

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

[Docket No. FWS-R8-ES-2020-0017;
FF09E21000 FXES1111090000 234]

RIN 1018-BF94

Endangered and Threatened Wildlife and Plants; Endangered Species Status and Designation of Critical Habitat for Tiehm's Buckwheat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), determine endangered species status under the Endangered Species Act of 1973 (Act), as amended, for Tiehm's buckwheat (*Eriogonum tiehmii*), a plant species native to Nevada in the United States. We also designate critical habitat. In total, we designate approximately 910 acres (368 hectares) in one unit in Nevada as critical habitat for Tiehm's buckwheat. This rule adds the species to the List of Endangered and Threatened Plants and extends the Act's protections to the species.

DATES: This rule is effective January 17, 2023.

ADDRESSES: This final rule is available on the internet at <https://www.regulations.gov>. Comments and materials we received, as well as supporting documentation we used in preparing this rule, are available for public inspection at <https://www.regulations.gov> at Docket No. FWS-R8-ES-2020-0017.

Availability of supporting materials: For the critical habitat designation, the coordinates or plot points or both from which the critical habitat maps are generated are available at <https://www.regulations.gov> under Docket No. FWS-R8-ES-2020-0017. Any additional supporting information that we developed for this critical habitat designation will be available at <https://www.regulations.gov>.

FOR FURTHER INFORMATION CONTACT: Justin Barrett, Deputy Field Supervisor, U.S. Fish and Wildlife Service, Reno Ecological Services Field Office, 1340 Financial Boulevard, Suite 234, Reno, NV 89502; telephone 775-861-6300. Individuals in the United States who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY, TDD, or TeleBraille) to access telecommunications relay services. Individuals outside the United States should use the relay services offered

within their country to make international calls to the point-of-contact in the United States.

SUPPLEMENTARY INFORMATION:**Executive Summary**

Why we need to publish a rule. Under the Act, a species warrants listing if it meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become endangered in the foreseeable future throughout all or a significant portion of its range). If we determine that a species warrants listing, we must list the species promptly and designate the species' critical habitat to the maximum extent prudent and determinable. We have determined that Tiehm's buckwheat meets the definition of an endangered species; therefore, we are listing it as such and designating critical habitat. Both listing a species as an endangered or threatened species and designating critical habitat can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process (5 U.S.C. 551 *et seq.*).

What this document does. This document lists Tiehm's buckwheat as an endangered species and designates critical habitat for this species under the Act, in a portion of Esmeralda County, Nevada. In total, we designate approximately 910 acres (ac; 368 hectares (ha)) in one unit in Nevada as critical habitat for Tiehm's buckwheat.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species because of any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We have determined that Tiehm's buckwheat is primarily at risk of extinction due to the destruction, modification, or curtailment of its habitat and range from mineral exploration and development; road development and off-highway vehicle (OHV) use; livestock grazing; nonnative, invasive plant species; and herbivory. Climate change may further influence the degree to which some of these threats (herbivory and nonnative invasive plant species), individually or collectively, may affect Tiehm's buckwheat. In addition, existing regulatory mechanisms may be inadequate to protect the species.

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

Abbreviations and Acronyms Used in This Final Rule

For the convenience of the reader, a list of the abbreviations and acronyms used in this final rule follows:

Act = Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*), as amended
 AUM = animal unit month
 BLM = Bureau of Land Management
 CBD = Center for Biological Diversity
 CFR = Code of Federal Regulations
 DoD = Department of Defense
 FLPMA = Federal Land Policy and Management Act (43 U.S.C. 1701 *et seq.*)
 FR = Federal Register
 GLM = general linear model
 HCP = habitat conservation plan
 IEc = Industrial Economics, Incorporated
 IEM = incremental effects memorandum
 INRMP = integrated natural resources management plan
 Ioneer = Ioneer USA Corporation
 NDF = Nevada Division of Forestry
 NDNH = Nevada Division of Natural Heritage
 NEPA = National Environmental Policy Act (42 U.S.C. 4321 *et seq.*)
 PBFs = physical and biological features
 PECE = Policy for Evaluation of Conservation Efforts
 PoO = Plan of Operations
 RCP = representative concentration pathway
 Service = U.S. Fish and Wildlife Service
 SSA = species status assessment

Previous Federal Actions

For more information on the species, general information about Tiehm's buckwheat habitat, and previous Federal actions associated with final listing and final critical habitat for Tiehm's buckwheat, refer to the 12-

month finding published in the **Federal Register** on June 4, 2021 (86 FR 29975), the proposed listing rule published in the **Federal Register** on October 7, 2021 (86 FR 55775), and the proposed critical habitat rule published in the **Federal Register** on February 3, 2022 (87 FR 6101). The species status assessment (SSA) and associated supporting documents available online at <https://www.regulations.gov> under Docket No. FWS-R8-ES-2020-0017.

Summary of Changes From the Proposed Rule

Based on review of the public comments, State agency comments, peer review comments, and new scientific information that became available since the proposed rules published, we updated information in our SSA (Service 2022, entire), including:

1. Updating the petition history;
2. Adding a discussion of the Bureau of Land Management's (BLM) Mitigation Manual MS-1794 and Handbook H-1794;
3. Updating genetics information;
4. Updating vegetation community and soil requirements of Tiehm's buckwheat;
5. Adding a discussion on pollinators, including pollinator efficiency and flight distances;
6. Updating abundance and populations demographics;
7. Adding information on a fence constructed by the BLM to restrict off-highway vehicle (OHV) access;
8. Updating nonnative, invasive species information;
9. Updating herbivory information; and
10. Updating mine exploration and development information.

We also modified our description of physical and biological features (PBFs) 1 and 4 to reflect the habitat needs of the species more accurately. PBF 1 still addresses the plant community needed by Tiehm's buckwheat but has been updated to include additional associated species to maintain plant-plant interactions and ecosystem resiliency needed by the species. PBF 4 still addresses suitable soils but has been updated with new scientific information related to the soils used by the species. These changes to the SSA are also reflected in the rule portion of this document in paragraph (2).

Supporting Documents

The Service prepared a SSA report (Service 2022, entire), 12-month finding (86 FR 29975; June 4, 2021), proposed listing rule (86 FR 55775; October 7, 2021), and proposed critical habitat rule (87 FR 6101; February 3, 2022) for

Tiehm's buckwheat. We prepared version 1.0 of the SSA (Service 2021a) and placed it on <https://www.regulations.gov> under Docket No. FWS-R8-ES-2020-0017 at the time we published the proposed listing rule. Version 1.0 of the SSA was also supporting information for the proposed critical habitat rule under that same docket number. In responding to comments on the proposed listing and proposed critical habitat rules, we updated the SSA to version 2.0 (Service 2022, entire), which is also available on <https://www.regulations.gov> along with this document (which combines the final listing and final critical habitat rules) under Docket No. FWS-R8-ES-2020-0017.

The SSA team was composed of Service biologists, in consultation with other species experts, that collected and analyzed the best available information to support this final listing and final critical habitat designation. The science provided in the SSA report, the 12-month finding, the proposed listing rule, and the proposed critical habitat rule is the basis for this final listing and final critical habitat rule. The SSA report, 12-month finding, proposed listing rule, and proposed critical habitat rule represent a compilation of the best scientific and commercial data available regarding a full status assessment of the species, including past, present, and future impacts (both negative and positive) affecting the species.

In accordance with our joint policy on peer review published in the **Federal Register** on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review of listing actions under the Act, the SSA report underwent independent peer review by three of the four scientists that we requested for peer review with expertise in botany, rare plant conservation, and plant ecology. The Service also sent the SSA report to three partner agencies, the Nevada Division of Forestry (NDF), the Nevada Division of Natural Heritage (NDNH), and the BLM, for review. We received comments from NDNH and BLM. In addition, we requested peer review of the proposed critical habitat rule for Tiehm's buckwheat from six scientists, and we did not receive any responses. The purpose of peer and partner review of the SSA report and proposed critical habitat rule is to ensure that our listing and critical habitat determination is based on scientifically sound data, assumptions, and analyses. Comments we received during peer and partner review were considered and incorporated into our SSA report.

I. Final Listing Determination

Background

A thorough review of the taxonomy, life history, and ecology of Tiehm's buckwheat is presented in the SSA report (Service 2022, pp. 13–26). A summary of the SSA is provided below.

Species Description, Habitat, and Needs

Tiehm's buckwheat was first discovered in 1983 and described in 1985. All available taxonomic and genetic research information indicates that Tiehm's buckwheat is a valid and recognizable taxon and represents a distinct species (Reveal 1985, pp. 277–278; Grady 2012, entire; Davis *in litt.* 2019; Wolf 2021, entire). Tiehm's buckwheat is a low-growing perennial herb, with blueish gray leaves and pale, yellow flowers that bloom from May to June and turn red with age. Seeds ripen in late-June through mid-July (Reveal 1985, pp. 277–278; Morefield 1995, pp. 6–7).

Tiehm's buckwheat occurs between 5,906 and 6,234 feet (ft; 1,800 and 1,900 meters (m)) in elevation and on all aspects with slopes ranging from 0–50 degrees (Ioneer 2020a, p. 5; Morefield 1995, p. 11). The species occurs on dry, upland sites, subject only to occasional saturation by rain and snow and is not found in association with free surface or subsurface waters (Morefield 1995, p. 11). Although there is no information on Tiehm's buckwheat's specific water needs during its various life stages (*i.e.*, dormant seed, seedling, juvenile, adult), Tiehm's buckwheat appears to be primarily dependent on occasional precipitation for its moisture supply (Morefield 1995, p. 11).

Like most terrestrial plants, Tiehm's buckwheat requires soil for physical support and as a source of nutrients and water. Tiehm's buckwheat is a soil specialist or edaphic endemic specifically adapted to grow on its preferred soil type. The species occurs on soil with a high percentage (70–95 percent) of surface fragments that is classified as clayey, smectitic, calcareous, mesic Lithic Torriorthents; clayey-skeletal, smectitic, mesic Typic Calcicargids; and clayey, smectitic, mesic Lithic Haplargids (United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS 2022, entire). The A horizon is thin (0–5.5 inches (in) (0–14 centimeters (cm))); B horizons are present as Bt (containing illuvial layer of lattice clays) or Bw (weathered); C horizons are not always present; and soil depths to bedrock range from 3.5 to 20 in (9 to 51 cm; USDA NRCS 2022, entire). The soil pH is greater than 7.6 (*i.e.*, alkaline) in

all soil horizons (USDA NRCS 2022, entire). All horizons effervesce to varying degrees using hydrochloric acid, indicating the presence of calcium carbonate throughout the soil profile (USDA NRCS 2022, entire). Soil horizons are characterized by a variety of textures and include gravelly clay loam, sand, clay, very gravelly silty clay, and gravelly loam (USDA NRCS 2022, entire).

Where Tiehm's buckwheat grows, the vegetation varies from exclusively Tiehm's buckwheat plants to sparse associations with a few other low-growing herbs and grass species. The abundance and diversity of arthropods (insects, mites, and spiders) observed in Tiehm's buckwheat subpopulations is especially high (1,898 specimens from 12 orders, 70 families, and 129 species were found in 2020) for a plant community dominated by a single native herb species (McClinton et al. 2020, p. 11). Primary insect visitors to Tiehm's buckwheat include bees,

wasps, beetles, and flies (McClinton et al. 2020, p. 18). A combination of pitfall traps, flower—insect observations, and pollinator exclusion studies demonstrate that Tiehm's buckwheat benefits from insect visitors and that the presence of an intact pollinator community is important for maintaining the species (Service 2022, pp. 15–21).

Tiehm's buckwheat is a narrow-ranging endemic known from only one population, comprising eight subpopulations, in the Rhyolite Ridge area of Silver Peak Range in Esmeralda County, Nevada. The single population of Tiehm's buckwheat is restricted to approximately 10 ac (4 ha) across a 3-square-mile area, located entirely on public lands administered by BLM. The subpopulations are separated by a rural, unpaved, county road where subpopulations 1, 2, and 8 occur north of the road, and subpopulations 3, 4, 5, 6, and 7 occur south of the road (figure 1). A 2019 survey estimated that the total Tiehm's buckwheat population

was 43,921 individual plants (table 1; Kuyper 2019, p. 2). Multiple survey efforts have not detected additional populations of the species.

In 2021, the first complete census of Tiehm's buckwheat was systematically conducted following an herbivory event (described in *Summary of Biological Status and Threats*, below, under *Herbivory*) that impacted the population in 2020 (Fraga 2021a, entire). During the census, living plants observed within each subpopulation were counted, totaling 15,757 living plants (table 1; Fraga 2021a, p. 5). Based on the number of plants counted during the 2021 census, the 2019 estimates in subpopulations 4 and 6 were likely overestimated. Because the survey methods used varied between surveyed years, we are unable to infer population trends over time. However, the 2021 census provides the best estimate of Tiehm's buckwheat plants to date as it was a direct count of living individuals.

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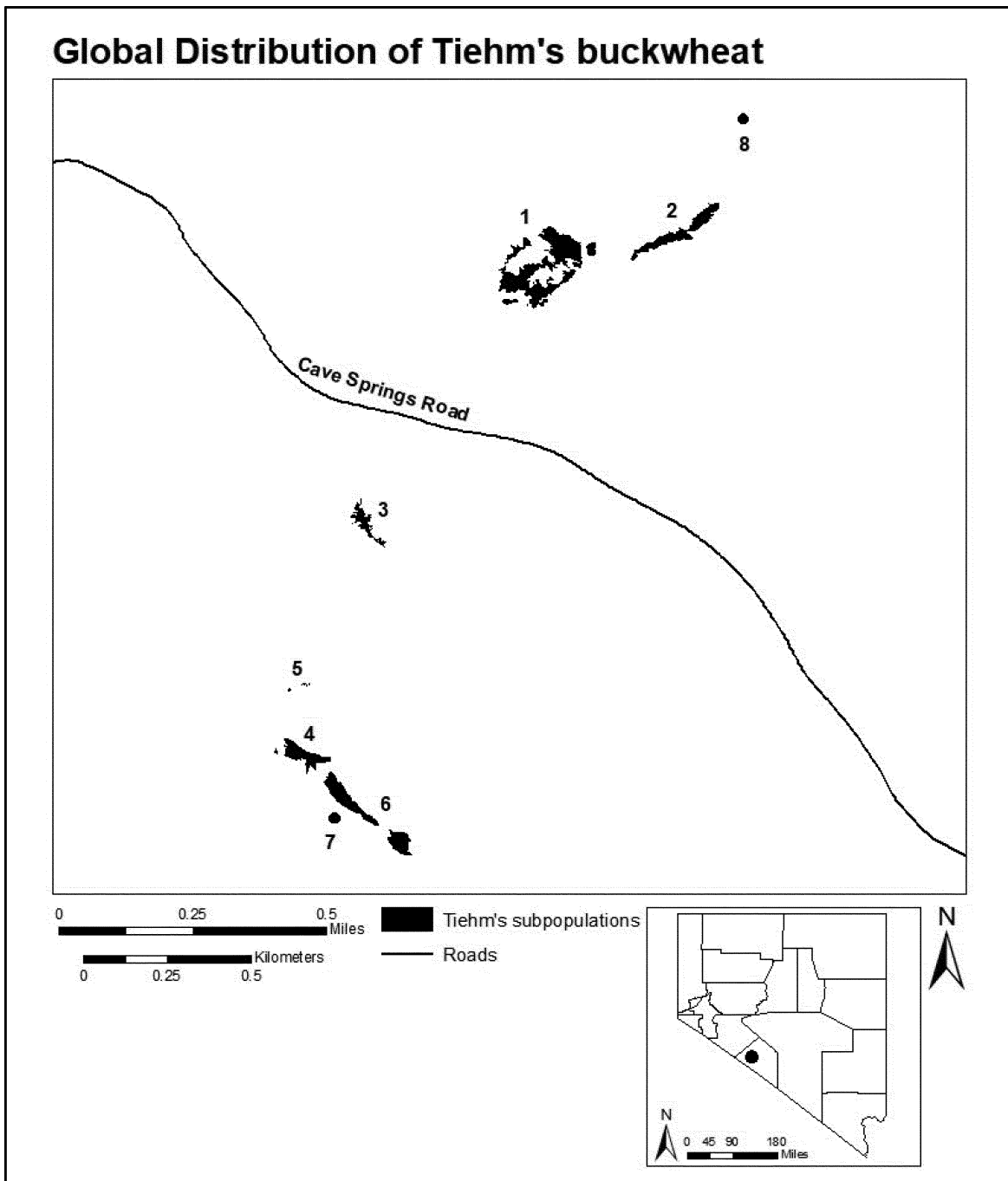


Figure 1—Global distribution of Tiehm’s buckwheat. The single population comprises eight subpopulations, indicated by the corresponding numbers on the map.

TABLE 1—SUMMARY OF TIEHM’S BUCKWHEAT INDIVIDUALS AND OCCUPIED HABITAT

Population	Subpopulation	Estimated number of plants				Occupied habitat (acres)	
		1994 ^a	2008/2010 ^b	2019 ^c	2021 ^e	2008/2010	2019
1	1	7,000+	15,380	9,240	4,420	4.71	4.81
	2	3,000+	4,000	4,541	1,719	1.17	1.56
	3	500+	4,000	1,860	1,165	0.62	0.63
	4	500+	1,960	8,159	649	0.58	1.04
	5	15	100	^d 199	3	0.03	0.04
	6	6,000+	11,100	19,871	7,787	1.64	1.88

TABLE 1—SUMMARY OF TIEHM’S BUCKWHEAT INDIVIDUALS AND OCCUPIED HABITAT—Continued

Population	Subpopulation	Estimated number of plants				Occupied habitat (acres)	
		1994 ^a	2008/2010 ^b	2019 ^c	2021 ^e	2008/2010	2019
	7	n/a	n/a	^d 50	14	n/a	0.004
	8	n/a	n/a	^d 1	not censused in 2021	n/a	(1 plant)
Total		17,015+	36,540	43,921	15,757	8.75	9.97

^aOcular estimate.

^bMethod employed: “Estimating Population Size Based on Average Central Density” (Morefield 2008, entire: Morefield 2010, entire).

^cMethod employed: Modified density sampling methodology in BLM technical reference “Sampling Vegetation Attributes” (BLM 1999, Appendix B) and “Measuring and Monitoring Plant Subpopulations” (Elzinga et al. 1998).

^dDirect count.

^eCensus of all living plants (Fraga 2021a, entire).

