



DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R1–ES–2019–0013; FF09E22000 FXES11130900000 212]

RIN 1018-BD59

Endangered and Threatened Wildlife and Plants; Removing Bradshaw’s Lomatium (*Lomatium bradshawii*) 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 (Service), remove Bradshaw’s lomatium (*Lomatium bradshawii*, also known as Bradshaw’s desert parsley), a plant found in western Oregon and southwestern Washington, from the Federal List of Endangered and Threatened Plants. Our review of the best available scientific and commercial data indicates that the threats to Bradshaw’s lomatium 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).

DATES: This rule is effective [INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: This final rule is available on the Internet at <http://www.regulations.gov> under Docket No. FWS–R1–ES–2019–0013. Comments and materials we received, as well as supporting documentation we used in preparing this rule, are available for public inspection at <http://www.regulations.gov> under FWS–R1–ES–2019–0013.

FOR FURTHER INFORMATION CONTACT: Paul Henson, State Supervisor, U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, 2600 SE 98th Avenue, Suite 100, Portland, OR 97266; telephone 503–231–6179. If you use a telecommunications device for the deaf

(TDD), please call the Federal Relay Service at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Previous Federal Actions

On November 26, 2019, we published in the *Federal Register* (84 FR 65067) a proposed rule to remove Bradshaw’s lomatium from the List of Endangered and Threatened Plants (i.e., to “delist” the species). Please refer to that proposed rule for a detailed description of the Federal actions concerning this species that occurred prior to November 26, 2019.

Summary of Changes from the Proposed Rule

In response to public comments and in the process of developing this final rule, we have made the following changes from our November 26, 2019, proposed rule (84 FR 65067):

- We added language in the final post-delisting monitoring plan to indicate that additional Bradshaw’s lomatium populations may be visited upon occasion, as time and resources allow, to provide for a “spot check” on the status of additional populations that are outside of the 18 priority sites identified for regular visits during the post-delisting monitoring period. These abbreviated field visits may collect information through assessment of population abundance, photo points, and/or evaluation of management practices and habitat condition.
- We incorporated into the preamble to this final rule mention of the recently developed MOU among the U.S. Army Core of Engineers, the Bureau of Land Management, the Natural Resource Conservation Service and the Service, to provide for the long-term conservation of Bradshaw’s lomatium, regardless of listing status.
- We made minor editorial changes in the preamble of this final rule, including revising our description of how we develop and implement recovery plans, adding additional discussion about which recovery criteria were met, inserting an updated description of our regulatory and analytical frameworks, updating our description of how we determine species status throughout all or a portion of the species’ range, and making minor textual updates to our assessment of Bradshaw’s lomatium’s status throughout a portion of its range.

I. Final Delisting Determination

Background

Status Assessment for Bradshaw's Lomatium

A thorough review of the taxonomy, life history, and ecology of Bradshaw's lomatium is presented in the document "Species Status Assessment Report for Bradshaw's lomatium (*Lomatium bradshawii* (Rose ex. Math.) Mathias & Constance) Version 1.0" (SSA report) (Service 2018), which is available at <http://www.regulations.gov> in Docket No. FWS-R1-ES-2019-0013, under Supporting Documents. The SSA report documents the results of our comprehensive biological status review for Bradshaw's lomatium, and has undergone peer review. The SSA report does not represent any decision by the Service regarding the status of Bradshaw's lomatium under the Act (16 U.S.C. 1531 *et seq.*). It does, however, provide the scientific basis that informed our most recent 5-year status review, which resulted in a recommendation that the species should be removed from the List. The SSA report also served as one of the bases for this final rule and our regulatory decision, which involves the further application of standards within the Act and its implementing regulations and policies.

In this final rule, we present only a summary of the key results and conclusions from the SSA report; the full report is available at <http://www.regulations.gov>, as referenced above.

Summary of the Biology of the Species

Bradshaw's lomatium is a perennial herb in the carrot or parsley family (Apiaceae) that is endemic to wet prairie habitats in western Oregon's Willamette Valley and adjacent southwestern Washington. These seasonally wet habitats may be flooded in the spring, or have soils saturated at or near the surface due to factors such as heavy precipitation in winter and spring, flooding, and poor drainage. A high light environment is important for Bradshaw's lomatium to complete its life cycle and reproduce, as reduced sunlight is associated with lower flower and seed production (Alverson 1993, unpublished data). This species is often associated with tufted hairgrass (*Deschampsia cespitosa*), and frequently occurs on and around the small

mounds created by senescent tufted hairgrass plants. In wetter areas, Bradshaw's lomatium occurs on the edges of tufted hairgrass or sedges in patches of bare or open soil. In drier areas, it is found in low areas, such as small depressions, trails, or seasonal channels, with open, exposed soils. Self-fertilization is rare in Bradshaw's lomatium (Kaye and Kirkland 1994, p. 8), indicating that pollinator-mediated outcrossing is required for reproduction. Over 30 species of solitary bees, flies, wasps, and beetles have been observed visiting the flowers (Kaye 1992, p. 3; Kaye and Kirkland 1994, p. 9; Jackson 1996, pp. 72–76). Bradshaw's lomatium does not reproduce asexually and depends exclusively on seeds for reproduction (Kaye 1992, p. 2), but does not maintain a persistent seed bank in the soil. Although some fruit survives in the soil for 1 year, the seeds are not viable (Kaye *et al.* 2001, p. 1376). Further information on the basic biology and ecology of Bradshaw's lomatium is summarized in the SSA report (Service 2018, entire).

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 must, to the maximum extent practicable, include objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of section 4 of the Act, that the species be removed from the List.

Recovery plans provide a roadmap for us and our partners on methods of enhancing conservation and minimizing threats to listed species, as well as measurable criteria against which to evaluate progress towards recovery and assess the species' likely future condition. However, they are not regulatory documents and do not substitute for the determinations and promulgation of regulations required under section 4(a)(1) of the Act. A decision to revise the status of a species, or to delist a species, is ultimately based on an analysis of the best scientific and commercial data available to determine whether a species is no longer an endangered species

or a threatened species, regardless of whether that information differs from the recovery plan.

There are many paths to accomplishing recovery of a species, and recovery may be achieved without all of the criteria in a recovery plan being fully met. For example, one or more criteria may be exceeded while other criteria may not yet be accomplished. In that instance, we may determine that the threats are minimized sufficiently and that the species is robust enough that it no longer meets the definition of an endangered species or a threatened species. In other cases, we may discover new recovery opportunities after having finalized the recovery plan.

Parties seeking to conserve the species may use these opportunities instead of methods identified in the recovery plan. Likewise, we may learn new information about the species after we finalize the recovery plan. The new information may change the extent to which existing criteria are appropriate for identifying recovery of the species. The recovery of a species is a dynamic process requiring adaptive management that may, or may not, follow all of the guidance provided in a recovery plan.

In 2010, we finalized the revised recovery plan for Bradshaw's lomatium (Service 2010). The recovery plan states that Bradshaw's lomatium could be considered for downlisting to threatened status when there are 12 populations and 60,000 plants distributed in such a way as to reflect the species' historical geographic distribution, when the number of individuals in the populations have been stable or increasing over a period of 10 years, when sites are managed to meet established habitat quality guidelines, when a substantial portion of the species' habitat is protected for conservation, and when populations are managed to ensure maintenance of habitat and to control threats.

