, and seedlings experienced high mortality following the disturbance (Melendez-Ackerman 2019, p. 4; Hernández-Muñiz et al., accepted for publication, entire). However, 16 previously unknown host trees (new populations) were recorded during post-hurricane surveys, indicating the species may be more widespread within its habitat (Melendez-Ackerman 2019, p. 2; Hernández-Muñiz et al., accepted for publication, entire).

Despite the species' apparent preference for caimitillo (*Micropholis garciniifolia*) (endemic to the higher elevations of EYNF) as a host tree, there are records of *L. eltoroensis* growing on palma de sierra (*Prestoea acuminata*) and helecho arboreo (*Cyathea arborea*), which are fast-growing species with widespread distributions within *L. eltoroensis* habitat whose abundance is favored by hurricanes. Therefore, the availability of potential host trees for *L. eltoroensis* should not be a limiting factor following hurricanes.

(3) *Comment:* One commenter indicated that the species should not be delisted because there is a need of crucial data on the species' reproductive biology (e.g., breeding system and pollinators), the feasibility of propagation, habitat requirements, and the ecology of the species.

Our Response: We are required to make our determinations based on the best available scientific and commercial data at the time the determination is made. A need for further research on a species is not necessarily relevant to the question of whether the species meets the definition of an "endangered species" or a "threatened species." Regardless of the mechanism for pollination of the species, reproduction and recruitment of *Lepanthes eltoroensis* is occurring, evidenced by the presence of different size classes. The reportedly low fruit set of the

species is not atypical of orchids of this type; thus, we do not consider it a concern for the future viability of the species. Finally, delisting the species does not prevent continued research on the species.

(4) *Comment:* One commenter indicated that the species should not be delisted because its habitat has not been completely surveyed, and there is a need to gather information on the species' distribution and abundance.

Our Response: As stated above, we make our status determinations based on the best available scientific and commercial data at the time the determination is made. Our analysis of the best commercial and scientific information available indicates that *Lepanthes eltoroensis* does not meet the Act's definitions of an "endangered species" or a "threatened species." Despite the limited range of this species, we determined that stressors either have not occurred, have been ameliorated, or are not expected to occur to the extent anticipated at the time of listing in 1991.

We acknowledge that the species has not been extensively surveyed outside the El Toro and Trade Winds trails due to the areas' remoteness and steep topography (Service 2019, p. 19). However, new occupied host trees were identified after Hurricane Maria, indicating the species extends beyond previously known areas. Additionally, species experts from University of Puerto Rico (University), in collaboration with the USFS and the Service, developed a habitat model using environmental variables such as elevation, aspect, and a topographic position index and heat load (Sparklin 2020, unpublished data). Although this model is pending field validation, the result from this analysis shows that further suitable habitat extends outside traditionally surveyed areas, including areas of Pico El Yunque and Pico del Este (Sparklin 2020, unpublished data).

For these reasons, current population numbers are likely underestimated as the species is expected to be more widespread particularly considering the pristine status of its habitat. Further, delisting the species does not prevent future study or habitat surveys.

(5) *Comment:* We received public comments indicating that the species should not be delisted because the Service has not completed the recovery actions stated in the species recovery plan. Two commenters indicated that the species should not be delisted because an agreement between the Service and the USFS concerning the protection of *Lepanthes eltoroensis* within the El Yunque National Forest property has not been prepared and

implemented (Recovery Objective #1). In addition, two commenters indicated that the species should not be delisted because new populations (the number of which should be determined following the appropriate studies) capable of self-perpetuation have not been established within protected areas (Recovery Objective #2).

Our Response: Recovery plans provide roadmaps to species recovery, but are not required in order to achieve recovery of a species or to evaluate it for delisting. In addition, recovery plans are also nonbinding documents that rely on voluntary participation from landowners, land managers, and other recovery partners. A determination of whether a valid, extant species should be delisted is made solely on the question of whether it meets the Act's definitions of an "endangered species" or a "threatened species." We have determined that *Lepanthes eltoroensis* does not.