Regulatory and Analytical Framework

Regulatory Framework

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

As with the proposed rule, we are applying the 2019 regulations for this final rule because the 2019 regulations are the governing law just as they were when we completed the proposed rule. Although there was a period in the interim—between July 5, 2022, and September 21, 2022—when the 2019 regulations became vacated and the pre-2019 regulations therefore governed, the 2019 regulations are now in effect and govern listing and critical habitat decisions (see *Center for Biological Diversity v. Haaland*, No. 4:19-cv-05206–JST, Doc. 168 (N.D. Cal. July 5, 2022) (*CBD v. Haaland*) (vacating the 2019 regulations and thereby reinstating the pre-2019 regulations)); *In re: Cattlemen’s Ass’n*, No. 22–70194 (9th

Cir. Sept. 21, 2022) (staying the district court’s order vacating the 2019 regulations until the district court resolved a pending motion to amend the order); *Center for Biological Diversity v. Haaland*, No. 4:19-cv-5206–JST, Doc. Nos. 197, 198 (N.D. Cal. Nov. 16, 2022) (granting plaintiffs’ motion to amend July 5, 2022 order and granting government’s motion for remand without vacatur).

The Act defines an “endangered species” as a species that is in danger of extinction throughout all or a significant portion of its range, and a “threatened species” as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether any species is an endangered species or a threatened species because of any of the following factors:

- (A) The present or threatened destruction, modification, or curtailment of its habitat or range;
- (B) Overutilization for commercial, recreational, scientific, or educational purposes;
- (C) Disease or predation;
- (D) The inadequacy of existing regulatory mechanisms; or
- (E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species’ continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term “threat” to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term “threat” includes actions or conditions that have a direct impact on individuals (direct impacts),

as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term “threat” may encompass—either together or separately—the source of the action or condition or the action or condition itself.

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

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

predictions. “Reliable” does not mean “certain”; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

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

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an assessment of the potential threats to the species. The SSA report does not represent our decision on whether the species should be listed as an endangered or threatened species under the Act. However, it does provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies. The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket No. FWS-R8-ES-2020-0017 on <https://www.regulations.gov>.

To assess Tiehm’s buckwheat 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 (*e.g.*, wet or dry, warm or cold years), redundancy supports the ability of the species to withstand catastrophic events (*e.g.*, droughts, large pollution events), and representation supports the ability of the species to adapt over time to long-term changes in the environment (*e.g.*, 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 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.

Biological Status and Threats

Here 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.

For Tiehm’s buckwheat to maintain viability, its populations or some portion thereof must be resilient. The resiliency of Tiehm’s buckwheat is influenced by the availability of suitable habitat, species abundance, and recruitment. The species’ resiliency is discussed in detail in the SSA report (Service 2022, entire) and summarized here.

Summary of Biological Status and Threats

We reviewed the potential threats that could be affecting Tiehm’s buckwheat now and in the future. In this final rule, we will discuss only those threats in detail that could meaningfully impact the status of the species. We evaluated the potential for all threats under the five listing factors in the SSA and found that overutilization for commercial and scientific purposes (Factor B) and disease (Factor C), are not affecting the species; therefore, these threats are not discussed here. The primary threats affecting the status of Tiehm’s buckwheat are physical alteration of habitat due to mineral exploration and development, road development and OHV use, livestock grazing, and nonnative, invasive plant species (all Factor A threats); herbivory (Factor C); and climate change (Factor E). Climate change may further influence the degree to which these threats, individually or collectively, may affect Tiehm’s buckwheat. While we generally discuss

these threats individually, threats can also occur simultaneously, thus additively affecting the resiliency of Tiehm’s buckwheat. Where different individual threats occur at the same time and place, we will describe how they may interact with one another in the threats discussion below. Threats may be reduced through the implementation of existing regulatory mechanisms or other conservation efforts that benefit Tiehm’s buckwheat and its habitat, and so we also summarize and discuss how the existing regulatory mechanisms (Factor D) address these threats.

Herbivory

The naturally occurring Tiehm’s buckwheat population (represented by one population with eight subpopulations) and a seedling transplant experiment suffered detrimental herbivory in 2020. The naturally occurring population experienced greater than 60 percent damage or loss of individual plants, while almost all experimental transplants were lost to rodent herbivores in a 2-week period (Service 2020, pp. 29–33). An environmental DNA analysis (*i.e.*, trace DNA found in soil, water, food items, or other substrates with which an organism has interacted) conducted on damaged Tiehm’s buckwheat roots, nearby soils, and rodent scat strongly linked small mammal herbivory to the widespread damage and loss of the naturally occurring Tiehm’s buckwheat population (Grant 2020, entire). This instance was the first time herbivory was documented on the species, although, prior to 2019, surveys of the population were infrequent. The significance of herbivory in the naturally occurring population depends not only on its frequency and intensity, but also on whether damaged plants can recover and survive, as we are uncertain if the species will be able to recover from this damage and loss. Rodent herbivory precluded seedling survival in experimental plots. Further studies and monitoring need to be conducted to determine if management to reduce rodent herbivory is necessary to maintain Tiehm’s buckwheat individuals and subpopulations, or if this significant herbivory event was only a random catastrophic event that is not likely to occur on a regular basis.

The 2020 herbivory event that Tiehm’s buckwheat experienced was extensive enough to compromise the long-term viability of individuals, subpopulations, and the overall population. One possible explanation for why this event occurred is that a

changing climate is leading to temperature increases and changes in moisture availability. Total precipitation was above average in the Rhyolite Ridge area from 2015 through 2019, whereas in 2020, it was significantly below average. Increases in precipitation are typically followed by increases in rodent populations (Beatley 1976, entire; Brown and Ernest 2002, pp. 981–985; Gillespie et al. 2008, pp. 78–81; Randel and Clark 2010, entire). This sudden shift from above- to below-average precipitation may have impacted the abundance and behavior of the local rodent population at Rhyolite Ridge; rodents in drought conditions may have been seeking water from whatever source was available and, in this case, found the shallow taproots of mature Tiehm's buckwheat plants (Boone 2020, entire; Morefield 2020, p. 12). If herbivory was driven by a water-stressed rodent population, future alteration of temperature and precipitation patterns may create climate conditions for this situation to happen again, resulting in further damage or loss of Tiehm's buckwheat individuals.

To better understand damage to Tiehm's buckwheat, all living plants within each subpopulation were counted in June 2021 (Fraga 2021a, pp. 5–6). A high proportion of plants appeared to be recovering from damage, especially in subpopulations 1, 2, and 4. However, the approximate number of plants recovering from damage was difficult to determine (Fraga 2021a, p. 5). Subpopulations 5 and 7 were presumed to be extirpated in 2020, but 3 individuals in subpopulation 5 and 14 individuals in subpopulation 7 were observed (Fraga 2021a, p. 6). Subpopulation 4 was the most severely impacted, with only 649 of the estimated 8,159 individuals remaining—a 92 percent decrease (Fraga 2021a, p. 6). Based on the 2021 census, it is estimated that all subpopulations, except for subpopulation 3, were reduced by 50 percent or more due to the 2020 herbivory event (table 3; Service 2022 p. 36; Fraga 2021a, p. 6). Regardless of whether the 2019 or 2021 population estimates are used to measure damage to Tiehm's buckwheat subpopulations, 60 percent or more plants were negatively impacted by the 2020 herbivory event.

Tiehm's buckwheat subpopulations were monitored throughout 2021, and no new widespread damage to plants was observed (BLM 2021a, entire; BLM 2021b, entire; BLM 2021c, entire; BLM 2021d, entire; BLM 2021e, entire; BLM 2021f, entire; BLM 2021g, entire; BLM 2021h, entire; BLM 2021i, entire; Fraga

2021a, p. 6; Garrison and Siebert 2021a, entire; Garrison and Siebert 2021b, entire; Heston 2021, entire; Kindred 2021, entire).

Mineral Exploration and Development

The specialized soils on which Tiehm's buckwheat occurs overlie and are developed directly from a sedimentary layer rich in mineralized lithium and boron, making this location of high interest for mineral development. Trenches and mine shafts associated with mineral exploration and development have already impacted subpopulations 1, 2, 3, 4, and 6, resulting in the loss of some of Tiehm's buckwheat habitat (Morefield 1995, p. 15). Future mineral exploration and development would be expected to result in similar or more detrimental impacts to the species. The BLM lands on which Tiehm's buckwheat occurs are subject to the operation of the Mining Law of 1872, as amended (30 U.S.C. 22–54). Under BLM's regulations, operators may explore and cause a surface disturbance of up to 5 acres after an operator gives notice to BLM and waits 15 days (43 CFR 3809.21(a)). By contrast, if a federally proposed or listed species or their proposed or designated critical habitat is present, unless BLM allows for other action under a formal land-use plan or threatened or endangered species recovery plan, an operator must submit a mining plan of operation and obtain BLM approval for any surface disturbance greater than casual use (43 CFR 3809.11(c)(6)).

In May 2020, Ioneer USA Corporation (Ioneer) submitted a plan of operations (2020 PoO) to BLM for the proposed Rhyolite Ridge lithium-boron project. The 2020 PoO, if permitted as proposed, would result in the complete loss of Tiehm's buckwheat habitat and subpopulations 4, 5, 6, and 7, even with the voluntary protection measures included in Ioneer's project proposal. The voluntary protection measures included in Ioneer's project proposal are summarized below in Conservation Measures and Regulatory Mechanisms (protection measures are described more thoroughly in Service 2022, pp. 39–42). The potential impact from the project proposed in the 2020 PoO would reduce the remaining Tiehm's buckwheat population by 54 percent, or from 15,757 individuals to roughly 7,305 individuals, and remove 30 percent of its total habitat (2.96 ac (1.2 ha); Ioneer 2020a, figure 4, p. 29). At the end of the project as proposed, areas previously occupied by Tiehm's buckwheat in subpopulations 4–7 would be underwater within the boundaries of a quarry lake (Ioneer 2020b, pp. 71–72). In

the 2020 PoO, Ioneer proposed to remove and salvage all remaining plants in subpopulations 4, 5, 6, and 7 (approximately 8,453 plants) and translocate them to another location. However, Tiehm's buckwheat is a soil specialist or edaphic endemic and adjacent, unoccupied sites are not suitable for all early life-history stages (McClinton et al. 2020, entire; NewFields 2021, entire). The results of that research combined with herbivore impacts on transplanted seedlings, a lack of understanding of factors influencing demographic processes, a lack of understanding of dispersal mechanisms and seedling recruitment, and a lack of testing and multiyear monitoring on the feasibility of transplanting the species, results in a high level of uncertainty regarding the potential for success of translocation efforts (e.g., Godefroid et al. 2011, entire; Maschinski and Haskins 2012, entire; Albrecht et al. 2018, entire; Ward et al. 2021, entire).

Subpopulation 6 may be the most resilient of the eight Tiehm's buckwheat subpopulations because it has the most individuals, produces a higher average density of flowers (correlating to a higher seed output), supports high pollinator diversity, and supports a variety of size classes, including having the most individuals in the smallest size class indicating that this subpopulation is likely experiencing the most recruitment (Kuyper 2019, p. 3; Ioneer 2020a, pp. 7–8; McClinton et al. 2020, pp. 23, 51). Loss of this subpopulation to the proposed Rhyolite Ridge lithium-boron project may have an immense impact on the overall resiliency and continued viability of the species, beyond just the loss of individuals (representation).

Rare plant species, like Tiehm's buckwheat, that have restricted ranges, specialized habitat requirements, and limited recruitment and dispersal, have a higher risk of extinction due to demographic uncertainty and random environmental events (Shaffer 1987, pp. 69–75; Lande 1993, pp. 911–927; Hawkins et al. 2008, pp. 41–42; Caicco 2012, pp. 93–94; Kaye et al. 2019, p. 2; Corlett and Tomlinson 2020, entire; Hulshof and Spasojevic 2020, entire). Additionally, habitat fragmentation poses specific threats to species through genetic factors such as increases in genetic drift and inbreeding, together with a potential reduction in gene flow from neighboring individuals or subpopulations (Jump and Peñuelas 2005, pp. 1015–1016). The effects of habitat fragmentation from the proposed Rhyolite Ridge lithium-boron project on Tiehm's buckwheat may be

compounded by the inherently poor dispersal of the species and its specific soil requirements.

In November 2021, Ioneer met with BLM and the Service to discuss proposed revisions to their 2020 PoO for the Rhyolite Ridge lithium-boron project (Service 2021b, entire) including adjustments to the proposed quarry location. On May 27, 2022, Ioneer provided the Service with a memorandum further describing the proposed revisions to their 2020 PoO (Ioneer 2022a, entire). On July 18, 2022, Ioneer submitted their revised PoO to BLM and provided the Service with a copy on August 8, 2022. On August 17, 2022, BLM determined the revised PoO was complete under 43 CFR 3809.401(b); however, BLM resource specialists are still in the process of receiving and reviewing baseline data reports that further explain the details of the 2022 revised PoO. BLM will analyze the environmental impacts of approving the project under National Environmental Policy Act (NEPA), and BLM may initiate consultation with the Service under section 7 of the Act.

The 2022 revised PoO includes modifications such as relocating the quarry to avoid individual Tiehm's buckwheat plants and implementing 13–127 ft (4–39 m) buffers with fencing around each subpopulation (Ioneer 2022b, p. 14 and Appendix J). An explosives storage area is proposed adjacent to subpopulation 1 (Ioneer 2022b, Figure 4). To the east, subpopulations 3, 4, 5, 6, and 7 would be concerningly close to a 960-ft (293 m) deep open-pit quarry and when mining is complete, a terminal quarry lake (Ioneer 2022b, p. 24, 74). In addition, over-burden storage facilities are proposed on the west side of subpopulations 3, 4, 5, 6, and 7 (Ioneer 2022b, p. 25). The combination of the quarry development and over-burden storage facilities are projected to disturb and remove up to 38 percent of critical habitat for this species, impacting pollinator populations, altering hydrology, removing soil, and risking subsidence.

Road Development and Off-Highway Vehicle Use

Ecological impacts of roads and ground-disturbing activities like OHV use include altered hydrology, pollution, sedimentation, silt erosion and dust deposition, habitat fragmentation, reduced species diversity, and altered landscape patterns (Forman and Alexander 1998, entire; Spellerberg 1998, entire). OHV impacts have occurred in subpopulations 1, 4, 5, and 6 (Caicco and Edwards 2007, entire;

Donnelly and Fraga 2020, p. 1; Ioneer 2020a, p. 10; Donnelly 2021a entire; Donnelly 2021b, entire; Fraga 2021a, p. 7; Heston 2021, p. 1; Kindred 2021, p. 1) and can compact soil, crush plants, and modify habitat through fragmentation. Mining and mineral exploration activities that grade, improve, and widen roads in the Rhyolite Ridge area may allow easier and greater access for OHVs and recreational use. Additionally, road development and increased vehicle traffic associated with the proposed mine may create conditions that further favor the establishment of nonnative, invasive species within Tiehm's buckwheat habitat.

Ioneer's proposed Rhyolite Ridge lithium-boron project would construct and maintain service and haul roads within the Rhyolite Ridge area. Cave Springs Road (as seen on figure 1) is currently maintained by Esmeralda County and bisects Tiehm's buckwheat subpopulations. Realignment of this road is proposed to accommodate haul roads. It is expected that the rerouted road would be transferred to the county at closure, as an amendment to the county's existing right-of-way with BLM (Ioneer 2020b, p. 44). The expected amount of truck traffic associated with providing needed materials and supplies and product transport for the proposed project is anticipated to be 100 round trips per day, 365 days per year (Ioneer 2020b, p. 7).

Dust deposition, often a result of vehicle traffic on roads, negatively affects the physiological processes of plants including photosynthesis, reproduction, transpiration, water use efficiency, leaf hydraulic conductance, and stomatal disruption that impedes the ability of the stomata to open and close effectively (Hirano et al. 1995, pp. 257–260; Vardaka et al. 1995, pp. 415–418; Wijayratne et al. 2009, pp. 84–87; Lewis 2013, pp. 56–79; Sett 2017, entire). Physiological disruption to Tiehm's buckwheat individuals from dust generated from vehicular traffic associated with the proposed Rhyolite Ridge lithium-boron project would likely negatively affect the overall health and physiological processes of the population.

To restrict access of OHVs into subpopulations of Tiehm's buckwheat, the BLM constructed two pipe rail fences in December of 2021 (BLM 2021j, entire). One fence, approximately 1,500 ft (457 m) long, was constructed along the unnamed wash road southeast of subpopulation 1 (BLM 2021j, pp. 4–5). A second fence was installed at the entrance of the intersection of Cave Springs Road and a mine exploration

road, preventing OHV access to subpopulations 3, 4, 5, 6, and 7 (BLM 2021j, pp. 4–5). BLM will monitor the effectiveness of the fences and plans to add signage to notify the public of the sensitive resources in the area (BLM 2021j, pp. 4–5).

Livestock Grazing

Livestock grazing has the potential to result in negative impacts to Tiehm's buckwheat individuals, subpopulations, and/or the population, depending on factors such as stocking rate and season of use. Livestock grazing may result in direct impacts to individual Tiehm's buckwheat plants due to trampling of vegetation and soil disturbance (compaction) in ways that can render habitat unsuitable to established plants, while also discouraging population recruitment (by discouraging seed retention, seed germination, and seedling survival). Patterns of soil disturbance associated with grazing can also create conditions conducive to the invasion of nonnative plant species (Young et al. 1972, entire; Hobbs and Huenneke 1992, p. 329; Loeser et al. 2007, pp. 94–95).

Tiehm's buckwheat occurs in the BLM Silver Peak livestock grazing allotment (BLM 1997, p. 15, map 17). The grazing permit for the Silver Peak allotment (NV00097) was reauthorized on September 9, 2020, with a 4-year term that expires on September 24, 2024 (BLM 2021k, entire). No grazing exclosures are associated with Tiehm's buckwheat within this BLM allotment, and trampling and cow manure have been observed in subpopulation 1 (Donnelly 2022, entire). Although some Tiehm's buckwheat individuals may be impacted by this threat, current grazing damage to Tiehm's buckwheat has not been observed. In January 2022, the permittee agreed to move the livestock west of the subpopulations to avoid any further impacts to Tiehm's buckwheat (Truax, BLM, pers. comm. 2022). Currently, 658 active AUMs (animal unit months) and 2,507 temporarily suspended AUMs are associated with the Silver Peak allotment due to stocking water range improvements that have fallen out of repair.

Upon expiration of the Silver Peak allotment grazing permit, BLM will consider reauthorization and/or changing the number of active AUMs. Range improvements are in progress, and additional AUMs may be returned on this allotment (Truax, pers. comm. 2020). However, grazing impacts could potentially increase in the future if additional AUMs are returned to this allotment.