The recovery plan states that, in addition to the criteria described above, Bradshaw's lomatium could be considered for delisting when there are 20 populations and 100,000 plants properly distributed, genetic material is stored in a facility approved by the Center for Plant Conservation, and post-delisting monitoring plans and monitoring agreements are in place. Given our current understanding of this species, the criteria addressing abundance, distribution,

and site management and protection are the most important in assessing recovery. Accordingly, these criteria are the basis of our analysis of resiliency, redundancy, and representation, and the focus of the discussion that follows. The remaining two criteria have also been met; genetic material is preserved at the Institute of Applied Ecology seed bank, and post-delisting monitoring plans and agreements are in place (see **Post-Delisting Monitoring**).

To reflect the historical distribution of Bradshaw's lomatium, the species' range was divided into eight recovery zones (Southwest Washington, Portland, Salem West, Salem East, Corvallis West, Corvallis East, Eugene West, and Eugene East), and targets for number of populations and number of plants for each zone were established based on historical presence, to the extent known (Service 2010, pp. IV-1–IV-6, IV-31–IV-34).

Two of the recovery zones (Portland and Salem West) are within the range of Bradshaw's lomatium, but do not have population targets for the species based on a lack of historical occurrence data. These recovery zones were nonetheless retained because if any populations of Bradshaw's lomatium were to be discovered or introduced within these zones, they could be considered as contributing to the recovery criteria for the species (under the category "Additional Populations").

The expression of recovery criteria in terms of population abundance, numbers of populations, and distribution across recovery zones reflects a foundational principle of conservation biology: That there is a positive relationship between the relative viability of a species over time and the resiliency, redundancy, and representation of its constituent populations (Shaffer and Stein 2000, pp. 307–310; Wolf *et al.* 2015, entire). To look at it another way, extinction risk is generally reduced as a function of increased population abundance (resiliency), numbers of populations (redundancy), and distribution or geographic or genetic diversity (representation). The recovery criteria laid out in the recovery plan for Bradshaw's lomatium were, therefore, informative for our review of the status of the species, as that analysis leans upon these measures of viability to assess the current and future status of the species

(Service 2018, pp. 1–2).

The downlisting criteria for number and distribution of populations and numbers of plants were intended to help identify the point at which imminent threats to Bradshaw's lomatium had been ameliorated so that the populations were no longer in immediate risk of extirpation; the delisting criteria for number and distribution of populations and numbers of plants were intended to identify the point at which the species was unlikely to become in danger of extinction. In our analysis, only populations with moderate to high overall condition and with more than 200 plants were considered to have met the recovery criteria, as populations with lower overall condition or abundance were considered too high risk to be counted toward recovery. An estimated 11,276,253 plants in 17 populations meet this standard (Service 2018, p. 39, updated based on Wilderman 2018, entire), an increase from approximately 25,000 to 30,000 individuals in 11 populations at listing in 1988. An additional 1,361 plants, distributed among 7 populations, comprise the grand total number of known Bradshaw's lomatium plants. In total, 24 populations occur on 71 distinct sites that are owned by a mix of Federal, State, and local governments; nongovernmental organizations (NGOs); and private citizens. Multiple sites are considered to be part of the same population when those sites are within a defined pollinator flight distance of 3 kilometers (km) (2 miles (mi)) of each other. The current population estimate is the combined count data from all sites; for some sites the plant count was the result of a full census (54 sites), while for others it was derived by visual estimate or calculated from count subsamples that were then extrapolated over the total area of the site (17 sites). The increase in known populations and number of plants over time is due to a combination of population augmentation and introductions, improved habitat management, and increased survey effort across the range of the species. Bradshaw's lomatium has been the focus of concentrated recovery efforts since it was listed in 1988. We now estimate there are likely more plants across the range of Bradshaw's lomatium than we have accounted for because not all areas of suitable habitat within the range of the species have been surveyed, and recent visits to previously unsurveyed areas have resulted in

the identification of formerly unknown populations (e.g., Service 2018, p. 10).

In our SSA report, we evaluated and ranked the resiliency of each population of Bradshaw's lomatium using the following criteria: (1) Population size, (2) current habitat conditions, (3) protection of the site from development, and (4) site management to restore and maintain appropriate habitat condition. Using these criteria, each population was given a rank of high, moderate, or low condition (Service 2018, pp. 26–30). The resiliency score for each population incorporates the degree to which the primary threats to the species have been addressed at each site as well as recovery criteria (population size and habitat quality), site protection (addressing habitat loss), and site management (addressing woody encroachment and invasive species). For details on evaluation and ranking of population condition, see the SSA report (Service 2018, pp. 26–43).

The table below summarizes our current knowledge of the abundance and distribution of Bradshaw's lomatium relative to the downlisting and delisting criteria presented in the recovery plan for the species (from Service 2018, p. 39, updated based on Wilderman 2018, entire). Because the table below summarizes only the abundance and distribution data for the species, the information in the table must be considered in conjunction with the five-factor analysis of threats to arrive at the status determination for Bradshaw's lomatium.

Summary of recovery goals and current condition of known *Lomatium bradshawii* populations.

Distribution and Abundance of <i>Lomatium bradshawii</i>						
Recovery Zone	Downlisting Goals		Delisting Goals		Current Condition*	
	Minimum Number of Populations per Zone	Target Number of Plants per Zone	Minimum Number of Populations per Zone	Target Number of Plants per Zone	Number of Populations Qualifying Toward Recovery Criteria	Number of Plants in Populations Qualifying Toward Recovery Criteria
OREGON						
Portland	0	0	0	0	0	0
Salem East	1	5,000	2	10,000	3	62,604
Salem West	0	0	0	0	0	0
Corvallis East	2	10,000	3	15,000	3	179,462
Corvallis West	2	10,000	2	10,000	2	17,485
Eugene East	1	5,000	3	15,000	2	34,451
Eugene West	3	15,000	3	15,000	6	191,593
					<i>Subtotal</i>	485,595
WASHINGTON						
Southwest Washington	1	5,000	2	10,000	1	10,790,658
					<i>Subtotal</i>	10,790,658

+ Additional Populations (may occur in any Recovery Zone within the range of <i>Lomatium bradshawii</i>)	2	10,000	5	25,000		
Total	12	60,000	20	100,000	17	11,276,253