As addressed under Recovery and Recovery Plan Implementation in the proposed rule (85 FR 13844, pp. 13852–13854), we consider the need for an agreement between the Service and USFS as obsolete. At the time the recovery plan was approved in 1996, this agreement was deemed as needed because the potential of habitat modification due to forest management practices (e.g., establishment and maintenance of plantations, selective cutting, trail maintenance, and shelter construction). However, the habitat where *L. eltoroensis* is found was congressionally designated as El Toro Wilderness Area in 2005. This designation provides stronger protection for *L. eltoroensis* than a conservation agreement would. The designated wilderness area is managed to retain primitive character without any permanent improvements or human habitation, and to preserve its natural conditions (USFS 2016, pp. 32–35). Currently, trails across *L. eltoroensis* habitat are used mostly by researchers and forest personnel; few human encounters are expected on these trails (USFS 2016, pp. 32–35), and no evidence indicates that forest management practices are negatively impacting the species.

Also addressed under Recovery and Recovery Plan Implementation in the proposed rule (85 FR 13844, pp. 13852–13854), the second recovery criterion regarding establishment of new populations capable of self-perpetuation within protected areas is no longer necessary because additional populations (host trees) and individuals have been found since the species was listed. In addition, new host trees have

been found as part of increased survey efforts. Moreover, recent habitat modeling indicates suitable habitat extends beyond traditional surveyed areas; thus, population numbers are expected to be higher.

(6) *Comment:* Several commenters indicated that the species should not be delisted because it is still threatened by potential overutilization for commercial, recreational, scientific, or educational purposes (Factor B); disease or predation (Factor C); the inadequacy of existing regulatory mechanisms (Factor D); and other natural or manmade factors (Factor E). Particularly, one commenter highlighted the potential impacts due to overutilization for commercial and recreational purposes and that the species may be in private collections. One commenter indicated that several *Lepanthes* species may exist ex-situ in private collections in the Netherlands, provided a photo, and suggested further investigation to potential poaching is needed.

Our Response: The commenters did not provide substantial new information indicating that Factors B, C, D, and E are threats to *Lepanthes eltoroensis*. We are proactively collaborating with the species' experts, and no specific information on these issues have been brought to our attention or highlighted as a threat. As for the potential poaching of the species, the known populations and prime habitat occur on Federal lands congressionally designated as the El Toro Wilderness to preserve its natural conditions, including *L. eltoroensis*. Standards specific to the El Toro Wilderness include no salvaging of timber, no issuing permits for collection of plants or plant material unless for a scientific purpose, no new special-use permits for facilities or occupancy, managing recreation to minimize the number of people on the trails, and no construction of new trails. In addition, the known populations of *L. eltoroensis* occur on remote areas with little human traffic, and are subject to surveillance by USFS law enforcement officers. The Netherlands record is from a photo, and it is not clear that it is actually from a private collection. There is no evidence indicating that *Lepanthes eltoroensis* has been advertised for sale or that it is in private collections. In addition, there is no historical or current evidence of poaching of the species.

Determination of Status of *Lepanthes Eltoroensis*

Section 4 of the Act (16 U.S.C. 1533), and its implementing regulations (50 CFR part 424), set forth the procedures for determining whether a species meets the definition of "endangered species"

or "threatened species." The Act defines an "endangered species" as 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. For a more detailed discussion on the factors considered when determining whether a species meets the definition of an endangered species or a threatened species and our analysis on how we determine the foreseeable future in making these decisions, please see Regulatory and Analytical Framework.

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 note that more individuals are known to occur than at the time of listing. Additionally, the best metapopulation estimate of 3,000 individuals is likely an underestimate, as not all potential habitat has been surveyed. Despite the effects of a small population size, continued limited distribution, and conditions rife for low gene flow (Factor E), the species has adapted to changing environmental conditions. Threats from incompatible forest management practices (Factor A) and collection (Factor B) have been addressed by regulatory changes, and are not anticipated to negatively affect *Lepanthes eltoroensis* in the future. Although hurricanes (Factor E) have the potential to negatively impact growth rates and survival of *L. eltoroensis*, stable subpopulations, even after recent severe hurricanes, indicate this species recovers from these natural disturbances. The greatest threat to the future of *L. eltoroensis* comes from the effects of climate change (Factor E); however, while changes to precipitation and drought, temperature, and life zones are expected to occur on Puerto Rico, they are not predicted to be substantial within the foreseeable future, and the viability of the species is expected to remain stable. We anticipate small population dynamics (small population size and restricted gene flow) (Factor E) will continue to be a concern, as conditions for genetic drift are present, nonetheless *L. eltoroensis* has demonstrated the ability to adapt to changing environmental conditions over time at population levels lower than they are currently or projected to be in the future.