Nonnative, Invasive Plant Species

Nonnative, invasive plant species could negatively affect Tiehm's buckwheat individuals, subpopulations, and/or the population through competition, displacement, and degradation of the quality and composition of its habitat (Gonzalez et al. 2008, entire; Simberloff et al. 2013, entire). Surveys of Tiehm's buckwheat conducted between 1994 and 2010 did not document any occurrences of nonnative, invasive species in its habitat (Morefield 1995, entire; Caicco and Edwards 2007, entire; Morefield 2008, entire; Morefield 2010, entire). However, saltlover (*Halogeton glomeratus*) has since become established to some degree and is part of the associated plant community in all subpopulations of Tiehm's buckwheat (CBD 2019, pp. 20–21; Ioneer 2020a, pp. 9–10; Fraga 2021b, pp. 3–4; WestLand Engineering & Environmental Services, Inc (WestLand) 2021, pp. 23–25). Vehicles can carry the seeds of nonnative, invasive plant species into the area, and soil disturbances, such as mineral exploration activities, can encourage the spread of saltlover, which alters the substrate by making the soil more saline and less suitable as habitat for Tiehm's buckwheat. In 2021, ocular estimates of saltlover observed between subpopulations 1 and 2 was 20–25 percent in an area that had been used in mining exploration and 10–15 percent near subpopulations 4 and 5 along a reclaimed exploration road (Fraga 2021b, p. 3). As of 2021, saltlover is the most abundant nonnative, invasive species within and adjacent to all subpopulations of Tiehm's buckwheat, especially in areas disturbed from mining exploration activities (CBD 2019, pp. 20–21; Fraga 2021b, p. 3).

Road development and vehicle traffic associated with the proposed mine as well as livestock grazing, which currently occurs within Tiehm's buckwheat population as part of BLM's Silver Peak allotment, may create conditions that further favor the establishment of nonnative, invasive species within Tiehm's buckwheat habitat. For example, Ioneer's Rhyolite Ridge lithium-boron project proposes to construct and operate a quarry, processing plant, overburden storage facility, spent ore storage facility, and access roads (Ioneer 2020b, p. 11). If the project is approved, and these ground-disturbing activities occur, there is a potential for increase in spread of nonnative, invasive plant species. However, this possible increase would depend on conditions associated with approval of the proposed project. Under

NEPA (42 U.S.C. 4321 *et seq.*), BLM has the discretion to analyze best management practices to help reduce the likelihood that nonnative, invasive plant species are introduced and spread in Tiehm's buckwheat habitat.

Climate Change

Tiehm's buckwheat occurs in the Great Basin Desert of Nevada (the largest contiguous area of watersheds with no outlets in North America that spans nearly all of Nevada, much of Utah, and portions of California, Idaho, and Oregon), where the effects of climatic changes depend largely on the interaction of temperature and precipitation. Between 1895 and 2011, temperatures in the Great Basin have increased 1.2 to 2.5 °F (0.7 to 1.4 °C), with a greater increase in the southern portion (where Tiehm's buckwheat occurs) than in the northern portion (Snyder et al. 2019, p. 3). Temperatures are increasing more at night than during the day and more in winter than in summer, leading to fewer cold snaps, more heatwaves, fewer frosty days and nights, less snow, and earlier snowmelt (Stewart et al. 2005, p. 1152; Mote et al. 2005, entire; Knowles et al. 2006, p. 4557; Abatzoglou and Kolden 2013, entire; Padgett et al. 2018, p. 167; Snyder et al. 2019, p. 3). Although these observed trends provide information as to how climate has changed in the past, climate models can be used to simulate and develop future climate projections.

Simulations using downscaled methods from 20 global climate models project mean average temperature during December, January, and February for the Rhyolite Ridge area will increase by 2.3 °F (1.3 °C) by 2060 and 3.4 °F (1.9 °C) by 2099 under moderate emission scenarios (RCP 4.5; Hegewisch and Abatzoglou 2020a). Under high emission scenarios (RCP 8.5), mean average temperatures during winter months increase by 3.6 °F (2 °C) by 2060 and 7.1 °F (3.9 °C) by 2099. Likewise, these models project maximum average temperatures during June, July, and August for the Rhyolite Ridge area to increase by 2.9 °F (1.6 °C) by 2060 and 4.1 °F (2.3 °C) by 2099 under moderate emission scenarios (RCP 4.5). Under high emission scenarios (RCP 8.5), maximum average temperatures during summer months increased by 4.6 °F (2.6 °C) by 2060 and 8.9 °F (4.9 °C) by 2099 (Hegewisch and Abatzoglou 2020a).

Additionally, simulations using these downscaling methods from multiple models project annual precipitation for the Rhyolite Ridge area to increase by 0.4 in (10.16 millimeters (mm)) by 2060 and 0.6 in (15.24 mm) by 2099 under moderate emission scenarios (RCP 4.5).

Under high emission scenarios (RCP 8.5), annual precipitation increases by 0.3 in (7.62 mm) by 2060 and 0.7 in (17.78 mm) by 2099 (Hegewisch and Abatzoglou 2020a). Total precipitation was above average in the Rhyolite Ridge area during the period 2015–2019, ranging from 6.1 to 8.7 in (15.5 to 22 cm) a year (Hegewisch and Abatzoglou 2020b). Whereas, in 2020, total average precipitation for the same area was 2.7 in (6.8 cm; Hegewisch and Abatzoglou 2020c).

Tiehm's buckwheat is adapted to dry, upland sites, subject only to occasional saturation by rain and snow. Increasing temperature can affect precipitation patterns. The fraction of winter precipitation (November–March) that falls as snow versus rain is declining in the western United States (Palmquist et al. 2016, pp. 13–16). When temperatures are cold enough to limit water losses from plant transpiration and soils are not frozen, shifts from snow to rain may have minimal impact on deep soil water storage. If rainfall replaces snow and temperatures are increased enough to thaw soils to stimulate plant growth and physiological activity earlier in the year, this scenario would result in less deep soil water recharge (*i.e.*, less soil water infiltration and more evaporation) and potential changes in plant community composition (Huxman et al. 2005, entire).

Fire is a naturally occurring phenomenon that impacts the distribution and structure of vegetation (Willis 2017, p. 52). However, due to increasing temperatures and reductions in precipitation, the severity and frequency of wildfires is likely to increase (Chambers and Wisdom 2009, pp. 709–710; Comer et al. 2013, pp. 130–135; Snyder et al. 2019, p. 8). While the Great Basin is extremely prone to fires, with 14 million ac (5.6 million ha) burning in the last 20 years, there are no reported accounts of fire within Tiehm's buckwheat habitat or in the surrounding Rhyolite Ridge area (BLM 2020a, entire). We currently do not have any data to indicate what level of effect wildfire could have on Tiehm's buckwheat; however, it could result in habitat loss or habitat fragmentation and/or remove Tiehm's buckwheat individuals.

The direct, long-term impact from climate change to Tiehm's buckwheat is yet to be determined. The timing of phenological events, such as flowering, are often related to environmental variables such as temperature. Large-scale patterns of changing plant distributions, flowering times, and novel community assemblages in response to rising temperatures and changing rainfall patterns are apparent

in many vegetation biomes (Parmesan 2006, entire; Burgess et al. 2007, entire; Hawkins et al. 2008, entire; Munson and Long 2017, entire; Willis 2017, pp. 44–49). However, we do not know if or how climate change may alter the phenology of Tiehm's buckwheat or cause changes in pollinator behavior.

In summary, Tiehm's buckwheat is adapted to dry, upland sites, subject only to occasional saturation by rain and snow. Under climate change predictions, we anticipate alteration of precipitation and temperature patterns, as models forecast warmer temperatures and slight increases in precipitation. The timing and type of precipitation received (snow vs. rain) may impact plant transpiration and the soil water recharge needed by Tiehm's buckwheat. Additionally, variability in interannual precipitation combined with increasing temperatures, as recently seen from 2015 through 2020, may make conditions less suitable for Tiehm's buckwheat by bolstering local rodent populations. High rodent abundance combined with high temperatures and drought may have contributed to the herbivore impacts in 2020 in both the transplant experiment and native population. Thus, climate change may exacerbate impacts from rodent herbivory currently affecting this species and its habitat.

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

Conservation Measures and Regulatory Mechanisms

BLM

Tiehm's buckwheat is listed and managed as a BLM sensitive species which are defined as "species that

require special management or considerations to avoid potential future listing under the Act" (BLM 2008a, pp. 1–48). Under this policy, BLM may initiate proactive conservation measures including programs, plans, and management practices to reduce or eliminate threats affecting the status of the species or improve the condition of the species' habitat on BLM-administered lands (BLM 2008a, Glossary, p. 2). BLM's regulations do not require conservation measures for sensitive species as a condition for exploring for, or developing minerals subject to disposal under, the Mining Law of 1872, as amended (30 U.S.C. 22–54; Mining Law). Under BLM's handbook, the Silver Peak allotment permits grazing across 281,489 ac (113,915 ha) that also encompass the area occupied by Tiehm's buckwheat. Under the Federal Land Policy and Management Act of 1976, as amended (43 U.S.C. 1701 *et seq.*), BLM has the discretion to establish and implement special management areas, such as areas of critical environmental concern, to reduce or eliminate actions that adversely affect sensitive species, such as Tiehm's buckwheat. Although Tiehm's buckwheat is a BLM sensitive species, there are no special restrictions or terms and conditions regarding livestock use within the Silver Peak allotment where this species occurs. BLM has best management practices (BMPs) for invasive and nonnative species that focus on the prevention of further spread and/or establishment of these species (BLM 2008b, pp. 76–77). BMPs should be considered and applied where applicable to promote healthy, functioning native plant communities, or to meet regulatory requirements. BMPs include inventorying weed infestations, prioritizing treatment areas, minimizing soil disturbance, and cleaning vehicles and equipment (BLM 2008b, pp. 76–77). However, incorporation or implementation of BMPs is at the discretion of an authorized BLM officer.

In response to the 2020 herbivory event on Tiehm's buckwheat subpopulations, BLM has been monitoring the species, and photo plots were established near undamaged plants in subpopulations 1, 3, and 6 to help determine whether herbivory is continuing (Crosby, BLM, pers. comms. 2020a; Crosby, BLM, pers. comms. 2020b; BLM 2020b, entire; BLM 2020c, entire; BLM 2021a, entire; BLM 2021b, entire; BLM 2021c, entire; BLM 2021d, entire; BLM 2021e, entire; BLM 2021f, entire; BLM 2021g, entire; BLM 2021h, entire; BLM 2021i, entire). Ocular

estimates from the photo plots indicate that herbivory is not ongoing (BLM 2020b, entire; BLM 2020c, entire; BLM 2021a, entire; BLM 2021b, entire; BLM 2021c, entire; BLM 2021d, entire; BLM 2021e, entire; BLM 2021f, entire; BLM 2021g, entire; BLM 2021h, entire; BLM 2021i, entire).

To restrict access of OHVs to subpopulations of Tiehm's buckwheat, the BLM constructed two pipe rail fences in December of 2021 (BLM 2021j, entire). One fence, approximately 1,500 ft (457 m) long, was constructed along the unnamed wash road southeast of subpopulation 1 (BLM 2021j, pp. 4–5). A second fence was installed at the entrance of the intersection of Cave Springs Road and a mine exploration road, preventing OHV access to subpopulations 3, 4, 5, 6, and 7 (BLM 2021j, pp. 4–5). BLM will monitor the effectiveness of the fences and plans to add signage to notify the public of the sensitive resources in the area (BLM 2021j, pp. 4–5).

Ioneer

As part of the proposed Rhyolite Ridge lithium-boron project, Ioneer is developing a conservation plan for Tiehm's buckwheat with the intent to protect and preserve the continued viability of the species on a long-term basis. The conservation plan is in the early stages of development (Ioneer 2020c, entire; Barrett, Service, pers. comm. 2021; Tress, WestLand, pers. comm. 2021a; Tress, WestLand, pers. comm. 2021b; Tress, WestLand, pers. comm. 2021c; Barrett, Service, pers. comm. 2022).

Ioneer has also implemented or proposed various protection measures for Tiehm's buckwheat as part of the 2020 PoO for the Rhyolite Ridge lithium-boron project. Ioneer funded the development of a habitat suitability model to identify additional potential habitat for Tiehm's buckwheat through field surveys (Ioneer 2020a, p. 12). In addition, a demographic monitoring program was initiated in 2019 to detect and document trends in population size, acres inhabited, size class distribution, and cover with permanent monitoring transects established in subpopulations 1, 2, 3, 4, and 6 (Ioneer 2020a, p. 16). Ioneer also funded collection of Tiehm's buckwheat seed in 2019 (Ioneer 2020a, pp. 13–14). Some of this seed was used by the University of Nevada, Reno, for a propagation trial and transplant study (Ioneer 2020a, p. 14). The remainder of this seed is in long-term storage at Rae Selling Berry Seed Bank at Portland State University (Ioneer 2020a, p. 13). Ioneer's 2020 PoO included avoiding subpopulations 1, 2, 3, and 8

(approximately 7,305 plants; Ioneer 2020a, p. 11), installing fences and signage around subpopulations 1 and 2 (Ioneer 2020a, p. 11), and removing and salvaging all remaining plants in subpopulations 4, 5, 6, and 7 (approximately 8,453 plants) and translocating them to another location (Ioneer 2020a, p. 15). However, in July 2022, Ioneer submitted a revised mining PoO, and the proposed project may or may not be permitted by BLM as proposed; thus, the project as proposed, and these protection measures, may or may not be fully implemented.

Summary of Current Condition

Globally, Tiehm's buckwheat is known from eight subpopulations that make up a single population (table 1). Tiehm's buckwheat substantially supports the high abundance and diversity of arthropods and pollinators found in the Rhyolite Ridge area. A specific set of soil conditions are required for the growth of Tiehm's buckwheat, as the species is specifically adapted to grow on its preferred soil type (McClinton et al. 2020, pp. 29–32; NewFields 2021, pp. 17–24, table 3; USDA NRCS 2022, entire).

Tiehm's buckwheat occurs entirely on 10 ac (4 ha) of Federal lands with sparse associations of other plant species. Tiehm's buckwheat is considered a rare plant species that has a restricted range, specialized habitat requirements, and limited recruitment and dispersal, which results in a higher risk of extinction due to demographic uncertainty and random environmental events. Under current conditions, primary threats to the species include mineral exploration and development; road development and OHV use; livestock grazing; nonnative, invasive plant species; herbivory; and climate change. Many of the threats currently affecting the species have the potential to work in combination. For example, mineral exploration, road development and OHV use, and livestock grazing can introduce nonnative, invasive plant species, which in turn can directly compete with and displace Tiehm's buckwheat within its habitat. With only one population (eight subpopulations), the risks to a small plant population like Tiehm's buckwheat include losses in reproductive individuals, declines in seed production and viability, loss of pollinators, loss of genetic diversity, and Allee effects (Eisto et al. 2000, pp. 1418–1420; Berc et al. 2007, entire; Willis 2017, pp. 74–77), which will impact a species that already has very limited redundancy and representation.

Data about Tiehm's buckwheat population dynamics are sparse, as

research and monitoring to better understand the species are still in their infancy (Grant 2020, entire; Ioneer 2020a, pp. 11–18; McClinton et al. 2020, entire; Service 2020, entire). As a result, the best available data do not allow us to determine population trends such as growth, survival, or reproductive rates. Therefore, our assessment of current condition is based upon the current population estimates, the condition of the habitat, and what is known regarding current and future threats likely to occur within the range of the species.

Summary of Comments and Recommendations

In the proposed listing rule published on October 7, 2021 (86 FR 55775), we requested that all interested parties submit written comments by December 6, 2021, and in the proposed critical habitat rule published February 3, 2022 (87 FR 6101), we requested that all interested parties submit written comments by April 4, 2022. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposals. Newspaper notices inviting general public comment were published in the Las Vegas Review-Journal (on October 22, 2021, for the proposed listing rule and on February 11, 2022, for the proposed critical habitat rule) and the Mineral County Independent-News (on October 14, 2021, for the proposed listing rule and on February 10, 2022, for the proposed critical habitat rule). We did not receive any requests for a public hearing. All substantive information received during comment periods has either been incorporated directly into this final determination or is addressed below.

Peer Reviewer Comments

As discussed in Supporting Documents above, we received comments from three peer reviewers on the SSA and no comments from peer reviewers on the proposed critical habitat. We also sent the SSA report to two State agencies (NDF and NDNH) and the Federal agency (BLM) with whom we work with on Tiehm's buckwheat conservation. We reviewed all comments we received from the peer reviewers for substantive issues and new information regarding the information contained in the SSA report. The peer and partner reviewers generally concurred with our methods and conclusions, and provided additional information, clarifications, and suggestions to improve the final SSA report, including information on

subpopulations, seed dispersal, agency policies, updating future scenarios, clarifications on herbivory, and other editorial suggestions. Peer and partner reviewer comments were addressed in version 1.0 of the SSA report, which was made available for public review at <https://www.regulations.gov> under Docket No. FWS–ES–R8–2020–0017 when the October 7, 2021, proposed rule (85 FR 55775) was published.

Federal Agency, States, and Tribes

We did not receive any comments from Federal agencies, States, or Tribes during the public comment periods.

Public Comments

We received comments from 28 individuals on the proposed listing rule and comments from 24 individuals on the proposed critical habitat rule. We reviewed all comments we received for substantive issues and new information. We received some of the same comments on the proposed listing rule as we did on the proposed critical habitat rule, and we provide our responses below. Comments unique to the proposed listing rule and proposed critical habitat rules and our responses subsequently follow.

Comment 1: Several commenters noted that the Service did not post SSA peer review comments on <https://www.regulations.gov> during the proposed listing rule public comment period and stated that the Service was not being transparent.

Our response: We included a summary of peer review on Tiehm's buckwheat SSA in our proposed rule to list Tiehm's buckwheat as endangered, and the peer review comments and responses are now posted on our Science Applications website under peer review at <https://www.fws.gov/program/science-applications>, which also is accessible to the public.

Comment 2: Several commenters asserted that BLM policies and guidance (FLPMA, H–1740–2, MS–6840) enforce sensitive species protective measures for mining operations and that the Service's assertion that they are not adequate assurances or do not provide certainty that Ioneer or BLM will actively conserve Tiehm's buckwheat is incorrect.