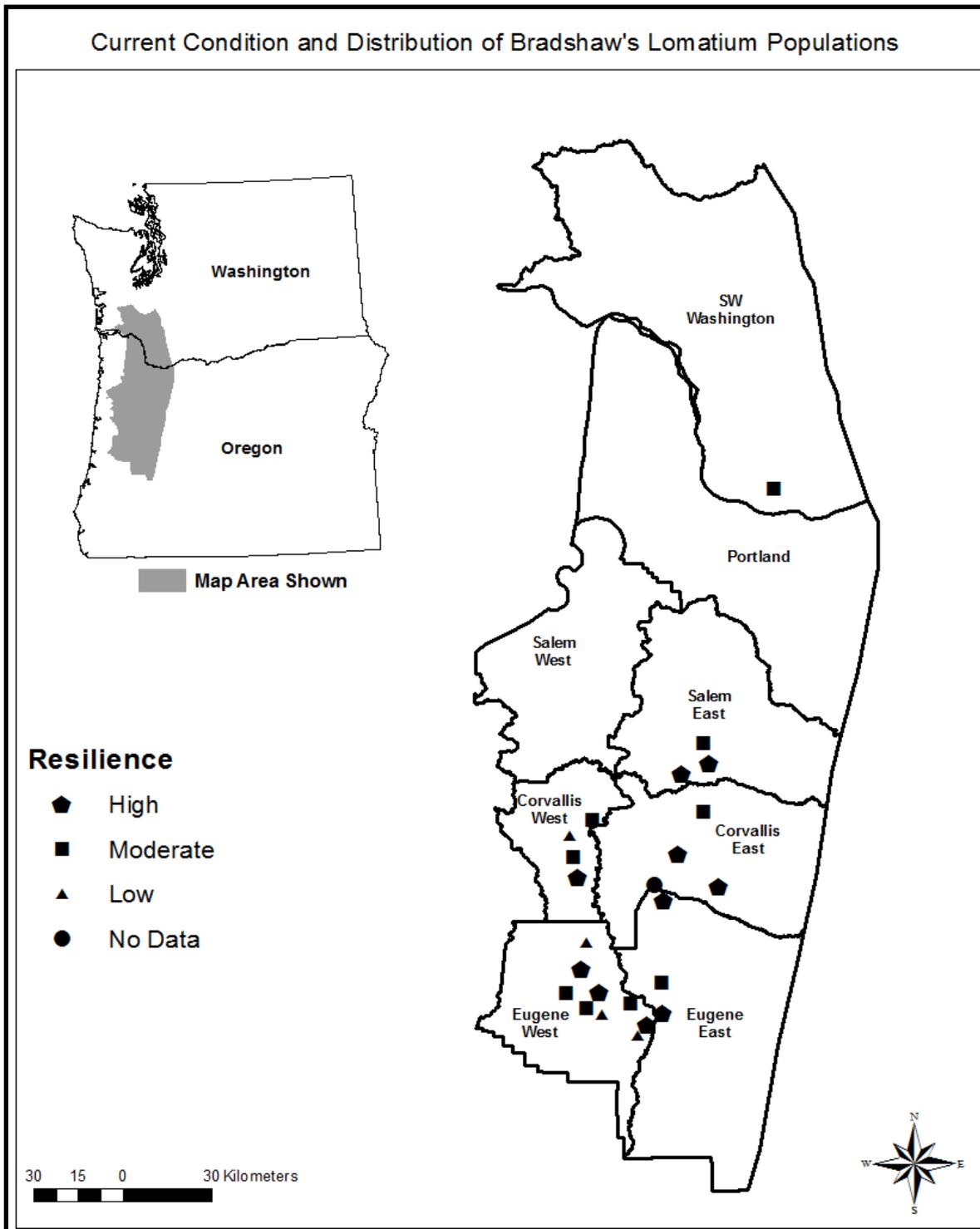
*Recovery zones highlighted in grey meet or exceed the recovery plan downlisting and delisting goals for the number of populations and target number of plants. Only populations with moderate to high overall condition and with more than 200 plants were considered to have met the recovery criteria and so are included in this count, as populations with lower overall condition or number of plants were considered too high risk to count toward recovery. For this reason, the total number of plants reported in this table (those counted for recovery) is not equivalent to the grand total number of plants known to occur throughout the range of the species.

Based on the most recent count, the number of plants counted towards recovery is 11,276,253, with an additional 1,361 plants occurring in populations with fewer than 200 individuals, which we did not count toward recovery. Of the total number of known plants, an estimated 10,790,658 occur in a single population in southwestern Washington. The other approximately 486,956 plants are within 23 populations in Oregon. If we consider only the populations in moderate or high condition, and with more than 200 plants (i.e., those we are counting toward recovery and presented in the table), we estimate there are 485,595 plants within Oregon populations. These populations are distributed from southeast of Salem, Oregon, south to Creswell, Oregon, both east and west of the Willamette River. The greatest density of populations occurs in the southern portion of the Willamette Valley near Eugene, Oregon.

Therefore, the most recent counts of Bradshaw's lomatium identify nearly 500,000 individuals in 23 known populations across the historical range of the species in Oregon and distributed among 69 known sites under various types of land ownership. We considered the abundance and distribution of Bradshaw's lomatium without including the roughly 10.8 million individuals concentrated in a single population (made up of 2 sites) in southwestern Washington to ensure our evaluation considered the abundance and distribution of the species across its entire range and also to ensure our overall evaluation was not unduly influenced by this single extremely large population. Of the 71 known sites, 51 are in public ownership, are within a public right-of-way, or are owned by a conservation-oriented NGO. Of the 20 remaining sites, 9 are under conservation easement or are enrolled in the Service's Partners for Fish and Wildlife Program (Service 2018, pp. 30–35, 36, 38, Appendix A). The remaining 11 sites are on private lands and are not currently under any formal protection agreements.

The figure below shows the results of this assessment across the range of the species. Of the 24 known populations, 4 are in low condition, 9 are in moderate condition, 10 are in high condition, and 1 is in unknown condition due to a lack of data (Service 2018, pp. 36–39). Populations occur in all recovery zones that have population goals. As noted above, the Portland

and Salem West Recovery Zones contain no known current populations, were not assigned specific targets by the Recovery Team, and have no documented historical occurrences of the species within them.



Map of known populations of Bradshaw's lomatium and the eight recovery zones identified for the species in the recovery plan. Resiliency rankings of high, moderate, and low are based on the assessment in our SSA report (Service 2018, pp. 30–35). Note: There are no recovery targets for Portland and Salem West recovery zones.

Based on this information, we conclude Bradshaw's lomatium is much more numerous than at the time of listing and is distributed throughout its known historical range. Across the 23 populations in Oregon, greater than 99 percent of known Bradshaw's lomatium plants are found on sites receiving some degree of protection from development such as public lands, conservancy lands, or private lands with conservation easements (Service 2018, Appendix A). Two sites in southwestern Washington collectively comprise the single largest population of the species with millions of plants. The vast majority of plants in the southwestern Washington population occur on private property that is not under formal protection, but over the years the site has been consistently managed in a manner conducive to supporting the largest population of Bradshaw's lomatium known. The other portion of the population in southwestern Washington, owned by the Washington Department of Natural Resources (WDNR), contains approximately 658 plants. The WDNR has been actively protecting, managing, and augmenting this smaller portion of the southwestern Washington population, and they are currently working to further expand protection at this site. Furthermore, the WDNR is working to conserve the sizeable Bradshaw's lomatium site that is on private land.

Due to ongoing threats from woody encroachment and the spread of nonnative, invasive plants, sites containing Bradshaw's lomatium require regular management to maintain the open prairie conditions that support robust populations. Management activities may include, but are not limited to, herbicide application, mowing, and prescribed fire. Although guarantee of management into perpetuity exceeds the requirements of the Act in evaluating whether a species meets the statutory definition of endangered or threatened, it is necessary to evaluate whether current and expected future management is sufficient to maintain resilient populations of Bradshaw's lomatium into the foreseeable future. Across the range of Bradshaw's lomatium, 75 percent of sites receive some form of management as described above, accounting for greater than 99 percent of known Bradshaw's lomatium plants. Sites receiving management span all

ownership types. Rangewide, 58 percent of sites have a management plan with goals for the conservation of Bradshaw's lomatium, or with goals for maintenance of the wet prairie habitat upon which this species depends. Sites with management plans include those owned by the U.S. Army Corps of Engineers, Bureau of Land Management, the Service, The Nature Conservancy, and privately owned sites covered by the Natural Resources Conservation Service's Wetland Reserve Program (Service 2018, pp. 30–35, Appendix A).