The species was originally listed as an endangered species due to its rarity, restricted distribution, specialized habitat, and vulnerability to habitat

destruction or modification, as well as because of collection for commercial/recreational uses. We find that these threats are no longer affecting the status of the species, as they have been minimized or eliminated. Surveys over the past 18 years, including following two strong hurricanes in 2018, documented more individuals than known at the time of listing, and the population appears to be relatively stable. The habitat at EYNF, where the species occurs, is a designated wilderness area and managed for its natural conditions; we conclude that this legal protection has addressed the threat of habitat modification or destruction to the degree that it is no longer a threat to the species continued existence. In addition, collection is prohibited under Puerto Rican law and USFS regulations, and there is no indication this is a current threat to the species. Stability of the species through repeated past strong hurricanes indicates the species has the ability to coexist with disturbances. While a narrow endemic, the species has continued to be viable across its historical range with all life stages represented and in good health. While projections show increasing temperatures and decreasing precipitation over time into the future, projected impacts to the species' habitat (e.g., life zone changes) are not expected to be significant within the foreseeable future (Service 2019, p. 69). Recent, yet unpublished, downscaled climate modeling (Bowden 2018, pers. comm.) indicates that higher elevation areas, like those supporting *L. eltoroensis*, may be buffered from the more generally predicted level of precipitation changes. This species has also demonstrated the ability to adapt to changes in its environment. Since the species was listed, warming temperatures have been documented and precipitation levels have decreased, yet the species has demonstrated resiliency. Additionally, following strong hurricanes that affected the species' habitat, abundance has remained stable, with all age classes represented and in good health. While suitable habitat conditions for the species may contract some over the foreseeable future, the species is likely to continue to maintain close to current levels of resiliency, redundancy, and representation. We conclude that there are no existing or potential threats that, either alone or in combination with others (i.e., forest management practices, climate change, and hurricane damage), are likely to cause the species' viability to decline. Thus, after assessing the best available information, we

determine that *L. eltoroensis* is not in danger of extinction now nor likely to become so within the foreseeable future throughout all of its range.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. Having determined that *Lepanthes eltoroensis* is not in danger of extinction or likely to become so within the foreseeable future throughout all of its range, we now consider whether it may be in danger of extinction or likely to become so within the foreseeable future in a significant portion of its range—that is, whether there is any portion of the species' range for which it is true that both (1) the portion is significant; and (2) the species is in danger of extinction now or likely to become so in the foreseeable future in that portion. Depending on the case, it might be more efficient for us to address the “significance” question or the “status” question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species' range.

In undertaking this analysis for *Lepanthes eltoroensis*, we choose to address the status question first—we consider information pertaining to the geographic distribution of both the species and the threats that the species faces to identify any portions of the range where the species is endangered or threatened. *Lepanthes eltoroensis* is a narrow endemic that functions as a single, contiguous population (with a metapopulation structure) and occurs within a very small area (EYNF, Puerto Rico). Thus, there is no biologically meaningful way to break this limited range into portions, and the threats that the species faces affect the species throughout its entire range. This means that no portions of the species' range have a different status from its rangewide status. Therefore, no portion of the species' range can provide a basis for determining that the species is in danger of extinction now or likely to become so in the foreseeable future in a significant portion of its range, and we find the species is not in danger of extinction now or likely to become so in the foreseeable future in any significant portion of its range. This is consistent with the courts' holdings in *Desert Survivors v. Department of the Interior*, No. 16–cv–01165–JCS, 2018 WL

4053447 (N.D. Cal. Aug. 24, 2018), and *Center for Biological Diversity v. Jewell*, 248 F. Supp. 3d, 946, 959 (D. Ariz. 2017).