Our response: BLM sensitive species are those species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the Act (BLM 2008a, pp. 1–48). Tiehm's buckwheat faces several threats, including herbivory and small population size, that existing regulatory mechanisms are unlikely to adequately

address even though BLM has policies that protect sensitive species. Additionally, BLM's mining regulations at 43 CFR 3809.420 listing performance standards for mining plans of operation do not take into account impacts to sensitive species, only adverse impacts to threatened or endangered species and their habitat, which may be affected by operations. Existing regulatory mechanisms are described in section 1.4.2 in the SSA.

Comment 3: One commenter stated that there is no data or locations to support the conclusion that Tiehm's buckwheat occurs in pure or monotypic stands and that the Service incorrectly interpreted Morefield 1995 and McClinton et al. 2020.

Our response: We do not use the term "monotypic stand" in our SSA or proposed listing rule. In these documents, we describe community structure as "open plant community with low plant cover and stature" where "the vegetation varies from pure stands of Tiehm's buckwheat to sparse associations with a few other low growing herbs and grass species." We reviewed additional information provided during the public comment period (WestLand 2021, pp. 23–27) and appropriately incorporated this information in the SSA. What comprises a pure stand depends on scale. To avoid confusion, we updated the SSA (Service 2022, p. 17) and removed the phrase "pure stands" and replaced it with the word "exclusively," as in "the vegetation varies from exclusively Tiehm's buckwheat plants to sparse associations with a few other low growing herbs and grass species."

Our interpretation of Morefield 1995 and McClinton et al. 2020 support these characterizations. Morefield 1995 (pp. 30–32) includes photos of Tiehm's buckwheat with other Tiehm's buckwheat plants in the background and others show the barren habitat at subpopulations 1 and 2 with a dozen or so Tiehm's buckwheat plants interspersed with its associates. Likewise, data in McClinton et al. 2020 (p. 22) support the high density of Tiehm's buckwheat where it occurs.

Comment 4: Two commenters noted that some of the literature cited in the SSA, including the genetic data that would be useful for assessing the uniqueness of Tiehm's buckwheat, is not publicly accessible. They requested that unpublished studies be made publicly available.

Our response: We have considered the best available scientific and commercial genetic data for assessing Tiehm's buckwheat in our SSA. We have provided information, including genetic

data, that is not publicly accessible at <https://www.regulations.gov> under Docket No. FWS–R8–ES–2020–0017.

Public Comments on Proposed Listing

Comment 5: One commenter stated that we should have determined that listing Tiehm's buckwheat was precluded because the economic development and national security benefits of the proposed mining project could be considered a "higher priority action" than listing Tiehm's buckwheat as endangered. In addition, efforts being made to relocate the species to a different habitat where it is not threatened constitute "expeditious progress" in support of a precluded finding.

Our response: In making a determination as to whether a species meets the Act's definition of an endangered or threatened species, under section 4(a)(1)(A) of the Act the Secretary is to make that determination based solely on the basis of the best scientific and commercial data. A species that we find warrants listing as endangered or threatened, but for which listing is precluded by higher priority listing activities, is referred to as a candidate species. The provision in the Act that allows the Service to make a "warranted, but precluded" finding refers to listing being precluded by pending proposals to determine whether other species should be listed as endangered species or a threatened species, not to economic development or national security benefits. Likewise, "expeditious progress" being made to add or remove species from the Lists of Endangered and Threatened Wildlife and Plants under the Act refers to the Service's progress in making listing determinations, a function of workload, not whether expeditious progress is being made on conservation actions for the species. Under the Act, the Service may evaluate economic impacts and impacts to national security only in association with the designation of critical habitat under section 4(b)(2).

Comment 6: Several commenters were concerned with the scientific data used in the SSA and proposed listing rule. They requested that the Service reassess the key characteristics of Tiehm's buckwheat and its habitat requirements in light of the best available science and correct perceived erroneous conclusions in the SSA. They also requested that the Service reassess the threats to the species in light of the best available science and current plans for mineral development.

Our response: Our Policy on Information Standards under the Act (published in the **Federal Register** on

July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658)), and our associated Information Quality Guidelines (www.fws.gov/informationquality/), provide criteria and guidance, and establish procedures to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for SSAs and listing rules.

Primary or original information sources are those that are closest to the subject being studied, as opposed to those that cite, comment on, or build upon primary sources. The Act and our regulations do not require us to use only peer-reviewed literature, but instead they require us to use the "best scientific data available" in a proposed listing rule. We use information from many different sources, including articles in peer-reviewed journals, scientific status surveys and studies completed by qualified individuals, Master's thesis research that has been reviewed but not published in a journal, other unpublished governmental and nongovernmental reports, reports prepared by industry, personal communication about management or other relevant topics, conservation plans developed by States and counties, biological assessments, other unpublished materials, experts' opinions or personal knowledge, and other sources. We have relied on published articles, unpublished research, habitat modeling reports, digital data publicly available on the internet, and the expert opinion of subject biologists for the SSA and listing rule for Tiehm's buckwheat.

Also, in accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited peer review from knowledgeable individuals with scientific expertise that included familiarity with the species, the geographic region in which the species occurs, and conservation biology principles. Additionally, we requested comments or information from other concerned governmental agencies, Native American Tribes, the scientific community, industry, and any other interested parties concerning the proposed rule. Comments and information we received helped inform this final rule.

Comment 7: One commenter did not agree with the Service's conclusion that Tiehm's buckwheat provides an

unusually high contribution to the arthropod community and stated that data collected by McClinton et al. 2020 indicate that beetles, wasps, and flies are important pollinators for Tiehm's buckwheat and there are no apparent specialist pollinators. The commenter also stated that the SSA and proposed listing rule should disclose that McClinton et al. 2020, concluded that occupied and unoccupied sites were similarly abundant and diverse; the presence of Tiehm's buckwheat had no bearing on the overall abundance and diversity of the arthropod community.

Our response: The native plant species that co-occur with Tiehm's buckwheat that have average percent cover equal or greater than Tiehm's buckwheat are shrubs and grasses (as described in WestLand 2021, pp. 23–27). All of these species—shadscale saltbush (*Atriplex confertifolia*), black sagebrush (*Artemisia nova*), Nevada mormon tea (*Ephedra nevadensis*), James' galleta (*Hilaria jamesii*) (formerly *Pleuraphis jamesii*), and alkali sacaton (*Sporobolus airoides*)—are wind pollinated, making Tiehm's buckwheat the dominant insect-pollinated flowering plant in the plant community in which it occurs. With this information, we can conclude that Tiehm's buckwheat contributes substantially to arthropod abundance and diversity because Tiehm's buckwheat is the dominant insect-pollinated plant species in its habitat where it occurs. As we described in the SSA, the abundance and diversity of arthropods in Tiehm's buckwheat subpopulations are especially high for a plant community dominated by a single native herb species, as compared to sites with more diverse insect-pollinated plant species (those that are unoccupied by Tiehm's buckwheat; as described in McClinton et al. 2020, pp. 9–24). We agree with the commentator, that at this time, scientific information does not indicate any specialist pollinators of Tiehm's buckwheat.

Comment 8: We received multiple comments related to the genetics of Tiehm's buckwheat. Some commenters questioned the validity of the species, while others supported the species distinction, providing various interpretations of science in support of their views. Three commenters stated that the gene tree analysis by Grady (2012, entire) does not show a distinct grouping of Tiehm's buckwheat separate from other species of buckwheat, and that Tiehm's buckwheat is a population of Shockley's buckwheat. One commenter stated that Tiehm's buckwheat is morphologically distinct from other members of the genus and

the validity of the taxon has never been called into question since it was first described by Reveal. Another commenter stated that they were not aware of any plant systematist who has questioned the validity of Tiehm's buckwheat, and, although Grady (2012, entire) narrowed the possible close relatives of Tiehm's buckwheat, phylogenetic relationships vary by gene region and analysis; in no phylogenetic tree is Tiehm's buckwheat nested within samples from another species.

Our response: We have updated the SSA with some additional genetic information provided to us during the public comment period. The Act requires us to use the best scientific and commercial data available in our listing determinations. We solicited peer review of our evaluation of the available data, including genetic information, and our peer reviewers supported our determination that Tiehm's buckwheat is a valid species.

Within the wild buckwheat (*Eriogonum*) genus, Tiehm's buckwheat is placed in the subgenus *Eucycla* (Morefield 1995, p. 8; Reveal 2012, pp. 256–261). Grady (2012, entire) examined the molecular phylogenetic patterns of narrow endemism relating to edaphic factors in wild buckwheat. This study indicates that Tiehm's buckwheat is morphologically distinct, geographically isolated, and ecologically specialized (Grady 2012, p. 127). Grady (2012, p. 124) found that there is a clade or group composed of three narrowly endemic species—*E. tiehmii*, *E. soledium* (Frisco buckwheat), and *E. holmgrenii* (Snake Range buckwheat)—that shows some similarities with distributions coinciding with a particular soil substrate, which may point to a lineage of *Eriogonum* that is preferentially adapted to specific soil substrates.

Grady (2012, entire) used only a single sample of Tiehm's buckwheat when conducting his sequencing, not fully allowing the conclusion to be made that Tiehm's buckwheat is genetically distinct. Consensus trees constructed from Grady's analyses (2012, entire) also indicate a close relationship between Tiehm's buckwheat and Shockley's buckwheat (*Eriogonum shockleyi*), which is widespread and has a history of hybridization with other *Eriogonum* species.

Due to this, a genetic analysis was recently conducted to determine the genetic uniqueness of Tiehm's buckwheat when compared to cushion buckwheat (*Eriogonum ovalifolium*), and money buckwheat (*Eriogonum nummularum*), two that co-occur with

Tiehm's buckwheat in the project area and Shockley's buckwheat, the closest genetic relative (per Grady 2012) that is within the geographic vicinity (the Silver Peak Range) (Davis *in litt.* 2019; Ioneer 2020a, p. 20). Results from this study indicate that Tiehm's buckwheat is genetically distinct, although most similar to Shockley's buckwheat (Figure 3; Davis *in litt.* 2019). Therefore, based on the best available science, we consider Tiehm's buckwheat to be a valid and recognizable taxon, representing a distinct species.

Comment 9: Two commenters stated their views that the Service failed to address additional soil studies and relied too much on McClinton et al. 2020 in the SSA and proposed listing rule. They do not believe that high lithium and boron concentrations are associated with the presence of Tiehm's buckwheat. They assert that the presence of Tiehm's buckwheat is not related to chemical constituent, but rather other soil characteristics and the species is not a soil specialist. They also do not agree with our statement that there are no unoccupied soils favorable for all three early life history stages (emergence, survival, and seedling growth) of Tiehm's buckwheat. They state that statistical analyses provided by McClinton et al. 2020 indicated that occupied and unoccupied sites did not differ in emergence or survival. They continue that neither the SSA nor the proposed listing rule disclose, much less discuss, these statistical findings but rather, the SSA, proposed listing rule, and subsequent Service statements rely on a correlation between emergence and survival of seedlings in occupied sites and a lack of this correlation in unoccupied sites as evidence that only occupied sites provide the soils required by the species. The commenter also noted that seedlings grown in the greenhouse that were transplanted to unoccupied site PTS-A in the field had an 83.1 percent survival rate after 2 months and that, in the greenhouse study, that site had the third worst plant survival rate of all the soil samples studied.

Our response: We received additional information related to the soils of Tiehm's buckwheat (NewFields 2021, entire; WestLand 2021, entire; USDA NRCS 2022; entire). However, this information was either received late in our initial proposed rule decision-making process or during our public comment period. We considered this input to be new scientific information and have incorporated these references into the Tiehm's buckwheat SSA and in our decision process where appropriate, including in the rule portion of this

document. We still consider this species to meet the definition of a soil specialist or edaphic endemic because it occurs predominantly on challenging soil that differs from the surrounding soil matrix and grows better on soils with these conditions (Mason 1964, entire; Gankin and Major 1964, entire; Rajakaruna and Bohm 1999, entire; Rajakaruna 2004, entire; Palacio *et al.* 2007, entire; Escudero *et al.* 2014, entire). We provide additional details and citations in our SSA report (Service, 2022, entire).

As stated in McClinton *et al.* 2020 and in the SSA, there was variation in soils among subpopulations and tested, adjacent, unoccupied sites. For example, McClinton *et al.* 2020 did find that, on average, boron levels on Tiehm's buckwheat soils were higher than in tested, unoccupied sites. Additionally, NewFields 2021 (table 3) shows that boron is more abundant on Tiehm's buckwheat soils than soils unoccupied by the species. However, subsequent analysis by NewFields found boron to be correlated with other variables, particularly clay, leaving it unclear which variables matter most to Tiehm's buckwheat. Additionally, maps provided to us displaying the lithology underlying Tiehm's buckwheat habitat as in Ioneer 2020b (appendix C-1), NewFields 2021 (figures 1, 2a, 2b, and 2c), and WestLand 2021 (figures 1a-3a) show moderate to high lithium and boron mineralization in rocks underlying Tiehm's buckwheat habitat, from which the soil the species inhabits is directly formed via weathering. Chemical soil properties alone do not determine suitable habitat for any plant species, and these results do not necessarily imply a physiological dependence on a particular mineral but are simply characteristics that may be helpful to describe where the species occurs and the species' habitat needs, to possibly identify additional suitable habitat for the species.

For McClinton *et al.* 2020 to find that Tiehm's buckwheat has specific soil requirements is persuasive, particularly because of the results of the plant-soil relationship greenhouse study. Simply measuring emergence in the tested occupied or unoccupied soil does not determine soil preference, because emergence is different than survival. As we state in the SSA and described in McClinton *et al.* 2020 (p. 36), some of the tested unoccupied soils were individually favorable for emergence, survival, or seedling growth, but there were no tested unoccupied soils that were favorable for all three life history stages of Tiehm's buckwheat. This does not mean there are no unoccupied soils

favorable for all three life history stages, just not among those that were tested.

Unoccupied site PTS-A is within potential dispersal distance from other subpopulations; however, Tiehm's buckwheat does not occur at this site. The low survival and biomass observed in seedlings growing in this soil in ideal greenhouse conditions may indicate a potential barrier to establishment during early life history stages. Even if herbivory did not occur and the transplanted seedlings survived, the lack of an extant subpopulation here indicates that it may be unlikely for seeds potentially generated by the transplanted seedlings to recruit and establish a self-sustaining subpopulation.

Comment 10: Several commenters were skeptical that attempts to relocate or transplant Tiehm's buckwheat would be successful, while several other commenters believe the species can be transplanted and translocated, providing various explanations for their views. One commenter interpreted the greenhouse study to conclude that transplantation and translocation were likely to be unsuccessful. Another commenter stated that transplantation of Tiehm's buckwheat has been significantly more fruitful than initially believed. One commenter stated that, even with short-term success, it is premature to declare the transplanting a success because longer term monitoring (several years to a decade or longer) is needed to determine long-term survival at a new site. One commenter stated that the SSA and proposed listing rule should acknowledge that successful translocations of mat-buckwheat species have been documented. One commenter stated that translocation of individual plants in lieu of protecting them in their native habitat is fundamentally at odds with the principles of conservation.

Our response: Translocation of Tiehm's buckwheat would not be being considered if it was not for the proposed Rhyolite Ridge lithium-boron project. Translocation should be considered as a mitigation measure and analyzed as part of BLM's NEPA process and as part of a Section 7 consultation. We conclude that, as a first step, direct seeding and/or seedling transplantation experiments in unoccupied but potentially favorable sites should be designed to test if dispersal mechanisms are restricting the species' range. Direct seeding and/or transplanting are much lower risk than translocating mature plants as they do not impact naturally occurring plants and subpopulations. Only if success is achieved with direct seeding or transplanting of seedlings into unoccupied sites, should translocation

be considered. In either case, we would not consider these efforts to be successful until an introduced population can carry on its basic life history processes—establishment (seeds germinate and seedlings are able to grow into adults), reproduction (plants are producing viable seed), and dispersal (seeds are able to produce new seedlings)—such that the probability of complete extinction due to random environmental events is low.

While it is true that translocations have occurred for other mat-buckwheat species in Nevada, to our knowledge, monitoring data that speaks to the success of these efforts does not exist or cannot be located. Without monitoring data we are unable to conclude if these translocations represent viable, self-sustaining populations. We also cannot assume that Tiehm's buckwheat will respond in the same manner to translocation as other mat buckwheats and therefore are unable to make assumptions from this anecdotal information on the efficacy of translocating Tiehm's buckwheat.

Comment 11: We received multiple comments about Ioneer's revised mine PoO and the need for the Service to update and revise the SSA's current and future threats analyses on mineral exploration and development.

Our response: In November 2021, Ioneer met with BLM and the Service to discuss proposed revisions to their 2020 PoO for the Rhyolite Ridge Lithium-Boron project (Service 2021b, entire) including adjustments to the proposed quarry location. On May 27, 2022, Ioneer provided the Service with a memorandum further describing the proposed revisions to their 2020 PoO (Ioneer 2022a, entire). On July 18, 2022, Ioneer submitted their revised PoO to BLM and Ioneer provided the Service with a copy on August 8, 2022. On August 17, 2022, BLM determined the revised PoO was complete under 43 CFR 3809.401(b); however, BLM resource specialists are still in the process of receiving and reviewing baseline data reports that further explain the details of the 2022 revised PoO. BLM will analyze the environmental impacts of approving the project under National Environmental Policy Act (NEPA), and BLM may initiate consultation with the Service under section 7 of the Act. We have considered and incorporated the 2022 revised PoO, which includes indirect impacts to individual plants and proposed loss of 38 percent of critical habitat, into our analysis, and we find that the threat of mining continues to be of such magnitude that taken in combination with other threats

described in this rule, Tiehm's buckwheat is in danger of extinction throughout all of its range. This final rule reflects the best available information that existed at the time we made this final determination.

Comment 12: One commenter stated that the proposed listing rule wrongly states that trenching in the past (before Ioneer's involvement) has resulted in the loss of some of Tiehm's buckwheat habitat. The commenter said that this statement is misleading because the only mineshaft present is in an area that is not occupied by the species. They state that there are exploration trenches (pre-Ioneer) within some of the subpopulations where Tiehm's buckwheat is currently growing in higher concentrations than in the surrounding area. Thus the commenter states that some level of disturbance may be a key habitat characteristic for Tiehm's buckwheat, as has been recognized for other buckwheat species.