Although not considered as a basis for this delisting, a memorandum of understanding (MOU) among the Bureau of Land Management, the Natural Resources Conservation Service, the U.S. Army Corps of Engineers, and the Service has been developed with the express purpose of providing for the long-term conservation and sustained recovery of Bradshaw's lomatium (Service *et al.* 2020, entire). Together these agencies own or manage at least 35 of the 71 known Bradshaw's lomatium sites. The MOU describes the ongoing commitment of the cooperating management agencies to maintain wet prairie habitats containing Bradshaw's lomatium populations at a sufficient quality to support the resilience of those populations, to the best of their abilities, irrespective of any change in the species' legal status and its standing under the Act. This MOU did not enter into our consideration of the delisting of Bradshaw's lomatium. However, it is added evidence of the strength of the ongoing collaborative efforts of conservation partners dedicated to the recovery of the native prairie species and ecosystems of the Willamette Valley.

These and other data that we analyzed indicate that most threats identified at listing and in the recovery plan are reduced in areas occupied by Bradshaw's lomatium. The status of the species has improved primarily due to: (1) Discovery of previously unknown populations; (2) reestablishment and augmentation of populations over the 30 years since the species was listed; (3) improvement in habitat management; and (4) an increase in protection from development.

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 delisting (removal from the Federal Lists of Endangered and Threatened Wildlife and Plants) or downlisting (reclassification from endangered to threatened) a species (see 50 CFR 424.11(c) through (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 we can reasonably determine that both the future threats and the species’ responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. “Reliable” does not mean “certain”; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

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

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an assessment of the potential threats to the species. The SSA report does not represent our decision on whether the species should be downlisted 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 Docket FWS–R1–ES–2019–0013 on <http://www.regulations.gov>.

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

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated the individual species' life-history needs. The next stage involved an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involved making predictions about the species' responses to positive and negative

environmental and anthropogenic influences. Throughout all of these stages, we used the best available information to characterize viability as the ability of a species to sustain populations in the wild over time. We use this information to inform our regulatory decision.

Summary of Biological Status and Threats

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

We consider 25 to 50 years to be a reasonable period of time within which reliable predictions can be made for potential stressors and responses for Bradshaw's lomatium. This period of time is sufficient to observe population trends for the species, based on its life history characteristics, and captures the terms of many of the management plans that are in effect at Bradshaw's lomatium sites; it is also the length of time over which we conclude we can make reliable prediction about the anticipated effects of climate change. Although information exists regarding potential impacts from climate change beyond a 50-year timeframe, the projections depend on an increasing number of assumptions, and thus become more uncertain with increasingly long timeframes. We, therefore, use a maximum timeframe of 50 years to provide the best balance of scope of impacts considered versus the certainty of those impacts being realized.

At the time of listing, the primary threats to Bradshaw's lomatium were habitat loss due to land use conversion for agriculture or urbanization and the invasion of prairie vegetation by various woody plant species (53 FR 38449–38450; September 30, 1988). The listing rule did not find that overutilization for commercial, recreational, scientific, or educational purposes posed a threat to Bradshaw's lomatium. The listing rule noted that several parasitic organisms (a fungus, spittle bug, and two aphids) could potentially have negative effects on smaller, stressed populations of the plant (but not the species as a whole) and questioned whether inbreeding depression might pose a threat to the species since the populations known at the time appeared to

be small and isolated from one another. The rule noted that further study was required to determine the significance of any such threats. Finally, the listing rule noted that State and Federal regulations existing at the time did not adequately protect the plant from habitat loss or other potential threats (53 FR 38450; September 30, 1988). By the time the recovery plan was developed in 1993, these same threats were still considered relevant (Service 1993, p. 12). There are three potential threats that were either not known or considered at the time of listing: (1) Competition from nonnative, invasive plant species; (2) potential impacts resulting from the effects of climate change; and (3) predation by voles (*Microtus* spp.), which has been observed within Bradshaw's lomatium sites. Subsequently, we conducted a 5-year status review based on the SSA report for Bradshaw's lomatium that includes an analysis of all factors known to affect the viability of the species (Service 2018, entire).

As discussed in our 2018 SSA report, the threat of habitat loss from land conversion for agriculture and urbanization has decreased since the time of listing due to land protection efforts. Although a few privately owned sites are still at risk, land use conversion is no longer considered a significant threat to the viability of Bradshaw's lomatium due to the number of sites now receiving some degree of protection from development (Service 2018, pp. 36–39, Appendix A). In Oregon, which supports 23 of the 24 known populations of the species, greater than 99 percent of known Bradshaw's lomatium plants occur on sites protected through public or NGO ownership, through designation as a right-of-way, or by conservation easements on private lands. In Washington, one of two sites that support Bradshaw's lomatium is owned by the WDNR, and the State is actively working toward the conservation of the very large adjacent site that supports the majority of known individuals of the species. As the threat posed to Bradshaw's lomatium from habitat loss is no longer considered significant, we additionally no longer consider State or Federal protections to be inadequate to address this threat.

The present threat to Bradshaw's lomatium from modification of habitat due to invasion of prairies by nonnative, invasive plants and by woody species has been reduced in many

populations due to active habitat management using herbicides, mowing, and prescribed fire, but ongoing habitat management is required to maintain these improvements. As noted above, across the range of Bradshaw's lomatium, 75 percent of the known sites receive active management that benefits the species, and 58 percent of total sites have a management plan in place with goals for the conservation of Bradshaw's lomatium, or for maintenance of the wet prairie habitat upon which it depends (Service 2018, pp. 36–39, Appendix A). Based on the high proportion of sites protected or managed, the history of positive management observed to date, and ongoing efforts to further restore and protect wet prairie habitats, we have confidence that management of Bradshaw's lomatium sites will continue to provide adequate protection to the species in the long term. This confidence is affirmed by the MOU committing to long-term conservation of Bradshaw's lomatium on Federal lands regardless of its listing status. We found no evidence that negative impacts due to parasitic organisms constitute a threat to the viability of Bradshaw's lomatium. Predation by voles appears to vary year to year, and can substantially reduce aboveground biomass and reproduction in years when vole abundance is high. However, the effect on populations is estimated to be minimal over time as long as there is sufficient time for Bradshaw's lomatium to regenerate taproot reserves between vole outbreaks (Drew 2000, pp. 54–55), and no consistent long-term declines attributable to vole predation have been reported (Service 2018, p. 20).

Concerns over the possibility of inbreeding depression expressed at the time of listing are now reduced due to a subsequent study indicating that overall genetic diversity in Bradshaw's lomatium is relatively high for a rare species (Gitzendanner and Soltis 2001, pp. 352–353), and is greater than that found in other rare *Lomatium* species (Gitzendanner and Soltis 2000, p. 787), although the most disjunct population in southwestern Washington showed relatively lower genetic diversity than less geographically isolated populations (Gitzendanner and Soltis 2001, p. 353). The threat of inbreeding depression is further considered reduced since we now understand Bradshaw's lomatium to be primarily an outcrossing species (which promotes increased genetic

diversity), rather than an obligate self-pollinating species as was believed at the time of listing (Service 2018, pp. 7, 20).