Determination of Status

Our review of the best available scientific and commercial data indicates that *Lepanthes eltoroensis* does not meet the definition of an endangered species or a threatened species in accordance with sections 3(6) and 3(20) of the Act. Therefore, we are removing *Lepanthes eltoroensis* from the Federal List of Endangered and Threatened Plants.

Effects of This Rule

This final rule revises 50 CFR 17.12(h) to remove *Lepanthes eltoroensis* from the Federal List of Endangered and Threatened Plants. Therefore, revision of the species' recovery plan is not necessary. On the effective date of this rule (see **DATES**, above), the prohibitions and conservation measures provided by the Act, particularly through sections 7 and 9, no longer apply to this species. Federal agencies will no longer be required to consult with the Service under section 7 of the Act in the event that activities they authorize, fund, or carry out may affect *L. eltoroensis*. There is no critical habitat designated for this species.

Post-Delisting Monitoring

Section 4(g)(1) of the Act requires us to monitor for not less than 5 years the status of all species that are delisted due to recovery. Post-delisting monitoring (PDM) refers to activities undertaken to verify that a species delisted due to recovery remains secure from the risk of extinction after the protections of the Act no longer apply. The primary goal of PDM is to monitor the species to ensure that its status does not deteriorate, and if a decline is detected, to take measures to halt the decline so that proposing it as an endangered or threatened species is not again needed. If at any time during the monitoring period data indicate that protective status under the Act should be reinstated, we can initiate listing procedures, including, if appropriate, emergency listing. At the conclusion of the monitoring period, we will review all available information to determine if relisting, the continuation of monitoring, or the termination of monitoring is appropriate.

Section 4(g) of the Act explicitly requires that we cooperate with the States in development and implementation of PDM programs. However, we remain ultimately responsible for compliance with section 4(g) and, therefore, must remain actively

engaged in all phases of PDM. We also seek active participation of other entities that are expected to assume responsibilities for the species' conservation after delisting. The Service has coordinated with PRDNER and USFS on the PDM.

We prepared a PDM plan for *Lepanthes eltoroensis* (Service 2019, entire). We published a notice of availability of a draft PDM plan with the proposed delisting rule (85 FR 13844; March 10, 2020), and we did not receive any comments on the plan. Therefore, we consider the plan final. The plan is designed to detect substantial declines in the species, with reasonable certainty and precision, or an increase in threats. The plan:

- (1) Summarizes the species' status at the time of proposed delisting;
- (2) Defines thresholds or triggers for potential monitoring outcomes and conclusions;
- (3) Lays out frequency and duration of monitoring;
- (4) Articulates monitoring methods, including sampling considerations;
- (5) Outlines data compilation and reporting procedures and responsibilities; and
- (6) Provides a PDM implementation schedule, funding, and responsible parties.

The final PDM plan is available at <https://ecos.fws.gov> and at <http://www.regulations.gov> in Docket No. FWS-R4-ES-2019-0073. It is our intent to work with our partners towards maintaining the recovered status of *Lepanthes eltoroensis*.

Required Determinations

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

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*), need not be prepared in connection with determining a species' listing status under the Endangered Species Act. In an October 25, 1983, notice in the **Federal Register** (48 FR 49244), we outlined our reasons for this determination, which included a compelling recommendation from the Council on Environmental Quality that we cease preparing environmental assessments or environmental impact statements for listing decisions.

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. We have determined that there are no Tribal interests affected by this rule.

References Cited

A complete list of references cited in this rulemaking is available on the internet at <http://www.regulations.gov> under Docket No. FWS-R4-ES-2019-

0073 and upon request from the Caribbean Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this rule are the staff members of the Service's Species Assessment Team and the Caribbean 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.

§ 17.12 [Amended]

- 2. Amend § 17.12(h) by removing the entry for “*Lepanthes eltoroensis*” under FLOWERING PLANTS from the List of Endangered and Threatened Plants.

Martha Williams,

Principal Deputy Director, Exercising the Delegated Authority of the Director, U.S. Fish and Wildlife Service.

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