Our response: As described in our SSA, Morefield (1995, p. 15) documented that subpopulations 1, 2, 3, 4, and 6 were all impacted by trenches, or mine shafts associated with past mineral exploration, or by surface disturbance associated with the placement of mining claim markers (pre-Ioneer) that resulted in a cumulative loss of about 0.10 ac (0.04 ha) of habitat. However, the observed trenches and mine shafts did not appear to be recent because Tiehm's buckwheat colonized some of the bottoms of trenches as well as the edges of debris piles (Morefield 1995, p. 15). During the public comment period, we were provided with observational data (WestLand 2021, p. 29) comparing density in disturbed (trenches) and undisturbed Tiehm's buckwheat habitat. For example, WestLand 2021 (p. 29) stated that within subpopulation 1, the density of Tiehm's buckwheat within trenches is between 4 and 10 times higher than the density of buckwheat within subpopulation 1. However, detailed methods and plant estimates between disturbed and undisturbed habitat were not provided, so we are unable to draw conclusions on Tiehm's buckwheat density in disturbed and undisturbed habitat, the level of disturbance the species may be able to withstand, or time since disturbance the species may be able to re-establish within its habitat. We welcome further science and monitoring data related to this topic.

Comment 13: One commenter stated that all comments about potential future impacts from mineral exploration are speculative at best; they are not reasonably foreseeable and cannot form

the basis for a decision to list Tiehm's buckwheat. They also stated that the Service is wrong to assume that mining impacts are likely to occur without taking into account the ways in which Ioneer's proposed protective measures would mitigate those threats.

Our response: BLM received a 2020 PoO and a revised 2022 PoO, both containing detailed mining plans, which the Service considered in determining the severity and immediacy of threats currently impacting the species now and those which are likely to occur in the near term. The Service considered Ioneer's proposed protective measures included in the 2020 PoO and the 2022 revised PoO. We understand the proposed project may or may not be permitted by BLM as proposed and therefore it is uncertain whether or not these mining plans and protection measures will be fully implemented as described. However, we used the best available information regarding the impacts of the mine and the threat of mining in our analysis.

Comment 14: One commenter stated that increased drought may be causing more herbivory in the region, postulating that placing a large drinking trough for desert bighorn sheep (*Ovis canadensis nelsoni*) and pronghorn (*Antilocapra americana*) next to the site could have helped subsidize possible herbivory.

Our response: The Service is unaware of a large drinking trough in close proximity to occupied habitat. Cervid (deer) eDNA was present in samples from damaged plants following the herbivory event in 2020. However, due to eDNA data and morphological evidence of rodent incisor marks on the roots of damaged plants, we conclude that a diurnal rodent in the genus *Ammospermophilus* was largely responsible for the damage to Tiehm's buckwheat. This conclusion is further described in Section 3.1.2 Herbivory in the SSA.

Comment 15: Several commenters were concerned about climate change impacts to Tiehm's buckwheat. One commenter stated that emissions from construction as well as vegetation clearing may create a localized heat island effect, increasing temperature and decreasing humidity and thereby adding more stress to Tiehm's buckwheat, and asked how temperature increases will impact this species. Another commenter stated that permitting the extraction of lithium for battery applications would reduce carbon dioxide emissions from vehicles and electricity generation, indirectly benefitting all species beyond the population of Tiehm's buckwheat.

Our response: As described in the SSA Section 4.1.3 Climate Change, the implications of climate change to Tiehm's buckwheat will depend largely on the interaction of temperature and precipitation. Analyzing the reduction in carbon dioxide emissions from electric vehicles is outside the scope of our SSA analysis, which is focused on the threat of climate change to Tiehm's buckwheat.

Comment 16: One commenter stated that assuming climate change exacerbates the risk of herbivory, climate change does not pose the sort of immediate threat to Tiehm's buckwheat that justifies listing the species as endangered.

Our response: Our listing decision was not solely based on the threat of climate change. As described in the proposed listing rule, we found that Tiehm's buckwheat is in danger of extinction due to the present or threatened destruction, modification, or curtailment of its habitat or range including habitat loss and degradation due to mineral exploration and development, road development and OHV use, livestock grazing, and nonnative, invasive plant species (all Factor A threats); herbivory (Factor C); and climate change (Factor E). Of these, we consider mineral exploration and development and herbivory to be the greatest threats to Tiehm's buckwheat. The existing regulatory mechanisms (Factor D) are inadequate to protect the species from these threats to the level that listing is not warranted. We did not identify threats to the continued existence of Tiehm's buckwheat due to overutilization for commercial, recreational, scientific, or educational purposes (Factor B) or disease (Factor C).

Comment 17: One commenter was concerned about the impacts of trampling on Tiehm's buckwheat. The commenter stated that the conservation status of the species and ensuing controversy has drawn numerous parties from across the country to the site, for scientific purposes, for curiosity, or other purposes. Repeated visitation has led to clearly delineated social trails and other areas of human impact. Compaction of soils from human trampling poses a threat to Tiehm's buckwheat by directly impacting or killing individual plants, providing a limiting factor on recruitment, increasing erosion, and altering precipitation and runoff dispersal.

Our response: BLM recently installed fences to restrict access of OHVs to subpopulations of Tiehm's buckwheat, which may restrict human visitation as

well. BLM will monitor the effectiveness of the fences and plans to add signage to notify the public of the sensitive resources in the area (BLM 2021j, pp. 4–5). The Service will continue to watch for anthropogenic impacts to the species including from human visitation.

Comment 18: One commenter stated that conservation benefits for Tiehm's buckwheat will only occur if Ioneer's project proceeds. They stated that under the Service's Policy for Evaluation of Conservation Efforts (PECE), the Service must evaluate the certainty that conservation efforts that have not yet been implemented will actually occur. The commenter stated that the Service should be evaluating two conservation efforts: Ioneer's protection measures that have already been implemented and a conservation plan that is being developed. However, the commenter stated that because the terms of the conservation plan are still under development, it is not appropriate for the Service to evaluate them under its Policy for Evaluation of Conservation Efforts (PECE).

Our response: We agree the PECE policy is not applicable at this time because the conservation plan is still under development as described in Section 4.2 Conservation Measures and Regulatory Mechanisms of our SSA. The Service considered Ioneer's proposed protective measures included in the 2020 PoO and the 2022 revised PoO. We understand the proposed project may or may not be permitted by BLM as proposed and therefore it is uncertain whether or not these mining plans and protection measures will be fully implemented as described. However, we used the best available information regarding the impacts of the mine and threat of mining in our analysis. Further, after the listing of a species, conservation agreements or partnerships to conserve the species can continue to be developed.

Public Comments on Proposed Critical Habitat

Comment 19: One commenter stated that the Rhyolite Ridge lithium-boron project is expected to employ 400 to 500 workers during the construction phase and 320 to 350 during operation. When considering the life of the mine (30 to 50 years under current technology) and the direct, indirect, and induced jobs created, the Rhyolite Ridge lithium-boron project will be transformative for the people, children, and businesses of Esmeralda County and its communities. They requested that, in considering a critical habitat designation, the Service

consider the economic and social benefits of the project.

Our response: The Service appreciates the information on the regional economic significance of the Rhyolite Ridge lithium-boron project. This issue is examined in our economic analysis. The primary intended benefit of critical habitat is to support the conservation of endangered and threatened species, such as Tiehm's buckwheat. Regardless of whether critical habitat is designated, if the species is listed as endangered, any section 7 consultation on the mine would consider the potential for the project to result in jeopardy to the listed species, and project modifications would be recommended to avoid jeopardy to Tiehm's buckwheat. With the designation of critical habitat, future section 7 consultations stemming from the mine project would additionally consider the potential for the project to result in adverse modification of its critical habitat. Project modifications could be recommended to avoid jeopardy and adverse modification. Given that there is only one critical habitat unit being designated, and it is occupied, we do not anticipate that a consultation on this project would generate different project modifications due to the designation of critical habitat.

Comment 20: One commenter asked if it is logical to extend protections to the habitat of Tiehm's buckwheat since the species is already classified as "proposed endangered." They stated that some may see the proposed critical habitat rule as misguided because the designation overlaps with a potential area of an open pit lithium mine.

Our response: According to section 4(a)(3)(A) of the Act, the Secretary of the Interior shall, to the maximum extent prudent and determinable, concurrently with making a determination that a species is an endangered species or a threatened species, designate critical habitat for that species. We have determined that critical habitat is both prudent and determinable for Tiehm's buckwheat. Therefore, as required by the Act, we proposed for critical habitat those areas occupied by the species at the time of listing and that contain the PBFs essential to the conservation of the species, which may require special management considerations or protection.

Comment 21: Several commenters thought that the critical habitat designation should be larger in size to better address the pollinators, hydrology, invasive species, and mining impacts like dust and air pollutants. One commenter recommended we include all habitat within a mile of the Tiehm's buckwheat population. One

commenter recommended that the Service use performance standards to determine effective buffer widths for the types of impacts that may affect Tiehm's buckwheat. One commenter recommended considering depth for our critical habitat boundary due to the proposed Rhyolite Ridge lithium-boron project.

Our response: Under the Act and its implementing regulations, in areas occupied at the time of listing, we are required to identify the PBFs essential to the conservation of the species for which we propose critical habitat. To determine critical habitat, the Service identified the physical or biological habitat features needed to provide for the life history processes of Tiehm's buckwheat. These include but are not limited to: space for individual and population growth for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding and rearing offspring; and habitats that are protected from disturbances or are representative of the historic geographical and ecological distributions of the species.

Tiehm's buckwheat is dependent on pollinators for reproduction. Thus, preserving the interaction between the buckwheat and its pollinators is integral for survival. Through our analysis, we found that a 1,640 ft (500 m) pollination area was sufficient to support the maximum foraging distance of primary insect visitors—bees, wasps, beetles, and flies—that are presumed to be the pollinators of Tiehm's buckwheat. This 1,640 ft (500 m) area encompasses the PBFs necessary to the conservation of Tiehm's buckwheat. We do not have information suggesting that a larger area around plants is necessary to maintain and support plant–pollinator interactions.

Soil depth was considered in our physical and biological features for Tiehm's buckwheat. Suitable soils for Tiehm's buckwheat have soil depths to bedrock that range from 3.5 to 20 in (9 to 51 cm; USDA NRCS 2022, entire). This, among other physical and biological features, is included in what we have determined to be essential to the conservation of Tiehm's buckwheat.

The various other elements that commenters sought to address, such as the threats from invasive species, altered hydrology and mining impacts like dust and air pollutants are not considered to be physical or biological features essential to the conservation of Tiehm's buckwheat. These potential threats would be evaluated in section 7 consultations on projects that may affect the species and its critical habitat.

Comment 22: One commenter stated that the Service has designated critical habitat for only five of eight other buckwheat (*Eriogonum*) species. They stated that for only one of those species did the Service include protection for pollinators; therefore, they found our inclusion of a PBF for pollination to be inconsistent with our other critical habitats for buckwheat species. The commenter goes on to state that the proposed 1,640 ft (500 m) buffer is inconsistent with what the Service has done for other buckwheat species; Umtanum desert buckwheat (*Eriogonum codium*) had a 98 ft (30 m) buffer and clay-loving buckwheat (*Eriogonum pelinophilum*) had a recommended (but not required) protection of 656–820 ft (200–250 m) for the conservation of native pollinators. The commenter believes that the failure to provide a reasoned explanation for these departures renders the proposed designation of protection for pollinator habitat arbitrary and capricious.

Our response: We considered the best scientific and commercial data available regarding Tiehm's buckwheat to evaluate its potential status and designation of critical habitat under the Act. Science is a cumulative process, and the body of knowledge is ever-growing. We recognize that over time as we evaluate each species under the Act, scientific information is continually evolving based on new studies and research, and, therefore, to determine critical habitat for Tiehm's buckwheat, the Service used the best available science to inform the physical or biological habitat features needed to support the life history processes of this species. In this instance, the Service used pollinator studies on pollinator efficiency and flight and foraging distances of bees, wasps, beetles, and flies, and concluded the 1640-ft (500-m) pollination area was sufficient to support the maximum foraging distance of pollinators and insect visitors. This area provides the essential habitat configuration that contains the PBFs essential to the conservation of Tiehm's buckwheat and is supported by the best scientific and commercial data currently available.

Comment 23: One commenter stated that the use of a uniform buffer creates distortions due to the significant difference in the size and geographic distribution of various subpopulations of Tiehm's buckwheat. The commenter recommended the Service tailor the boundaries of the critical habitat designation so that the total area of the buffer associated with individual subpopulations is proportional to subpopulation size and avoids

distortions resulting from the separation between subpopulation 3 and the other subpopulations. The commenter recommended that the Service reduce the buffer around subpopulation 3 so that the protected area associated with that subpopulation is proportional to the area protected for other subpopulations.

Our response: The final rule designating critical habitat for Tiehm's buckwheat has retained a unit boundary that has a symmetrical shape because we are using the best available nesting, egg-laying, and foraging information for bee, wasp, beetle, and fly pollinator and insect visitors of Tiehm's buckwheat to define the critical habitat boundary. Principles of conservation biology stress the importance of maintaining the largest areas of contiguous habitat possible with the least amount of fragmentation. We considered other boundary options for critical habitat; however, our boundary captures pollinator and insect visitor overlap among subpopulations as well as other PBFs necessary to the conservation of Tiehm's buckwheat.

Comment 24: One commenter stated that a much smaller buffer would adequately protect habitat for the pollinators that serve Tiehm's buckwheat because bees are relatively infrequent visitors and the pollinators that dominate visitation to Tiehm's buckwheat flowers are either likely to fly short distances or are unlikely to be limited by flight distances. Far more pollinators than solitary bees have been detected in Tiehm's buckwheat habitat, and it's unclear that the solitary bee is an appropriate proxy for other pollinators.

Our response: As described in sections 2.3 and 2.4 of our SSA, a combination of pitfall traps, flower-insect observations, and pollinator exclusion studies demonstrate that Tiehm's buckwheat benefits from insect visitors and that the presence of an intact pollinator community is important for maintaining the species (McClinton et al. 2020, pp. 9–24). However, not all floral visitors are pollinators and not all pollinators are equally effective in their pollinator services (Senapathi et al. 2015, entire; Garratt et al. 2016, entire; Wang et al. 2017, entire). For example, a plant visited frequently by flies and only occasionally by bees could still be pollinated primarily by the bees if the bees transfer larger quantities of pollen per visit. Studies that look at pollen loads (the number of pollen attached to a pollinator's body) and insect visitor frequency with pollinator effectiveness or performance (the ability of a floral

visitor to remove and deposit pollen) have not been done for any of the insect visitors to Tiehm's buckwheat. Therefore, we looked at the best available science for all insect visitors to Tiehm's buckwheat to ensure our recommendations capture all of their needs.

Comment 25: One commenter stated that megafauna such as desert bighorn sheep and pronghorn spend substantial time within Tiehm's buckwheat habitat as evidenced by the presence of their scat within the area, implying they provide nutrient cycling services in an otherwise nutrient-limited highly mineralized soil. The commenter stated that a 1,640 ft (500 m) buffer would not be large enough to maintain the ecosystem functions and limit disruption of behavior of large ungulates and recommended that the Service consider a 1 mile (5,280 ft (1,609 m)) buffer.

Our response: We are aware that desert bighorn sheep and pronghorn spend time within Tiehm's buckwheat habitat; however, we are not aware of any data on their scat and nutrient cycling services that it may provide to Tiehm's buckwheat. Therefore, we are not able to identify the benefit that might be associated with expanding the unit boundary to accommodate the potential benefit of these species to Tiehm's buckwheat.

Comment 26: One commenter stated that suitable unoccupied habitat exists because the Service is erroneous in its understanding of the habitat needs of Tiehm's buckwheat. They also recommended the Service revisit its decision regarding the designation of areas outside the currently occupied locations as critical habitat.

Our response: Under the first prong of the Act's definition of critical habitat, areas within the geographic area occupied by the species at the time it is listed are included in a critical habitat designation if they contain PBFs (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographic area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. We designate critical habitat in areas outside the geographic area occupied by a species only when a designation limited to its range would be inadequate to ensure the conservation of the species. In the case of Tiehm's buckwheat, which is known from only one geographic area, we are

designating critical habitat under the first prong of the Act. Other unoccupied locations may have similar physical and biological features that may support life history requirements for Tiehm's buckwheat; however, until direct seeding or transplant studies are conducted (*i.e.*, to increase the species dispersal) in these locations, we do not have any scientific evidence to support the theory that Tiehm's buckwheat has the ability to grow and persist at locations other than where it currently occurs. Because we determined that occupied areas are sufficient to conserve the species, no unoccupied areas are essential for the conservation of the species. Therefore, we did not identify any unoccupied areas that may qualify as units of critical habitat and are not designating any areas outside the geographical area occupied by the species.

Comment 27: Two commenters had concerns related to the plant community PBFs. One commenter stated that the Service has not adequately shown the relationship of associated plant species to Tiehm's buckwheat survivability. Another commenter stated that Tiehm's buckwheat is found in previously disturbed areas like former exploration trenches, countering the false impression that the species requires an area free from anthropogenic disturbance.

Our response: While Tiehm's buckwheat has shown some adaptive characteristics such as colonizing some disturbed areas within otherwise occupied subpopulations, the best available science for this species continues to demonstrate that PBFs and habitat characteristics, including soil type and plant community associations, are required to sustain the species' life history processes. See also, our response to comment 12 related to previously disturbed areas.

Comment 28: One commenter stated that Loneer intends to collect data during the 2022 flowering season on flying insects at various distances from Tiehm's buckwheat subpopulations. They state the Service should consider this data before finalizing the critical habitat for Tiehm's buckwheat.

Our response: We welcome additional data to characterize the pollinator community associated with Tiehm's buckwheat. However, we cannot delay our decision to allow for the development of additional data and have used the best available scientific and commercially available data in our critical habitat designation.

Loneer collected pollinator data during the 2022 flowering season and provided the Service an initial findings

report on July 5, 2022. However, this report did not provide sufficient analyses to include in this final rule with preliminary findings similar to those described in McClinton et al. 2020.

Comment 29: One commenter stated that BLM-approved seed mixes have not been proven effective in increasing native plant cover and preventing dust deposition. They state that empirical evidence from Rhyolite Ridge reveals that sites disturbed during the exploration phase of the proposed Rhyolite Ridge lithium-boron project have not been effectively "reclaimed" or restored. Another commenter stated that Loneer scraped a large area for water bladders along an existing road. This area is within the proposed critical habitat and is now covered in the noxious weed, saltlover. They asked if the proposed critical habitat will be weeded and seeded and if disturbed areas will be reclaimed and made weed-free.