The potential threat posed to Bradshaw's lomatium from the effects of climate change is difficult to predict. The primary threat to the species from the effects of climate change is likely reduced moisture availability due to warmer temperatures and alterations to precipitation patterns resulting in increased evapotranspiration (Bachelet *et al.* 2011, p. 414 ;Steel *et al.* 2011, pp. 43; Kaye *et al.* 2013, p. 18. The vulnerability of Bradshaw's lomatium to the effects of climate change, assessed over a range of potential future emissions scenarios, has been ranked as anywhere from low to moderate (Steel *et al.* 2011, pp. 25, 89) to highly vulnerable (Kaye *et al.* 2013, p. 20). Possible effects of climate change on Bradshaw's lomatium include increased reproduction after increased early precipitation, temporal shifts in life cycle completion to earlier in spring (earlier germination and seed set), increased mortality, and decreased recruitment (USFWS 2018, p. 43). We assessed the potential impacts of climate change on Bradshaw's lomatium projected out over a period up to 50 years in the future. Published assessments provide only qualitative appraisals of the potential response of Bradshaw's lomatium to the effects of climate change; therefore, we characterized a "worst case" future scenario in terms we could use in our analysis of future condition. In consultation with species experts and conservation partners, we defined the worst case scenario as one where increased mortality and decreased recruitment culminate in a 50 percent reduction of all populations. We considered this to be a conservative approach, in that the actual effects on populations size are likely to be more moderate. Even in the face of such a severe population reduction, the species is anticipated to remain viable as indicated by appreciable levels of resiliency, redundancy, and representation. We estimated that populations currently in low condition or with very low abundance may be extirpated due to the combined effects of climate change impacts and stochastic events; this translated to an estimated loss of up to five small populations, with other populations reduced in size. However, even with a presumed 50 percent reduction in abundance, at least 14 to 16

populations of Bradshaw's lomatium in moderate or high condition are expected to remain on the landscape with ongoing management. We do not anticipate any significant effect on representation, that is, the ability of the species to adapt to changing environmental conditions over time (Service 2018, pp. 42–46).

Cumulative Impacts

When multiple stressors co-occur, one may exacerbate the effects of the other, leading to effects not accounted for when each stressor is analyzed individually. The full impact of these synergistic effects may be observed within a short period of time or may take many years before they are noticeable. For example, high levels of predation on Bradshaw's lomatium during vole outbreaks can cause large temporary population declines but are not generally considered a significant threat to long-term viability; populations that are relatively large and well-distributed should be able to withstand such naturally occurring events. However, the relative impact of predation by voles may be intensified when outbreaks occur in conjunction with other factors that may lessen the resiliency of Bradshaw's lomatium populations, such as prolonged woody species encroachment; extensive nonnative, invasive plant infestations; or possible hydrological alterations resulting from the effects of climate change.

Although the types, magnitude, or extent of potential cumulative impacts are difficult to predict, we are not aware of any combination of factors that is likely to co-occur with significant negative consequences for the species. We anticipate that any negative consequence of co-occurring threats will be successfully addressed through the same active management actions that have contributed to the ongoing recovery of Bradshaw's lomatium and that are expected to continue into the future. The best scientific and commercial data available indicate that Bradshaw's lomatium is composed of multiple populations, primarily in moderate to high condition, which are sufficiently resilient, well distributed, protected, and managed such that they will be robust in the face of potential cumulative effects to which they may be exposed.

Overall, we conclude that under current conditions, most populations of Bradshaw's

lomatium are resilient, because they have abundant numbers of individuals. There are redundant populations of Bradshaw's lomatium, meaning that multiple populations occur in most recovery zones, indicating that the species has the ability to minimize potential loss from catastrophic events. The concern at the time of listing about a possible genetic bottleneck has been alleviated by genetic studies demonstrating that Bradshaw's lomatium has relatively high genetic diversity for a rare species. Also, with populations distributed across the known historical range of the species (Service 2018, p. 40), Bradshaw's lomatium has likely retained much of its adaptive capacity (i.e., representation). We also considered the potential future conditions of Bradshaw's lomatium, taking into account the current condition and additional stressors not considered at the time of recovery plan development (e.g., the effects of climate change). Projecting 25 to 50 years into the future, under a conservative estimate that conditions could potentially worsen such that all existing populations are reduced by half, the species would retain its resiliency and redundancy. With an estimated 14 to 16 populations in moderate or high condition expected to remain on the landscape with ongoing management, representation was not anticipated to be affected (Service 2018, p. 44). As noted earlier, the degree to which threats to the species have been successfully addressed is incorporated into the evaluation of population resiliency at each site (i.e., site protection and management actions were considered in the scoring of each population's current condition; Service 2018, p. 28). The continuation of these conservation measures was an assumption of our projection.

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. Our assessment of the current and future conditions encompasses and incorporates the threats individually and cumulatively. Our current and future condition assessment is iterative because it 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.

See the SSA report (Service 2018, entire) for a more detailed discussion of our evaluation of the biological status of Bradshaw's lomatium and the influences that may affect its continued existence. Our conclusions are based upon the best available scientific and commercial data and the expert opinions of the species status assessment team members.

Summary of Comments and Recommendations

In the proposed rule published in the *Federal Register* on November 26, 2019 (84 FR 65067), we requested that all interested parties submit written comments on our proposal to delist Bradshaw's lomatium by January 27, 2020. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal. Newspaper notices inviting general public comment were published in *The Oregonian*. We did not receive any requests for a public hearing. All substantive information provided during the comment period has either been incorporated directly into this final rule or is addressed below.

Public Comments

We received three comments from the public on our November 26, 2019, proposed rule. One of these generally opposed the delisting of Bradshaw's lomatium but did not provide substantive comments to respond to or address. The remaining two provided substantive comments on the proposed rule or the draft post-delisting monitoring plan, and are addressed below.

Comment (1): One commenter expressed concerns that Federal delisting of Bradshaw's lomatium would likely result in a petition for State delisting as well, resulting in a potential threat from the inadequacy of regulatory mechanisms to require habitat maintenance for the

species (Factor D). The commenter states that habitat management benefitting this conservation-reliant species may not necessarily continue after delisting, which would again expose populations of Bradshaw's lomatium to the threat of habitat degradation through encroachment of woody vegetation and nonnative plants. In particular, the commenter argued that if only 58 percent of total sites have a management plan with conservation goals for Bradshaw's lomatium or wet prairie habitat, a "worst case" future scenario could leave the remaining 42 percent of sites unmanaged, or under-managed, in terms of habitat maintenance. Overall, the commenter suggested that more measures are needed to formalize the commitment of landowners to continue Bradshaw's lomatium habitat management efforts to ensure habitat for the species remains protected from degradation following delisting, with particular emphasis on non-Federal public sites and the large population in Washington.

Our Response: Our evaluation of the level of protection and active management provided to populations of Bradshaw's lomatium, required to effectively ameliorate the threat of habitat degradation now and into the future, was one of our primary considerations in determining the appropriate status of the species. As described in the November 26, 2019, proposed rule (84 FR 65067) and in Appendix A of the SSA report, our information indicates that in Oregon, where 69 of the 71 sites of Bradshaw's lomatium are found, nearly 99 percent of Bradshaw's lomatium individuals now receive protection from further habitat loss and fragmentation due to land ownership by Federal, State, or other public entities, or by NGOs, or due to protections through management agreements or conservation easements on private lands. Nearly all of these management commitments are long-term or perpetual (61), and the short-term management agreements (8) are renewable. Of the 71 total known sites, 51 are in public ownership and 9 have either a conservation easement or Partners for Fish and Wildlife agreement in place. There are only 11 sites on privately owned lands without a formal agreement in place, but even without formal protections, several of these are managed such that they provide habitat for Bradshaw's lomatium, and they support relatively few plants overall. The 58 percent of sites with a

management plan mentioned by the commenter refers only to those sites that have a plan specific to Bradshaw's lomatium or the maintenance of wet prairie habitat; even without such a plan, many of these sites do have management plans, and the majority of sites experience some degree of habitat protection and management that benefits the species, even if that benefit is incidental to, and not focused specifically on, Bradshaw's lomatium. Based on all of these considerations, we do not foresee a future in which it is likely that up to 42 percent of sites would be unmanaged or under-managed, as the commenter suggests.

The largest single population of Bradshaw's lomatium plants, located in southwestern Washington, is privately owned, and WDNR continues to actively pursue avenues for the perpetual conservation and management of this site. However, as noted above and as described earlier in this document, even without formal protections, the regular mowing that occurs at this site on a consistent basis year after year has provided for the most vast and robust population of the species known, the owners have voluntarily placed signs to alert the public to the presence of the plant, and the site faces no known threats.

The fact that the majority of Bradshaw's lomatium sites are in some form of public or NGO ownership, or under conservation easement or other agreement, gives us confidence that appropriate habitat management is likely to continue into the foreseeable future. The MOU committing to long-term conservation of Bradshaw's lomatium on Federal lands regardless of its listing status, recently developed by the U.S. Army Corps of Engineers, Bureau of Land Management, Natural Resources Conservation Service, and the Service, which collectively own or manage at least 35 of the 71 known Bradshaw's lomatium sites, further adds to this confidence (Service *et al.* 2020, entire). As noted above, this MOU did not enter into our consideration of the potential delisting of Bradshaw's lomatium. However, it offers further support for our confidence in the strength of the established conservation alliances for the preservation of prairie species and ecosystems in the Willamette Valley, and the likelihood that these efforts are likely to continue. Monitoring under the post-delisting monitoring plan (see our

response to *Comment (2)*, below) is designed to confirm that appropriate management continues and that degradation of habitat for the species does not follow delisting.

Details about the State of Oregon's criteria for delisting plants from the State Endangered Species List can be found in Oregon Administrative Rule (OAR) 603-073-0030. Under this OAR, when a plant is removed from the Federal list, it is not automatically removed from the State list, but must undergo review if delisting is initiated. This review process can take years. Removal from the State list is, therefore, not necessarily imminent. In addition, the habitat protections afforded listed plants by both Federal and State laws are limited. Under the provisions of both the Act and Oregon State law (see OAR 603-073-0090 and Oregon Revised Statute (ORS) 564.120), listed plants are protected by prohibitions from certain activities (for example, cutting, digging, damaging, destroying; transport and sale) but nothing in either law requires the maintenance of habitat for listed plants. We, therefore, would not expect State delisting of Bradshaw's lomatium to have much practical effect on the maintenance of habitat for the species or protection from habitat degradation.

After the protections of the Act no longer apply, we are planning for a 6-year post-delisting monitoring period to ensure Bradshaw's lomatium's status does not deteriorate. If a substantial decline in the species (numbers of individuals or populations) or an increase in threats is detected during that period, we will implement measures to halt the species' decline so that re-proposing it as an endangered or threatened species is not needed. The objective of the post-delisting monitoring plan is to verify that Bradshaw's lomatium remains secure from the risk of extinction after the protections of the Act have been removed. The plan is specifically designed to detect any significant declines in Bradshaw's lomatium populations, should any occur, with reasonable certainty and precision (see also our response to *Comment (2)*, below).

Comment (2): One commenter expressed concerns that the draft post-delisting monitoring plan prioritizes monitoring of only 18 sites, or about 25 percent of all known sites, which could leave the status of most sites unknown and possibly allow a serious decline in critical

populations to be missed. The commenter recommended including more sites, and choosing those sites based on their recovery value; including smaller, more vulnerable populations that play an important role in terms of species viability (redundancy or representation) as a priority for monitoring; and prioritizing sites for monitoring that lack management plans or are otherwise at high risk of being threatened following delisting. With regard to some of the smaller populations that are contributing to recovery, the commenter suggested that population trend information be presented in addition to measures of plant abundance.

In addition, this commenter suggested expedited site visits to additional lower priority sites after delisting. These visits could include collection of data that is informative but less time-consuming to collect, such as identifying whether management is continuing, identifying whether flowering plants are present, photo monitoring, and estimating population size-class.

Our Response: Monitoring a representative subsample of sites as outlined in the draft post-delisting monitoring plan will give us an early indication if declines are occurring or if threats such as habitat degradation are resurgent. Limited resources preclude our ability to completely survey all of the known Bradshaw's lomatium sites each year; thus, we endeavored to craft a post-delisting monitoring plan that would effectively capture trends in population size, habitat quality, and management direction across a representative sample of sites.

The 18 priority sites for post-delisting monitoring have been selected to represent the full geographic range of the species, a variety of ownerships (informative regarding habitat management; see below), and a range of population sizes. We specifically designed post-delisting monitoring to address whether, and what type of, management has occurred on the site in the previous year, as well as the ownership status of the site, precisely because Bradshaw's lomatium is a conservation-reliant species and is so dependent on appropriate habitat management. Conservation programs offered through the Service's Partners for Fish and Wildlife Program and various Farm Bill programs administered through the Natural Resources Conservation Service will continue to be available to private landowners for the long-term

maintenance and protection of important Bradshaw's lomatium populations on private lands after the species is delisted. As described in the post-delisting monitoring plan, a 6-year post-delisting monitoring period will provide time for sites to undergo two to three management cycles, allowing monitoring efforts to identify potential deficiencies in management outcomes.

The sites chosen for monitoring include representation from all of the recovery zones across the range of the species, different land ownerships, and different population sizes (ranging from as few as 83 individuals to nearly 75,000). The monitoring history of sites was an important consideration in their selection for post-delisting monitoring; to the extent possible we chose sites that have already been monitored for long periods of time and have established population trends, which allows us to build on this existing data set and provides a more robust analysis of trend information post-delisting. The plan calls for post-delisting monitoring to follow methods previously used at each site so that reliable long-term trends can be determined based on standardized data collection.

Of the 18 sites, 4 are privately owned, and only 2 of those are without conservation and management agreements. Fourteen of the 18 sites are on Federal, State, municipal, or other conservation ownership with active management plans. The 18 priority sites are just that: the priority sites for monitoring. Additional sites may be monitored as resources allow, and the post-delisting monitoring plan specifically allows for future modification as needed or appropriate. We have incorporated the commenter's recommendation to add expedited site visits and abbreviated data collection at additional sites as time and opportunity allows, which would provide for an occasional check on the status of other Bradshaw's lomatium populations, into our final post-delisting monitoring plan.