Our response: In accordance with BLM's regulations at 43 CFR 3809.420(b)(3), at the earliest feasible time, operators shall reclaim the area disturbed, except to the extent necessary to preserve evidence of mineralization. The BLM identifies seed mixes based upon the project area which are designed to facilitate reclamation. BLM has BMPs for invasive and nonnative species that focus on the prevention of further spread and/or establishment of these species (BLM 2008b, pp. 76–77). BMPs should be considered and applied where applicable to promote healthy, functioning native plant communities, or to meet regulatory requirements. BMPs include inventorying weed infestations, prioritizing treatment areas, minimizing soil disturbance, and cleaning vehicles and equipment (BLM 2008b, pp. 76–77). However, incorporation or implementation of BMPs are at the discretion of the authorized BLM officer.

Determination of Tiehm's Buckwheat Status

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

endangered species or threatened species because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range

After evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we found that the population occurs in an extremely small area, has specialized habitat requirements, and has limited recruitment and dispersal. Our analysis revealed that the species is vulnerable to ongoing and future threats that affect both individual plants and their habitat.

We have carefully assessed the best scientific and commercial information available regarding the current and future threats to Tiehm's buckwheat. We considered the five factors identified in section 4(a)(1) of the Act in determining whether Tiehm's buckwheat meets the definition of an endangered species (section 3(6)) or threatened species (section 3(20)). We find that Tiehm's buckwheat is in danger of extinction due to the present or threatened destruction, modification, or curtailment of its habitat or range including habitat loss and degradation due to mineral exploration and development, road development and OHV use, livestock grazing, and nonnative, invasive plant species (all Factor A threats); herbivory (Factor C); and climate change (Factor E). Of these, we consider mineral exploration and development and herbivory to be the greatest threats to Tiehm's buckwheat. The existing regulatory mechanisms (Factor D) are inadequate to protect the species from these threats. We did not identify threats to the continued existence of Tiehm's buckwheat due to overutilization for commercial, recreational, scientific, or educational purposes (Factor B) or disease (Factor C).

In 2020, a detrimental herbivory event caused greater than 60 percent damage or loss of individual Tiehm's buckwheat plants across the population. The proposed Rhyolite Ridge lithium-boron project (if permitted by BLM as proposed in the 2020 PoO) would reduce the remaining Tiehm's buckwheat population by 54 percent, or from 15,757 individuals to roughly 7,305 individuals as we do not know yet

if translocating plants is feasible. Road development and vehicle traffic associated with the proposed mine as well as livestock grazing may further affect the overall health and physiological processes of individual Tiehm's buckwheat plants and create conditions that further favor the establishment of nonnative, invasive species within the species' habitat. Increased temperatures and alteration of precipitation patterns due to climate change may impact plant transpiration and soil water recharge needed by Tiehm's buckwheat, as well as bolstering local rodent populations. High rodent abundance combined with high temperatures and drought may have contributed to the herbivore impacts in 2020.

We find that Tiehm's buckwheat is in danger of extinction throughout all of its range due to the severity and immediacy of threats currently impacting the species now and those which are likely to occur in the near term. We have considered and incorporated the 2022 revised PoO, which includes indirect impacts to individual plants and proposed loss of 38 percent of critical habitat, into our analysis and we find that the threat of mining continues to be of such a magnitude that, taken in combination with other threats described in this rule, Tiehm's buckwheat is in danger of extinction throughout all of its range.

We find that a threatened species status is not appropriate because the threats are severe and imminent, and Tiehm's buckwheat is in danger of extinction now, as opposed to likely to become endangered in the future. Therefore, on the basis of the best available scientific and commercial information, we determine that Tiehm's buckwheat is in danger of extinction throughout all of its range and are listing Tiehm's buckwheat as an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. We have determined that Tiehm's buckwheat is in danger of extinction throughout all of its range and accordingly did not undertake an analysis of any significant portion of its range. Because Tiehm's buckwheat warrants listing as endangered throughout all of its range, our determination does not conflict with the decision in *Center for Biological*

Diversity (CBD) v. Everson, 435 F. Supp. 3d 69 (D.D.C. Jan. 28, 2020) because that decision related to significant portion of the range analyses for species that warrant listing as threatened, not endangered, throughout all of their range.

Determination of Status

Our review of the best available scientific and commercial information indicates that Tiehm's buckwheat meets the Act's definition of an endangered species. Therefore, we are adding Tiehm's buckwheat to the List of Endangered and Threatened Plants as an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness and conservation by Federal, State, Tribal, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and other countries and calls for recovery actions to be carried out for listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Section 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning consists of preparing draft and final recovery plans, beginning with the development of a recovery outline and making it available to the public after publication of a final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to

address continuing or new threats to the species, as new substantive information becomes available. The recovery plan also identifies recovery criteria for review of when a species may be ready for reclassification from endangered to threatened ("downlisting") or removal from protected status ("delisting"), and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our website (<https://www.fws.gov/endangered>), or from our Reno Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

Following publication of this final rule, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost-share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the State of Nevada could be eligible for Federal funds to implement management actions that promote the protection or recovery of Tiehm's buckwheat. Information on our grant programs that are available to aid species recovery can be found at: <https://www.fws.gov/service/financial-assistance>.

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

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is listed as an endangered or threatened species and with respect to its critical habitat. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service. Consultation may be informal (the proposed action may affect, but is not likely to adversely affect listed species or critical habitat) or formal (the proposed action may affect, and is likely to adversely affect listed species or critical habitat). The standard for consultation is “may affect,” which means that a proposed action may pose any effects on listed species or designated critical habitat.

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

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

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a final listing on proposed and ongoing activities within the range of a listed species. Based on the best available information, the following actions are unlikely to result in a violation of section 9, if these activities are carried out in accordance with existing regulations; this list is not comprehensive:

(1) OHV or other vehicle use on existing roads and trails in compliance with the BLM’s Tonopah Resource Management Plan.

(2) Recreational use with minimal ground disturbance (e.g., hiking, walking).

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

(1) Removing, maliciously damaging or destroying, or collecting of Tiehm’s buckwheat on Federal land; and

(2) Removing, cutting, digging up, or damaging or destroying Tiehm’s buckwheat in knowing violation of any law or regulation of the State of Nevada or in the course of any violation of a State criminal trespass law.

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

II. Critical Habitat Designation

Background

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

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Act, on which are found those physical or biological features:

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

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

(2) Specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the Act, upon a determination that such areas are

essential for the conservation of the species.

Although this critical habitat designation was proposed when the regulatory definition of habitat (85 FR 81411; December 16, 2020) and the 4(b)(2) exclusion regulations (85 FR 82376; December 18, 2020) were in place and in effect, those two regulations have been rescinded (87 FR 37757; June 24, 2022 and 87 FR 43433; July 21, 2022) and no longer apply to any designations of critical habitat. Therefore, for this final rule designating critical habitat for Tiehm’s buckwheat, we apply the regulations at 50 CFR 424.19 and the 2016 Policy on 4(b)(2) exclusions (81 FR 7226; February 11, 2016) as described in the 4(b)(2) rescission rule (87 FR 43433; July 21, 2022).

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

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

implement “reasonable and prudent alternatives” to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act’s definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain PBFs (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those PBFs that are essential to the conservation of the species (such as space, food, cover, and protected habitat). In identifying those PBFs that occur in specific occupied areas, we focus on the specific features that are essential to support the life-history needs of the species, including, but not limited to, water characteristics, soil type, geological features, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity.

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

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information

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

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

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

contribute to recovery of the species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of those planning efforts calls for a different outcome (*i.e.*, if new information sufficiently justifies the proposed conservation effort).

Physical or Biological Features Essential to the Conservation of the Species

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12(b), in determining which areas we will designate critical habitat from within the geographical area occupied by the species at the time of listing, we consider the PBFs that are essential to the conservation of the species and that may require special management considerations or protection.

The features may also be combinations of habitat characteristics and may encompass the relationship between characteristics or the necessary amount of a characteristic essential to support the life history of the species.

In considering whether features are essential to the conservation of the species, the Service may consider an appropriate quality, quantity, and spatial and temporal arrangement of habitat characteristics in the context of the life-history needs, condition, and status of the species. These characteristics include, but are not limited to: (1) Space for individual and population growth and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, or rearing (or development) of offspring; and (5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Using the species’ habitat, ecology, and life history, which are summarized below and are described more fully in the proposed listing rule (86 FR 55775; October 7, 2021) and the SSA report (Service 2022, entire) that was developed to supplement the proposed listing rule, which are available at <https://www.regulations.gov> under Docket No. FWS–R8–ES–2020–0017, we consider the following habitat characteristics to derive the specific PBFs essential for the conservation of Tiehm’s buckwheat.

Habitat Characteristics

Tiehm's buckwheat occurs between 5,906 and 6,234 feet (ft) (1,800 and 1,900 meters (m)) in elevation and on all aspects with slopes ranging from 0 to 50 degrees (Ioneer 2020a, p. 5; Morefield 1995, p. 11). The species occurs on dry, upland sites, subject only to occasional saturation by rain and snow, and is not found in association with free surface or subsurface waters (Morefield 1995, p. 11). Tiehm's buckwheat is the dominant native herb in the sparsely vegetated community in which it occurs, resulting in an open plant community with low plant cover and stature (Morefield 1995, p. 12). Where Tiehm's buckwheat grows, the vegetation varies from exclusively Tiehm's buckwheat to sparse associations with a few other low-growing herbs and grass species, suggesting the species is not shade-tolerant and requires direct sunlight. The most common associates of Tiehm's buckwheat with and in the surrounding area are species found in salt desert shrubland communities such as shadscale saltbush, black sagebrush, Nevada mormon tea, James' galleta, and alkali sacaton (Morefield 1995, p. 12; Cedar Creek Associates 2021, p. 1; WestLand 2021, p. 25). The nonnative forb saltlover has recently become established and is now part of the associated plant community in all subpopulations of Tiehm's buckwheat (See section 3.1.1 in Service 2022 for further discussion; CBD 2019, pp. 20–21; Ioneer 2020a, pp. 9–10; Fraga 2021b, pp. 3–4; WestLand 2021, pp. 23–25).

Like most terrestrial plants, Tiehm's buckwheat requires soil for physical support and as a source of nutrients and water. Tiehm's buckwheat occurs on soil with a high percentage (70–95 percent) of surface fragments that is classified as clayey, smectitic, calcareous, mesic Lithic Torriorthents; clayey-skeletal, smectitic, mesic Typic Calcicargids; and clayey, smectitic, mesic Lithic Haplargids (United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS 2022, entire). The A horizon is thin (0–5.5 in (0–14 cm)); B horizons are present as Bt (containing illuvial layer of lattice clays) or Bw (weathered); C horizons are not always present; and soil depths to bedrock range from 3.5 to 20 in (9 to 51 cm; USDA NRCS 2022, entire). The soil pH is greater than 7.6 (*i.e.*, alkaline) in all soil horizons (USDA NRCS 2022, entire). All horizons effervesce to varying degrees using hydrochloric acid, indicating the presence of calcium carbonate throughout the soil profile (USDA NRCS 2022, entire). Soil horizons are

characterized by a variety of textures, and include gravelly clay loam, sand, clay, very gravelly silty clay, and gravelly loam (USDA NRCS 2022, entire).

Tiehm's buckwheat is distributed on these soils along an outcrop of lithium clay and boron in exposed former lake beds (Ioneer 2020a, p. 5; Ioneer 2020b, appendix C–1; NewFields 2021, figure 1; WestLand 2021, figure 1a–1c). Initial soil sample analyses demonstrate that boron and carbonates were commonly present at excessive levels and sulfur, calcium, and potassium were commonly present at high levels (Ioneer 2020a, p. 6). Two further analyses indicate differences in soil chemistry and texture among soils that are occupied and unoccupied by Tiehm's buckwheat (McClinton 2020, pp. 29–32; NewFields 2021, pp. 17–24, table 3). Soils occupied by Tiehm's buckwheat have high clay and silt content as well as high pH (McClinton *et al.* 2020, pp. 35, 55; NewFields 2021, p. 21). McClinton *et al.* 2020 (p. 35) found significant differences in soil chemistry between soils occupied and unoccupied by Tiehm's buckwheat, including potassium, zinc, sulfur, and magnesium, which were on average lower in occupied soils, and boron, bicarbonate, and pH, which were, on average, higher, though there was variation among subpopulations and adjacent, unoccupied sites (McClinton *et al.* 2020, pp. 35, 53). For example, boron was higher in Tiehm's buckwheat subpopulations 1, 2, and 3 than in subpopulations 4, 5, 6, 7, and 8 (McClinton *et al.* 2020, p. 30). NewFields 2021 (p. 18, table 3) found that active carbon, boron, lithium, magnesium, sodium, and total kjeldahl nitrogen were significantly different between soils occupied and unoccupied by Tiehm's buckwheat. However, many soil variables were correlated to each other in the NewFields 2021 (pp. 10–25) dataset, leaving it unclear which ones are most important to Tiehm's buckwheat (*i.e.*, if two variables were highly correlated, one variable was chosen for subsequent analyses) using general linear models (GLMs). For example, boron was a soil variable that was significantly different between occupied and unoccupied soils (NewFields 2021, p. 18, table 3), but was excluded from the GLM because it was correlated with other variables that were chosen to be used in the model instead, particularly clay (NewFields 2021, pp. 10–25).

High rates of endemism are characteristic of plants growing on unusual soils (Mason 1964, pp. 218–222; Rajakaruna 2004, entire; Hulshof

and Spasojevic 2020, pp. 2–3). Taking all soil components into consideration, there is a range of soil conditions in which Tiehm's buckwheat thrives that is different from adjacent, unoccupied soils. Tiehm's buckwheat meets the definition of a soil specialist or edaphic endemic because it occurs primarily or exclusively on challenging soils that differ from the surrounding soil matrix and grows better on soils with these conditions (Mason 1964, entire; Ganin and Major 1964, entire; Rajakaruna and Bohm 1999, entire; Rajakaruna 2004, entire; Palacio *et al.* 2007, entire; Escudero *et al.* 2014, entire).

Soil specialists or edaphic endemics are under different selection regimes compared with non-specialists because they are generally subjected to stressful physical and chemical properties such as increased metal concentrations, lower water availability, lower nutrient availability, higher light levels, and/or poor soil structure (Palacio *et al.* 2007, entire; Boisson *et al.* 2017, entire; Hulshof and Spasojevic 2020, p. 7). Like many other soil specialists or edaphic endemics, colonization of unoccupied, but suitable habitat by Tiehm's buckwheat may be limited by dispersal (Palacio *et al.* 2007, entire; Hulshof and Spasojevic 2020, entire; McClinton *et al.* 2020, p. 37). As described in Service 2022 (pp. 15–17), Tiehm's buckwheat seeds likely do not travel far from the parent plant as the species lacks effective animal dispersers.

Taking all soil components into consideration as well as results of greenhouse propagation experiments (McClinton *et al.* 2020, p. 36), current research suggests that there is a range of soil conditions in which Tiehm's buckwheat thrives that is different from adjacent unoccupied soils (Service 2022, pp. 17–21).

Tiehm's buckwheat is a perennial plant species that is not rhizomatous or otherwise clonal. Therefore, like other buckwheat species, reproduction in Tiehm's buckwheat is presumed to occur via sexual means (*i.e.*, seed production and recruitment). As with most plant species, Tiehm's buckwheat does not require separate sites for reproduction other than the locations in which parent plants occur and any area necessary for pollinators and seed dispersal. The primary seed dispersal agents of Tiehm's buckwheat are probably gravity, wind, and water (Morefield 1995, p. 14). Upon maturation of the fruit, seeds are likely to fall to the ground in the immediate vicinity of the parent plant, becoming lodged in the soil surface (Ioneer 2020a, p. 4). The number of seeds produced by individual Tiehm's buckwheat plants is

variable, ranging from 50 to 450 seeds per plant per growing season (McClinton et al. 2020, p. 22; Service 2022, pp. 15–17). We have no information on the longevity and viability of Tiehm's buckwheat seed in the soil seed bank (*i.e.*, natural storage of seeds within the soil of ecosystems) or what environmental cues are needed to trigger germination. However, many arid plants possess seed dormancy, enabling them to delay germination until receiving necessary environmental cues (Pake and Venable 1996, pp. 1432–1434; Jurado and Flores 2005, entire).

Buckwheat, in general, are sexual reproducers and insects are the most common pollinators (Gucker and Shaw 2019, pp. 5–6). Buckwheat flowers can be pollinated by everything from bee flies and closely related spider predators (the Acroceridea (Cyrtidae)) to specialist pollinators, while other buckwheat species are also capable of self-pollination (Moldenke 1976, pp. 20–25; Archibald et al. 2001, p. 612; Neel and Ellstrand 2003, p. 339). Tiehm's buckwheat may be able to produce some seed when pollinators are excluded (through wind pollination or selfing), but open pollination significantly increased seed production, averaging 7.3 times as many seeds as inflorescences where pollinators were excluded (McClinton et al. 2020, p. 22). The increase in seed set when pollinators have open access to flowers strongly suggests that the presence of an intact pollinator community is important for maintaining Tiehm's buckwheat, as insects significantly increased the number of seeds produced by the plants (McClinton et al. 2020, pp. 9–24). Primary insect visitors (insects that visit a plant to feed on pollen, nectar, or other flower parts, but may not necessarily play a role in pollination) to Tiehm's buckwheat flowers include bees, wasps, beetles, and flies, and have an abundance and diversity exceptionally high for a plant community dominated by a native herb species (McClinton et al. 2020, pp. 11–22; Service 2022, pp. 16–17).

Not all floral visitors are pollinators and not all pollinators are equally effective in their pollination services (Senapathi et al. 2015, entire; Garratt et al. 2016, entire; Wang et al. 2017, entire). Bees (Hymenoptera) are considered the most effective and important pollinators for many plant species (Garratt et al. 2016, entire; Ballantyne et al. 2017, entire; Willmer et al. 2017; Khalifa et al. 2021, entire). Wasps (Hymenoptera) are globally widespread, but their pollination services are not well understood. Adult wasps feed on nectar from flowers and

may inadvertently transfer pollen between flowers; however, the efficiency of pollen transfer depends on the wasps' behaviors during and after visits to a flower as well as the wasps' morphology (*e.g.*, pubescence) and relative size (O'Neill 2019, pp. 143–151; Brock et al. 2021, pp. 1655–1657). Beetles (Coleoptera) are abundant flower visitors that feed on pollen, nectar, or floral structures, eat flower-visiting insects, or mate and lay eggs (Gottsberger 1977, entire; Mawdsley 2003, entire; Kirmse and Chaboo 2020, entire). Flowers pollinated exclusively by beetles tend to be large, flat to bowl shaped, and have a strong odor; however, some beetle visitors have pubescence that trap pollen grains, which are transported to other flowers while they are feeding, visiting, or mating (Gottsberger 1977, entire; Mawdsley 2003, entire). Flies (Diptera) are also often prevalent floral visitors and have frequently been reported as the most common visitors to flowers from a variety of plant families (Inouye et al. 2015, table 1; Raguso 2020, entire); however, flies generally carry and deliver fewer pollen grains than bees (Kearns 1992, entire; Tepedino et al. 2011, entire; Bischoff et al. 2013, entire; Ballantyne et al. 2017, entire; Willmer et al. 2017). This means that a plant visited frequently by flies and only occasionally by bees could still be pollinated primarily by the bees if the bees transfer larger quantities of pollen per visit.