Through the implementation of the post-delisting monitoring plan, the implementation of the aforementioned MOU, and the continued work of the various native plant work groups and conservation partnerships focused on the recovery of native plants, we conclude that sufficient monitoring is in place to detect any significant changes in the populations of Bradshaw's

lomatium. If data show that the species is declining, or if one or more factors that have the potential to cause a decline are identified, we may continue monitoring beyond the 6-year period and modify the post-delisting monitoring plan based on an evaluation of the results, or reinstate listing if necessary.

Section 4(g)(2) of the Act directs the Service to make prompt use of its emergency listing authorities under section 4(b)(7) of the Act to prevent a significant risk to the well-being of any recovered species. While not specifically mentioned in section 4(g) of the Act, authorities to list species in accordance with the process prescribed in sections 4(b)(5) and 4(b)(6) of the Act may also be used to reinstate species on the List, if warranted.

Determination of Bradshaw's Lomatium's Status

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

Status Throughout All of Its Range

After evaluating threats to the species and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we found that the known range of Bradshaw's lomatium was considered dramatically reduced when we listed it as an endangered species in 1988; at that time, we estimated that there were 11 small populations that included a total of roughly 25,000 to 30,000 individuals. In addition, the species faced threats from habitat loss due to land conversion

for agriculture and urbanization, as well as natural succession to woody species dominance due to loss of historical disturbance regimes. As such, the species was perceived to be upon the brink of extinction. Bradshaw's lomatium has been the subject of intensive recovery efforts since it was listed under the Act 30 years ago, and the discovery of new, previously unknown populations; success in augmentation and habitat restoration and management efforts; and the protection of Bradshaw's lomatium populations and habitats on public lands and on private lands through conservation easements and management agreements with NGOs and other parties have led to a significant reduction in threats and improvement in the status of the species since listing.

Recovery goals for delisting Bradshaw's lomatium were set at a minimum of 20 populations with a total of 100,000 individual plants distributed across the species' historical range. Under current conditions, 24 populations of Bradshaw's lomatium are distributed throughout the species' historical range; if we consider only those populations in high or moderate condition and containing at least 200 individuals as contributing to recovery, 17 such populations occur throughout the range of the species (see table, above). Considering only those 17 populations in high or moderate condition and with greater than 200 plants, the most recent counts demonstrate an estimated 485,595 known individuals are distributed throughout the historical range of the species (this count does not include the southwestern Washington population to ensure our evaluation was not unduly influenced by this single extremely large population).

Our analysis of current population condition on the basis of plant abundance, habitat quality, management, and protection from development resulted in rankings of 10 populations in high condition overall, 9 populations in moderate condition, and 4 populations in low condition. Therefore, we are significantly less concerned about small population sizes or limited distribution of the species than we were at the time of listing. The increase in known populations is due in large part to increased survey efforts and incidental discovery of more occupied habitat, leaving open the potential of finding even more populations of Bradshaw's lomatium in the

future.

Acquisition by conservation NGOs, or enrollment into conservation easement programs, of sites containing Bradshaw's lomatium populations has substantially reduced the risk of habitat and population losses due to land use conversion (Factor A). In addition, population augmentation or introduction, combined with ongoing active management of woody encroachment and of nonnative, invasive plant infestations, has ameliorated the threat posed by these processes (Factor A) and increased the resilience of many Bradshaw's lomatium populations on protected sites. Other potential threats identified at the time of listing have either never materialized (parasitism by other organisms (Factor C), negative effects of inbreeding depression (Factor E)) or have been addressed through other means (i.e., habitat protections and management, addressing Factor D).

Since listing, we have become aware of the potential for the effects of climate change (Factor E) to affect organisms and ecosystems, including potentially Bradshaw's lomatium. We considered the potential consequences of climate change and evaluated a range of future scenarios, including one with up to a 50 percent reduction in the size of all known populations across the range of the species. Even in the face of such a severe population reduction, the species retained appreciable levels of resiliency, redundancy, and representation such that we do not consider the effects of climate change to pose a threat such that it would place the species at risk of extinction in the future (Service 2018, pp. 42–46). To be conservative, our analysis of future conditions did not consider that ongoing efforts to improve population sizes and habitat quality have the potential to further increase the number of resilient populations of Bradshaw's lomatium. Many stressors to the species are being addressed through habitat management and population augmentation, but ongoing management is necessary to maintain resilient populations throughout the species' range.

In sum, significant impacts at the time of listing such as habitat loss due to land use conversion and woody encroachment that could have resulted in the extirpation of all or parts of

populations have been either eliminated or reduced since listing. An assessment of likely future conditions, including the status of known stressors, management trends, and possible impacts of climate change, finds that although populations may decline in abundance, at least 14 to 16 populations across the range of the species are expected to maintain high or moderate resiliency over a timeframe of 25 to 50 years into the future (Service 2018, pp. 42–46). We, therefore, conclude that the previously recognized impacts to Bradshaw’s lomatium from present or threatened destruction, modification, or curtailment of its habitat or range (specifically, habitat development for agriculture or urbanization and invasion of prairie vegetation by various woody plant species) (Factor A); disease or predation (specifically, parasitism by insects and predation by voles) (Factor C); the inadequacy of existing regulatory mechanisms (Factor D); and other natural or manmade factors affecting its continued existence (specifically, genetic isolation, inbreeding depression, and the effects of climate change) (Factor E) do not rise to a level of significance, either individually or in combination, such that the species is in danger of extinction now or likely to become so within the foreseeable future. Overutilization for commercial, recreational, scientific, or educational purposes (Factor B) was not a factor in listing and based on the best available information, we conclude that it does not constitute a threat to Bradshaw’s lomatium now or in the foreseeable future. The Service recognizes that woody encroachment and nonnative, invasive plant species are stressors with ongoing impacts to Bradshaw’s lomatium, but finds that current and expected trends in site protection and habitat management are sufficient to prevent these stressors from constituting a threat to the species such that it would meet the definition of an endangered species or a threatened species. Thus, after assessing the best available information, we determine that Bradshaw’s lomatium is not in danger of extinction now or likely to become so in the foreseeable future throughout all of its range.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a

significant portion of its range. Having determined that Bradshaw's lomatium is not in danger of extinction or likely to become so in the foreseeable future throughout all of its range, we now consider whether it may be in danger of extinction or likely to become so in the foreseeable future in a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant, and (2) the species is in danger of extinction 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 Bradshaw's lomatium, 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. We considered whether the threats to Bradshaw's lomatium are geographically concentrated in any portion of the species' range at a biologically meaningful scale. We examined the following threats: Habitat loss from land conversion or invasion of prairies by nonnative, invasive, and woody species; parasitic organisms; predation by voles; inadequate State or Federal protections; inbreeding depression; climate change; and the cumulative effects of these threats.

The threat of habitat loss from land conversion and invasion of prairies by nonnative, invasive, and woody species has decreased in all portions of the range since the time of listing, due to land protection efforts and active habitat management. Of the two sites that comprise the sole population of Bradshaw's lomatium in southwestern Washington, one is located on a privately owned golf course and contained approximately 10.8 million Bradshaw's lomatium plants at the most recent survey. This site currently has high-quality habitat. Current management at the site, as in past years, supports open, wet prairie conditions (Service 2018, pp. 29, 57), primarily through mowing. Although no formal protections are in place that would

prevent future development, we have no information to indicate that it is likely the site would be developed or that habitat management will change in any way that would substantially impact Bradshaw's lomatium. In addition, the areas occupied by Bradshaw's lomatium are within wetlands, which may have protections from development under State or Federal law. Based on the current protections of the other Washington site, a preserve owned and managed by the WDNR, the lack of any present threat of destruction or degradation at the privately owned golf course site, and ongoing appropriate management at both sites, we have confidence that habitat at these sites will continue to support Bradshaw's lomatium for the foreseeable future. In Oregon, greater than 99 percent of known Bradshaw's lomatium plants occur on sites protected through public or NGO ownership, through designation as a right-of-way, or by conservation easements on private lands. Rangelwide, 75 percent of the known sites receive active management that benefits the species. Thus, we have found no evidence that the present or threatened destruction, modification, or curtailment of habitat (Factor A) is concentrated within any portion of Bradshaw's lomatium's range, or will be within the foreseeable future.

We found no evidence that negative impacts due to parasitic organisms constitute a threat to the viability of Bradshaw's lomatium in any part of its range, now or in the foreseeable future.

Predation by voles appears to vary year to year and can substantially reduce aboveground biomass and reproduction of Bradshaw's lomatium in years when vole abundance is high. However, the effect on populations is found to be minimal over time, as long as there is sufficient time for Bradshaw's lomatium to regenerate taproot reserves between vole outbreaks (Drew 2000, pp. 54–55), and no consistent long-term declines attributable to vole predation have been reported (Service 2018, p. 20). The best available information does not indicate that predation is concentrated with any portion of the range of Bradshaw's lomatium, or will be within the foreseeable future (Factor C).

Current State and Federal protections appear adequate to address the loss of Bradshaw's lomatium habitat throughout its range, and we do not foresee changes to these protections in the

foreseeable future (Factor D). As described above, we do not consider habitat loss to be concentrated within any portion of its range. Of the two known sites containing Bradshaw's lomatium in southwestern Washington, one is protected through ownership by the WDNR. Although the second, larger site lacks formal protection, it faces no currently known threat of habitat loss or degradation, either now or within the foreseeable future. Additionally, the WDNR continues to make efforts to provide additional conservation at the site. Bradshaw's lomatium remains listed as endangered by the State of Washington.

Concerns over the possibility of inbreeding depression expressed at the time of listing are now reduced due to a subsequent study indicating that overall genetic diversity in Bradshaw's lomatium is relatively high for a rare species (Gitzendanner and Soltis 2001, pp. 352–353), and is greater than that found in other rare *Lomatium* species (Gitzendanner and Soltis 2000, p. 787). Although the most disjunct population in southwestern Washington showed relatively lower genetic diversity than less geographically isolated populations (Gitzendanner and Soltis 2001, p. 353), the threat of inbreeding depression is considered reduced, as we now understand Bradshaw's lomatium to be primarily an outcrossing species (which promotes increased genetic diversity), rather than an obligate self-pollinating species as was believed at the time of listing (Service 2018, pp. 7, 20). We have no information indicating that inbreeding depression constitutes a threat to the viability of Bradshaw's lomatium in any part of its range, now or in the foreseeable future.

In our SSA report, we assessed the potential impacts of climate change on Bradshaw's lomatium projected up to 50 years in the future, and conservatively evaluated a future scenario in which the potential negative effects of climate change were such that all populations were reduced in size by up to 50 percent. Under such a scenario, we estimated that populations currently in low condition or with very low abundance may be extirpated due to the combined effects of climate change impacts and stochastic events; this translated to an estimated loss of up to five small populations, with other populations reduced in size. However, even with a

presumed 50 percent reduction in abundance, at least 14 to 16 populations of Bradshaw's lomatium in moderate or high condition are expected to remain throughout the range with ongoing management. We, therefore, have no information to indicate that other natural or manmade factors pose a threat to the continued existence of Bradshaw's lomatium (Factor E), now or within the foreseeable future, in any portion of the range.

Although the types, magnitude, or extent of potential cumulative impacts are difficult to predict, we are not aware of any combination of factors that are likely to co-occur with significant negative consequences for the species within any portion of its range. We anticipate that any negative consequence of co-occurring threats will be successfully addressed through the same active management actions that have contributed to the ongoing recovery of Bradshaw's lomatium and that are expected to continue into the future.

We found no concentration of threats in any portion of Bradshaw's lomatium's range at a biologically meaningful scale. 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 information indicates that Bradshaw's lomatium 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 Bradshaw's lomatium from the List of Endangered and Threatened Plants.

Effects of This Rule

This rule revises 50 CFR 17.12(h) to remove Bradshaw's lomatium from the Federal List

of Endangered and Threatened Plants. 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, and Federal agencies are no longer 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 Bradshaw's lomatium. There is no critical habitat designated for this species, so there will be no change to 50 CFR 17.96.

Post-Delisting Monitoring

Section 4(g)(1) of the Act requires the Secretary of the Interior, through the Service and in cooperation with the States, to implement a monitoring program for not less than 5 years for all species that no longer meet the definition of endangered or threatened and, therefore, have been delisted. The purpose of this post-delisting monitoring is to verify that a species remains secure from risk of extinction after the protections of the Act have been removed. The monitoring is designed to detect the failure of any delisted species to sustain itself without the protective measures provided by the Act. If, at any time during the monitoring period, data indicate that the protective status under the Act should be reinstated, we can initiate listing procedures, including, if appropriate, emergency listing under section 4(b)(7) of the Act. Section 4(g) of the Act explicitly requires us to cooperate with the States in post-delisting monitoring programs, but we remain responsible for compliance with section 4(g) of the Act and, therefore, must remain actively engaged in all phases of post-delisting monitoring. We also seek active participation of other entities that are expected to assume responsibilities for the species' conservation post-delisting.

We prepared a post-delisting monitoring plan for Bradshaw's lomatium. The plan discusses the current status of the species and describes the methods for monitoring the species subsequent to its removal from the Federal List of Endangered and Threatened Plants. The final post-delisting monitoring plan is available at <http://www.regulations.gov> under Docket No. FWS-R1-ES-2019-0013. We will work closely with our partners to maintain the recovered

status of Bradshaw's lomatium and ensure post-delisting monitoring is conducted and future management strategies are implemented (as necessary) to benefit Bradshaw's lomatium.

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 of 1969 (42 U.S.C. 4321 *et seq.*), need not be prepared in connection with regulations pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the *Federal Register* on October 25, 1983 (48 FR 49244).

Government-to-Government Relationship with Tribes

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

References Cited

A complete list of all references cited in this rule is available on the Internet at <http://www.regulations.gov> under Docket No. FWS-R1-ES-2019-0013 or upon request from

the State Supervisor, Oregon Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this rule are the staff of the Oregon Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

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; 4201-4245, unless otherwise noted.

§ 17.12 [Amended]

2. Amend § 17.12(h) by removing the entry for “*Lomatium bradshawii*” 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.