Successful transfer of pollen among Tiehm's buckwheat subpopulations may be inhibited if subpopulations are separated by distances greater than pollinators can travel and/or a pollinator's nesting or foraging habitat and behavior is negatively affected (BLM 2012a, p. 2; Cranmer et al. 2012, p. 562; Dorchin et al. 2013, entire). Flight distances are generally correlated with body size in bees; larger bees are able to fly farther than smaller bees (Gathmann and Tschardt 2002, entire; Greenleaf et al. 2007, pp. 592–594). Some evidence suggests that larger bees, which are able to fly longer distances, do not need their habitat to remain contiguous, but it is more important that the protected habitat is large enough to maintain floral diversity (BLM 2012a, p. 18). While researchers have reported long foraging distance for solitary bees, the majority of individuals remain close to their nest, thus foraging distance tends to be 1,640 ft (500 m) or less (BLM 2012a, p. 19; Danforth et al. 2019, p. 207; Antoine and Forrest 2021, p. 152). Nest building is common in some solitary wasps (such as Sphecidae and Pompilidae, which were observed at

Tiehm's buckwheat subpopulations). The distances between hunting sites and nests are unknown for wasps, but many wasps probably hunt close to their nest (within 3 to 66 ft (1 to 20 m)) (O'Neill 2019, pp. 108–111, 152). Most butterflies, flies, and beetles find egg laying and feeding sites as they move across the landscape. The most common bee and wasp pollinators have a fixed location for their nest, and thus their nesting success is dependent on the availability of resources within their flight range (Xerces 2009, p. 14).

Many insect communities are known to be influenced not only by local habitat conditions, but also the surrounding landscape condition (Klein et al. 2004, p. 523; Xerces 2009, pp. 11–26; Tepedino et al. 2011, entire; Dorchin et al. 2013, entire; Inouye et al. 2015, pp. 119–121). In order for genetic exchange of Tiehm's buckwheat to occur, insect visitors and pollinators must be able to move freely between subpopulations. Alternative pollen and nectar sources (other plant species within the surrounding vegetation) are needed to support pollinators during times when Tiehm's buckwheat is not flowering. Conservation strategies that maintain plant–pollinator interactions, such as maintenance of diverse, herbicide-free nectar resources, would serve to attract a wide array of insects, including pollinators of Tiehm's buckwheat (BLM 2012a, pp. 5–6, 19; Cranmer et al. 2012, p. 567; Senapathi et al. 2015, entire).

Summary of Essential Physical or Biological Features

Based on our current knowledge of the PBFs and habitat characteristics required to sustain the species' life-history processes, we determine that the following PBFs are essential to the conservation of Tiehm's buckwheat:

1. *Plant community.* A plant community that supports all life stages of Tiehm's buckwheat includes:
 - a. Open to sparsely vegetated areas with low native plant cover and stature.
 - b. An intact, native vegetation assemblage that can include, but is not limited to, shadscale saltbush, black sagebrush, Nevada mormon tea, James' galleta, and alkali sacaton to maintain plant–plant interactions and ecosystem resiliency and provide the habitats needed by Tiehm's buckwheat's insect visitors and pollinators.
 - c. A diversity of native plants whose blooming times overlap to provide insect visitors and pollinator species with flowers for foraging throughout the seasons and to provide nesting and egg-laying sites; appropriate nest materials; and sheltered, undisturbed habitat for

hibernation and overwintering of pollinator species and insect visitors.

2. *Pollinators and insect visitors.*

Sufficient pollinators and insect visitors, particularly bees, wasps, beetles, and flies, are present for the species' successful reproduction and seed production.

3. *Hydrology.* Hydrology that is suitable for Tiehm's buckwheat consists of dry, open, relatively barren, upland sites subject to occasional precipitation from rain and/or snow for seed germination.

4. *Suitable soils.* Soils that are suitable for Tiehm's buckwheat consist of:

a. Soils with a high percentage (70–95 percent) of surface fragments that is classified as clayey, smectitic, calcareous, mesic Lithic Torriorthents; clayey-skeletal, smectitic, mesic Typic Calcicargids; and clayey, smectitic, mesic Lithic Haplargids.

b. Soils that have a thin ((0–5.5 in (0–14 cm)) A horizon, B horizons that are present as Bt (containing illuvial layer of lattice clays) or Bw (weathered), C horizons that are not always present, and soil depths to bedrock that range from 3.5 to 20 in (9 to 51 cm).

c. Soils characterized by a variety of textures, and include gravelly clay loam, sand, clay, very gravelly silty clay, and gravelly loam.

d. Soils with pH greater than 7.6 (*i.e.*, alkaline) in all soil horizons.

e. Soils that commonly have on average boron and bicarbonates present at higher levels, and potassium, zinc, sulfur, and magnesium present at lower levels.

Special Management Considerations or Protection

When designating critical habitat, we assess whether the specific areas within the geographical area occupied by the species at the time of listing contain features which are essential to the conservation of the species and which may require special management considerations or protection. The area designated as critical habitat may require some level of management to address the current and future threats to the PBFs essential to the conservation of Tiehm's buckwheat.

A detailed discussion of threats to Tiehm's buckwheat and its habitat can be found in the SSA report (Service 2022, pp. 26–42). The features essential to the conservation of Tiehm's buckwheat (plant community, pollinators and insect visitors, and suitable hydrology and soils, required for the persistence of adults as well as successful reproduction of such individuals and the formation of a

seedbank) may require special management considerations or protection to reduce threats; these threats are described in the proposed listing rule (86 FR 55775; October 7, 2021). The current range of Tiehm's buckwheat is subject to anthropogenic threats such as mineral development, road development and OHV activity, livestock grazing, nonnative and invasive plant species, and climate change, as well as natural threats such as herbivory and potential effects associated with small population size (Service 2022, pp. 26–59).

Management activities that could ameliorate these threats include (but are not limited to): treatment of nonnative, invasive plant species; minimization of OHV access and placement of new roads away from the species and its habitat; regulations or agreements to minimize the effects of mineral exploration and development where the species resides; minimization of livestock use or other disturbances that disturb the soil or seeds; minimization of habitat fragmentation; and monitoring for herbivory. These activities would help protect the PBFs for the species by preventing the loss of habitat; protecting the plant's habitat, pollinator and insect visitors, and soils from undesirable patterns or levels of disturbance; and facilitating management for desirable conditions that are necessary for Tiehm's buckwheat to fulfill its life-history needs.

Tiehm's buckwheat occurs entirely on Federal lands managed by the BLM. As described in the Tonopah BLM Resource Management Plan, habitat for all federally listed endangered and threatened species and for all Nevada BLM sensitive species will be managed to maintain or increase current species populations. The introduction, reintroduction, or augmentation of Nevada BLM sensitive species may be allowed in coordination with the State of Nevada or the Service, if it is deemed appropriate. Such actions will be considered on a case-by-case basis and will be subject to applicable procedures (BLM 1997, p. 9).

The Rhyolite Ridge area, where Tiehm's buckwheat occurs, is open to the operation of the Mining Law, meaning mineral exploration and extraction operations may occur, subject to compliance with BLM's regulations at 43 CFR subparts 3715 and 3809 (BLM 1997, p. 23). As a result, the Service has been coordinating with BLM and Ioneer on both the 2020 PoO (Ioneer 2020b) and 2022 revised PoO (Ioneer 2022b). In November 2021, Ioneer met with BLM and the Service to discuss proposed revisions to their 2020 PoO for the

Rhyolite Ridge lithium-boron project (Service 2021b, entire) including adjustments to the proposed quarry location. On May 27, 2022, Ioneer provided the Service with a memorandum further describing the proposed revisions to their 2020 PoO (Ioneer 2022a, entire). On July 18, 2022, Ioneer submitted their revised PoO to BLM and provided the Service with a copy on August 8, 2022. On August 17, 2022, BLM determined the revised PoO was complete under 43 CFR 3809.401(b); however, BLM resource specialists are still in the process of receiving and reviewing baseline data reports that further explain the details of the 2022 revised PoO. BLM will analyze the environmental impacts of approving the project under National Environmental Policy Act (NEPA), and BLM may initiate consultation with the Service under section 7 of the Act.

The 2022 revised PoO includes modifications such as relocating the quarry to avoid individual Tiehm's buckwheat plants and implementing 13–127 ft (4–39 m) buffers with fencing around each subpopulation (Ioneer 2022b, p. 14 and Appendix J). An explosives storage area is proposed adjacent to subpopulation 1 (Ioneer 2022b, Figure 4). To the east, subpopulations 3, 4, 5, 6, and 7 would be concerningly close to a 960-ft (293 m) deep open-pit quarry and when mining is complete, a terminal quarry lake (Ioneer 2022b, p. 24, 74). In addition, over-burden storage facilities are proposed on the west side of subpopulations 3, 4, 5, 6, and 7 (Ioneer 2022b, p. 25). The combination of the quarry development and over-burden storage facilities are projected to disturb and remove up to 38 percent of critical habitat for this species, impacting pollinator populations, altering hydrology, removing soil, and risking subsidence.

Criteria Used To Identify Critical Habitat

As required by section 4(b)(2) of the Act, we use the best scientific data available to designate critical habitat. In accordance with the Act and our implementing regulations at 50 CFR 424.12(b), we review available information pertaining to the habitat requirements of the species and identify specific areas within the geographical area occupied by the species at the time of listing and any specific areas outside the geographical area occupied by the species to be considered for designation as critical habitat. The occupied areas are sufficient for the conservation of the species because those are the only areas Tiehm's buckwheat has been known to

exist, and the occupied areas provide all of the physical and biological features that are necessary to support the life history requirements for Tiehm’s buckwheat. Other unoccupied locations may have similar physical and biological features that may support life history requirements for Tiehm’s buckwheat; however, until direct seeding or transplant studies are conducted (*i.e.*, to increase the species dispersal) in these locations, we do not have any scientific evidence to support the theory that Tiehm’s buckwheat has the ability to grow and persist at locations other than where it currently occurs. Because we determined that occupied areas are sufficient to conserve the species, no unoccupied areas are essential for the conservation of the species. Therefore, we are not designating any areas outside the geographical area occupied by the species.

We are designating one occupied critical habitat unit for Tiehm’s buckwheat. The one unit comprises approximately 910 ac (368 ha) in Nevada and is completely on lands under Federal (BLM) land ownership. The unit was determined using location information for Tiehm’s buckwheat from E.M. Strategies and NDNH (Kuyper 2019, entire; Morefield 2010, entire;

Morefield 2008, entire). These locations were classified into one discrete population, with eight subpopulations, based on mapping standards devised by NatureServe and its network of Natural Heritage Programs (NatureServe 2004, entire). This unit includes the physical footprint of where the plants currently occur, as well as their immediate surroundings out to 1,640 ft (500 m) in every direction from the periphery of each subpopulation. This area of surrounding habitat contains components of the PBFs (*i.e.*, the pollinator community and its requisite native vegetative assembly) necessary to support the life-history needs of Tiehm’s buckwheat (Gathmann and Tschardt 2002, entire; Greenleaf et al. 2007, pp. 592–594; Xerces 2009, p. 14; p. 207; BLM 2012a, p. 19; Danforth et al. 2019, p. 207; O’Neill 2019, pp. 108–111, 152; Antoine and Forrest 2021, p. 152). This essential habitat configuration was based on the best available nesting, egg-laying, and foraging information for the bee, wasp, beetle, and fly pollinators and insect visitors of Tiehm’s buckwheat (McClinton et al. 2020, p. 18), as most insect communities are known to be influenced not only by local habitat conditions, but also the surrounding landscape conditions (Klein et al. 2004,

p. 523; Xerces 2009, pp. 11–26; Tepedino et al. 2011, entire; Dorchin et al. 2013, entire; Inouye et al. 2015, pp. 119–121).

The critical habitat designation is defined by the map, as modified by any accompanying regulatory text, presented at the end of this document under Regulation Promulgation. We include more detailed information on the boundaries of the critical habitat designation in the preamble of this document. The coordinates or plot points or both on which the map is based are available to the public on <https://www.regulations.gov> at Docket No. FWS–R8–ES–2020–0017 and at the field office responsible for the designation (see **FOR FURTHER INFORMATION CONTACT** above).

Final Critical Habitat Designation

We designate one unit as critical habitat for Tiehm’s buckwheat. The unit is considered occupied at the time of listing. The critical habitat area, the Rhyolite Ridge area of the Silver Peak Range in Esmeralda County, Nevada, that we describe below constitutes our current best assessment of areas that meet the definition of critical habitat for Tiehm’s buckwheat. Table 2 (below) shows the final critical habitat unit and its approximate area.

TABLE 2—CRITICAL HABITAT UNIT FOR TIEHM’S BUCKWHEAT (ERIOGONUM TIEHMII)
[Area estimates reflect all lands within the critical habitat boundary]

Unit name	Federally owned land *		Total area	
	Acres	Hectares	Acres	Hectares
Rhyolite Ridge Unit	910	368	910	368

* These lands are Federal lands managed by the Bureau of Land Management (BLM).

We present a brief description of the critical habitat unit, and reasons why it meets the definition of critical habitat for Tiehm’s buckwheat, below.

Rhyolite Ridge Unit

The Rhyolite Ridge Unit consists of approximately 910 ac (368 ha) of Federal land. This unit is located approximately 13 miles (21 kilometers) west of Silver Peak in Esmeralda County, Nevada. Cave Springs Road, a rural, county unpaved road, bisects the unit. The roads and other manmade structures existing as of the effective date of the final rule are excluded from the designation of critical habitat. The entire unit is on Federal lands managed by the BLM. This unit is currently occupied and contains the single population comprised of eight subpopulations of Tiehm’s buckwheat and all of the habitat that is occupied by

the species across its range. This unit contains all of the PBFs essential to the conservation of the species, including a plant community that supports all life stages of Tiehm’s buckwheat; sufficient pollinators and insect visitors, particularly bees, wasps, beetles, and flies; hydrology suitable for Tiehm’s buckwheat that consists of dry, open, relatively barren, upland sites subject to occasional precipitation from rain and/or snow; and soils that are suitable for Tiehm’s buckwheat. Special management considerations or protection may be required to address mineral development, including the 2020 and 2022 revised mining PoOs, road development and OHV activity, livestock grazing, nonnative invasive plant species, and herbivory (see Special Management Considerations or Protection).

Effects of Critical Habitat Designation

Section 7 Consultation

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

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

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

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

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

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

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

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

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

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

Application of the “Destruction or Adverse Modification” Standard

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

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

Activities that the Service may, during a consultation under section 7(a)(2) of the Act, consider likely to destroy or adversely modify the critical habitat of Tiehm’s buckwheat include, but are not limited to, actions that are likely to cause large-scale habitat impacts, adversely affecting the PBFs at

a scale and magnitude such that the designated critical habitat would no longer be able to provide for the conservation of the species. Examples include removing pollinator habitat and corridors for pollinator movement and seed dispersal; significantly disrupting the native vegetative assemblage, seed bank, or soil composition and structure; or significantly fragmenting the landscape and decreasing the resiliency and representation of the species throughout its range (Service 2021c, p. 14). For such activities, the Service would likely require reasonable and prudent alternatives to ensure the implementation of project-specific conservation measures designed to reduce the scale and magnitude of these habitat impacts.

Exemptions

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

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

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

Section 4(b)(2) of the Act states that the Secretary shall designate and make revisions to critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from designated critical habitat based on economic impacts, impacts on national security, or any other relevant impacts. Exclusion decisions are governed by the regulations at 50 CFR 424.19 and the Policy Regarding Implementation of Section 4(b)(2) of the Endangered Species Act (hereafter, the “2016 Policy”; 81 FR 7226, February 11, 2016), both of which were developed jointly with the National Marine Fisheries Service (NMFS). We also refer to a 2008 Department of the Interior Solicitor’s opinion entitled “The Secretary’s Authority to Exclude Areas from a Critical Habitat Designation under

Section 4(b)(2) of the Endangered Species Act” (M–37016). We explain each decision to exclude areas, as well as decisions not to exclude, to demonstrate that the decision is reasonable. In considering whether to exclude a particular area from the designation, we identify the benefits of including the area in the designation, identify the benefits of excluding the area from the designation, and evaluate whether the benefits of exclusion outweigh the benefits of inclusion. If the analysis indicates that the benefits of exclusion outweigh the benefits of inclusion, the Secretary may exercise discretion to exclude the area only if such exclusion would not result in the extinction of the species. In making the determination to exclude a particular area, the statute on its face, as well as the legislative history, are clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor. We describe below the process that we undertook for taking into consideration each category of impacts and our analyses of the relevant impacts. In this final rule, we have not considered any areas for exclusion from critical habitat.

Consideration of Economic Impacts

Section 4(b)(2) of the Act and its implementing regulations require that we consider the economic impact that may result from a designation of critical habitat. To assess the probable economic impacts of a designation, we must first evaluate specific land uses or activities and projects that may occur in the area of the critical habitat. We then must evaluate the impacts that a specific critical habitat designation may have on restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the areas proposed. We then identify which conservation efforts may be the result of the species being listed under the Act versus those attributed solely to the designation of critical habitat for this particular species. The probable economic impact of a proposed critical habitat designation is analyzed by comparing scenarios both “with critical habitat” and “without critical habitat.”

The “without critical habitat” scenario represents the baseline for the analysis, which includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat (e.g., under the Federal listing as well as other Federal, State, and local regulations). Therefore, the baseline represents the costs of all efforts attributable to the listing of the species

under the Act (*i.e.*, conservation of the species and its habitat incurred regardless of whether critical habitat is redesignated). The “with critical habitat” scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts would not be expected without the designation of critical habitat for the species. In other words, the incremental costs are those attributable solely to the designation of critical habitat, above and beyond the baseline costs. These are the costs we use when evaluating the benefits of inclusion and exclusion of particular areas from the final designation of critical habitat should we choose to conduct a discretionary section 4(b)(2) exclusion analysis.

For this particular designation, we developed an incremental effects memorandum (IEM; Service 2021c, entire) considering the probable incremental economic impacts that may result from the proposed designation of critical habitat. The information contained in our IEM was then used to develop a screening analysis of the probable effects of the designation of critical habitat for Tiehm’s buckwheat (Industrial Economics Inc. (IEc) 2021, entire).

We began by conducting a screening analysis of the proposed designation of critical habitat in order to focus our analysis on the key factors that are likely to result in incremental economic impacts. The purpose of the screening analysis is to filter out particular geographic areas of critical habitat that are already subject to such protections and are, therefore, unlikely to incur incremental economic impacts. In particular, the screening analysis considers baseline costs (*i.e.*, absent critical habitat designation) and includes any probable incremental economic impacts where land and water use may already be subject to conservation plans, land management plans, best management practices, or regulations that protect the habitat area as a result of the Federal listing status of the species. Ultimately, the screening analysis allows us to focus our analysis on evaluating the specific areas or sectors that may incur probable incremental economic impacts as a result of the designation. The presence of the listed species in occupied areas of critical habitat means that any destruction or adverse modification of those areas will also jeopardize the continued existence of the species. Therefore, designating occupied areas as critical habitat typically causes little if any incremental impacts above and

beyond the impacts of listing the species. Therefore, the screening analysis focuses on areas of unoccupied critical habitat. If the proposed critical habitat designation contains any unoccupied units, the screening analysis assesses whether those units require additional management or conservation efforts that may incur incremental economic impacts. This screening analysis combined with the information contained in our IEM constitute what we consider to be our final economic analysis of the critical habitat designation for Tiehm’s buckwheat; our economic analysis is summarized in the narrative below.

Executive Orders 12866 and 13563 direct Federal agencies to assess the costs and benefits of available regulatory alternatives in quantitative (to the extent feasible) and qualitative terms. Consistent with the Executive Orders’ regulatory analysis requirements, our effects analysis under the Act may take into consideration impacts to both directly and indirectly affected entities, where practicable and reasonable. If sufficient data are available, we assess to the extent practicable the probable impacts to both directly and indirectly affected entities. As part of our screening analysis, we considered the types of economic activities that are likely to occur within the areas likely affected by the critical habitat designation. In our evaluation of the probable incremental economic impacts that may result from the proposed designation of critical habitat for Tiehm’s buckwheat, first we identified, in the IEM dated July 21, 2021 (Service 2021c, entire), probable incremental economic impacts associated with the following categories of activities: mining and minerals exploration, livestock grazing, and recreation. We considered each industry or category individually. Additionally, we considered whether their activities have any Federal involvement. Critical habitat designation generally will not affect activities that do not have any Federal involvement; under the Act, designation of critical habitat only affects activities conducted, funded, permitted, or authorized by Federal agencies. Because the species is being listed as endangered, in areas where Tiehm’s buckwheat is present, Federal agencies need to consult with the Service on any activity that they authorize, fund, or carry out that may affect the species or its critical habitat.

In our IEM, we attempted to clarify the distinction between the effects that would result from the species being listed and those attributable to the critical habitat designation (*i.e.*,

difference between the jeopardy and adverse modification standards) for Tiehm's buckwheat critical habitat. The following specific circumstances help to inform our evaluation: (1) The essential PBFs identified for critical habitat are the most important features essential for the life-history needs of the species, and (2) any actions that would result in sufficient adverse effect to the essential PBFs to result in destruction or adverse modification of the critical habitat would also likely constitute jeopardy to Tiehm's buckwheat. The IEM outlines our rationale concerning this limited distinction between baseline conservation efforts and incremental impacts of the designation of critical habitat for Tiehm's buckwheat. This evaluation of the incremental effects has been used as the basis to evaluate the probable incremental economic impacts of this final designation of critical habitat.

The final critical habitat designation for Tiehm's buckwheat includes one critical habitat unit (Rhyolite Ridge Unit) totaling approximately 910 ac (368 ha), which was occupied by Tiehm's buckwheat at the time of proposed listing and is currently occupied now at the time of final listing. Any actions that may affect the species would also reach the "may affect" threshold for critical habitat, and it is unlikely that any additional conservation efforts would be recommended to address the adverse modification standard over and above those recommended as necessary to avoid jeopardizing the continued existence of Tiehm's buckwheat. Therefore, the final critical habitat designation is expected to result in only administrative costs. While additional analysis will require time and resources by both the Federal action agency and the Service, it is believed that, in most circumstances, these costs would be relatively minor and administrative in nature.

This final critical habitat designation is expected to result in six consultations in 10 years (IEc 2021, p. 3). This additional administrative effort includes a projected estimate of five formal consultations and one programmatic consultation, which is aggregated into a given year to give a total annual incremental cost for the purpose of determining whether the rule is economically significant under Executive Order 12866 (IEc 2021, exhibit 3, p. 12). The analysis forecasts no incremental costs associated with project modifications that would involve additional conservation efforts for Tiehm's buckwheat. The projected incremental costs for each programmatic, formal, informal, and

technical assistance effort are estimated to be approximately \$5,300 (formal consultation), \$2,600 (informal consultation), \$9,800 (programmatic consultation), and \$420 (technical assistance). Analyzing the potential for adverse modification of the species' critical habitat during section 7 consultation will likely result in a total annual incremental cost of less than approximately \$37,000 (2021 dollars) in a given year for Tiehm's buckwheat (IEc 2021, exhibits 4 and 5, p. 13); therefore, the annual administrative burden is extremely unlikely to generate costs exceeding \$100 million in a single year (*i.e.*, the threshold for an economically significant rule under Executive Order 12866).

We solicited data and comments from the public on the draft economic analysis discussed above, as well as on all aspects of the proposed critical habitat rule (87 FR 6101, February 3, 2022) and our required determinations. In developing this final designation, we considered the information presented in the draft economic analysis and any additional information on economic impacts we received during the public comment period to determine whether any specific areas should be excluded from the final critical habitat designation under the authority of section 4(b)(2) and our implementing regulations at 50 CFR 424.19 and the 2016 Policy.

During the public comment period, we did not receive credible information regarding the existence of a meaningful economic or other relevant impact supporting a benefit of exclusion; therefore, we did not conduct an exclusion analysis for the relevant area or areas. In developing the proposed critical habitat we have the discretion to evaluate any other particular areas for possible exclusion. Furthermore, when we conducted an exclusion analysis based on impacts identified by experts in, or sources with firsthand knowledge about, impacts that are outside the scope of the Service's expertise, we gave weight to those impacts consistent with the expert or firsthand information unless we had rebutting information. We may exclude an area from critical habitat if we determine that the benefits of excluding the area outweigh the benefits of including the area, provided the exclusion will not result in the extinction of this species. We considered the economic impacts of the critical habitat designation. The Secretary is not exercising her discretion to exclude any areas from this designation of critical habitat for Tiehm's buckwheat based on economic impacts.

Consideration of National Security Impacts

Section 4(a)(3)(B)(i) of the Act may not cover all DoD lands or areas that pose potential national-security concerns (*e.g.*, a DoD installation that is in the process of revising its INRMP for a newly listed or proposed listed species or a species previously not covered). If a particular area is not covered under section 4(a)(3)(B)(i), then national-security or homeland-security concerns are not a factor in the process of determining what areas meet the definition of "critical habitat." However, the Service must still consider impacts on national security, including homeland security, on those lands or areas not covered by section 4(a)(3)(B)(i), because section 4(b)(2) requires the Service to consider those impacts whenever it designates critical habitat. Accordingly, if DoD, Department of Homeland Security (DHS), or another Federal agency has requested exclusion based on an assertion of national-security or homeland-security concerns, or we have otherwise identified national-security or homeland-security impacts from designating particular areas as critical habitat, we generally have reason to consider excluding those areas.

However, we cannot automatically exclude requested areas. When DoD, DHS, or another Federal agency requests exclusion from critical habitat on the basis of national-security or homeland-security impacts, we must conduct an exclusion analysis if the Federal requester provides credible information, including a reasonably specific justification of an incremental impact on national security that would result from the designation of that specific area as critical habitat. That justification could include demonstration of probable impacts, such as impacts to ongoing border-security patrols and surveillance activities, or a delay in training or facility construction, as a result of compliance with section 7(a)(2) of the Act. If the agency requesting the exclusion does not provide us with a reasonably specific justification, we will contact the agency to recommend that it provide a specific justification or clarification of its concerns relative to the probable incremental impact that could result from the designation. If we conduct an exclusion analysis because the agency provides a reasonably specific justification or because we decide to exercise the discretion to conduct an exclusion analysis, we will defer to the expert judgment of DoD, DHS, or another Federal agency as to: (1) Whether activities on its lands or

waters, or its activities on other lands or waters, have national-security or homeland-security implications; (2) the importance of those implications; and (3) the degree to which the cited implications would be adversely affected in the absence of an exclusion. In that circumstance, in conducting a discretionary section 4(b)(2) exclusion analysis, we will give great weight to national-security and homeland-security concerns in analyzing the benefits of exclusion.

Under section 4(b)(2) of the Act, we also consider whether a national-security or homeland-security impact might exist on lands not owned or managed by DoD or DHS. In preparing this rule, we have determined that the lands within the designation of critical habitat for Tiehm's buckwheat are not owned or managed by DoD or DHS. Therefore, we anticipate no impact on national security or homeland security. During the public comment period we did not receive credible information that we determine indicates that there is a potential for impacts on national security or homeland security from designating particular areas as critical habitat; therefore, as part of developing the final designation of critical habitat, we did not conduct a discretionary exclusion analysis to determine whether to exclude those areas under authority of section 4(b)(2) and our implementing regulations at 50 CFR 424.19 and the 2016 Policy.

Consideration of Other Relevant Impacts

Under section 4(b)(2) of the Act, we consider any other relevant impacts, in addition to economic impacts and impacts on national security discussed above. Other relevant impacts may include, but are not limited to, impacts to Tribes, States, local governments, public health and safety, community interests, the environment (such as increased risk of wildfire, or pest and invasive species management), Federal lands, and conservation plans, agreements, or partnerships. To identify other relevant impacts that may affect the exclusion analysis, we consider a number of factors, including whether there are permitted conservation plans covering the species in the area—such as HCPs, safe harbor agreements, or candidate conservation agreements with assurances—or whether there are non-permitted conservation agreements and partnerships that may be impaired by designation of, or exclusion from, critical habitat. In addition, we look at whether Tribal conservation plans or partnerships, Tribal resources, or government-to-government

relationships of the United States with Tribal entities may be affected by the designation. We also consider any State, local, social, or other impacts that might occur because of the designation.

When analyzing other relevant impacts of including a particular area in a designation of critical habitat, we weigh those impacts relative to the conservation value of the particular area. To determine the conservation value of designating a particular area, we consider a number of factors, including, but not limited to, the additional regulatory benefits that the area would receive due to the protection from destruction or adverse modification as a result of actions with a Federal nexus, the educational benefits of mapping essential habitat for recovery of the listed species, and any benefits that may result from a designation due to State or Federal laws that may apply to critical habitat.

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

In the case of Tiehm's buckwheat, the benefits of critical habitat include public awareness of the presence of Tiehm's buckwheat and the importance of habitat protection, and, where a Federal nexus exists, increased habitat protection for Tiehm's buckwheat due to protection from destruction or adverse modification of critical habitat.

Conservation Plans

We evaluate the existence of a conservation plan when considering the benefits of inclusion. We consider a variety of factors, including, but not limited to, whether the plan is finalized; how it provides for the conservation of the essential PBFs; whether there is a reasonable expectation that the conservation management strategies and actions contained in a management plan will be implemented into the future; whether the conservation strategies in the plan are likely to be effective; and whether the plan contains a monitoring program or adaptive management to ensure that the conservation measures are effective and can be adapted in the future in response to new information.

Private or Other Non-Federal Conservation Plans or Agreements and Partnerships

We sometimes exclude specific areas from critical habitat designations based in part on the existence of private or other non-Federal conservation plans or agreements and their attendant partnerships. A conservation plan or agreement describes actions that are designed to provide for the conservation needs of a species and its habitat, and may include actions to reduce or mitigate negative effects on the species caused by activities on or adjacent to the area covered by the plan. Conservation plans or agreements can be developed by private entities with no Service involvement, or in partnership with the Service, sometimes through the permitting process under section 10 of the Act.

When we undertake a discretionary section 4(b)(2) analysis, we evaluate a variety of factors to determine how the benefits of any exclusion and the benefits of inclusion are affected by the existence of private or other non-Federal conservation plans or agreements and their attendant partnerships. There are no HCP's for the area in the final critical habitat designation for Tiehm's buckwheat.

Ioneer USA Corporation (Ioneer)

As part of the proposed Rhyolite Ridge lithium-boron project, Ioneer USA Corporation (Ioneer) is developing a conservation strategy for Tiehm's buckwheat to protect and preserve the continued viability of the species on a long-term basis. Currently, this strategy is in the early stages of development (Ioneer 2020c, entire; Barrett, Service, pers. comm. 2021; Tress, WestLand, pers. comm. 2021a; Tress, WestLand, pers. comm. 2021b; Tress, WestLand, pers. comm. 2021c; Barrett, Service, pers. comm. 2022).

Ioneer has also implemented or proposed various protection measures for Tiehm's buckwheat as part of the 2020 PoO for the Rhyolite Ridge lithium-boron project. Ioneer funded the development of a habitat suitability model to identify additional potential habitat for Tiehm's buckwheat through field surveys (Ioneer 2020a, p. 12). In addition, a demographic monitoring program was initiated in 2019 by Ioneer, to detect and document trends in population size, acres inhabited, size class distribution, and cover with permanent monitoring transects established in subpopulations 1, 2, 3, 4, and 6 (Ioneer 2020a, p. 16). Ioneer also funded collection of Tiehm's buckwheat seed in 2019 and plans to collect seeds

in 2022 (Ioneer 2020a, pp. 13–14). Some of this seed was used by the University of Nevada, Reno, for a propagation trial and transplant study (Ioneer 2020a, p. 14). The remainder of this seed is in long-term storage at Rae Selling Berry Seed Bank at Portland State University (Ioneer 2020a, p. 13). As part of the 2020 PoO, Ioneer also plans to avoid subpopulations 1, 2, 3, and 8 (Ioneer 2020a, p. 11), fence and place signage around subpopulations 1 and 2 (Ioneer 2020a, p. 11), and remove and salvage all remaining plants in subpopulations 4, 5, 6, and 7 and translocate them to another location (Ioneer 2020a, p. 15). However, in July 2022, Ioneer submitted a revised mining PoO and the proposed project may or may not be permitted by BLM as proposed; thus, the project as proposed, and these protection measures, may or may not be fully implemented and therefore, we did not exclude lands based on Ioneer's draft conservation strategy.

Tribal Lands

Several Executive Orders, Secretarial Orders, and policies concern working with Tribes. These guidance documents generally confirm our trust responsibilities to Tribes, recognize that Tribes have sovereign authority to control Tribal lands, emphasize the importance of developing partnerships with Tribal governments, and direct the Service to consult with Tribes on a government-to-government basis. In addition, we look at the existence of Tribal conservation plans and partnerships. In preparing this proposal, we have determined that the final designation of critical habitat does not include any Tribal lands or trust resources. We anticipate no impact on Tribal lands or partnerships from this final designation of critical habitat.

We may also consider areas not identified for inclusion or exclusion from the final critical habitat designation based on information we may receive during the public comment period. As noted above, we have requested that the entities seeking inclusion or exclusion of areas provide credible information regarding the existence of a meaningful economic or other relevant impact supporting a benefit of exclusion for that particular area (see 50 CFR 424.19). We have considered the information we received through the public comment period regarding other relevant impacts of the proposed designation and have determined that we are not excluding any areas from critical habitat. In preparing this final rule, we have determined that there are currently no HCPs or other management plans for

Tiehm's buckwheat, and the designation does not include any Tribal lands or trust resources. We anticipate no impact on Tribal lands, partnerships, or HCPs from this final critical habitat designation. We did not receive any additional information during the public comment period for the proposed rule regarding other relevant impacts to support excluding any specific areas from the final critical habitat designation under authority of section 4(b)(2) and our implementing regulations at 50 CFR 424.19. Accordingly, the Secretary is not exercising her discretion to exclude any areas from this designation based on other relevant impacts.

Required Determinations

Regulatory Planning and Review (Executive Orders 12866 and 13563)

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

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

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

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 et seq.), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA; 5 U.S.C. 801 et seq.), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (*i.e.*, small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the

head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. The SBREFA amended the RFA to require Federal agencies to provide a certification statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities.

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

Under the RFA, as amended, and as understood in light of recent court decisions, Federal agencies are required to evaluate the potential incremental impacts of rulemaking on those entities directly regulated by the rulemaking itself; in other words, the RFA does not require agencies to evaluate the potential impacts to indirectly regulated entities. The regulatory mechanism through which critical habitat protections are realized is section 7 of the Act, which requires Federal agencies, in consultation with the Service, to ensure that any action authorized, funded, or carried out by the agency is not likely to destroy or adversely modify critical habitat. Therefore, under section 7, only Federal action agencies are directly subject to the specific regulatory requirement (avoiding destruction and adverse modification) imposed by critical habitat designation. Consequently, it is our position that only Federal action agencies would be directly regulated with this final critical habitat designation. The RFA does not require evaluation of the potential impacts to

entities not directly regulated. Moreover, Federal agencies are not small entities. Therefore, because no small entities would be directly regulated by this rulemaking, the Service certifies that this final critical habitat designation for Tiehm's buckwheat will not have a significant economic impact on a substantial number of small entities.

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

Energy Supply, Distribution, or Use—Executive Order 13211

Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare statements of energy effects when undertaking certain actions. There are no operation, management, and maintenance activities of utility facilities (e.g., hydropower facilities, powerlines, pipelines) that we are aware of or that have been known to occur within the range of Tiehm's buckwheat and its final critical habitat unit. If proposed in the future, these are activities that the Service consults on with Federal agencies (and their respective permittees, including utility companies) under section 7 of the Act. As discussed in the EA, the costs associated with consultations related to occupied critical habitat would be largely administrative in nature and are not anticipated to reach \$100 million in any given year based on the anticipated annual number of consultations and associated consultation costs, which are not expected to exceed \$37,000 per year (2021 dollars) (IEc 2021, p. 13). In our economic analysis, we did not find that this final critical habitat designation would significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action, and no statement of energy effects is required.

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

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

(1) This rule would not produce a Federal mandate. In general, a Federal

mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or Tribal governments, or the private sector, and includes both "Federal intergovernmental mandates" and "Federal private sector mandates." These terms are defined in 2 U.S.C. 658(5)–(7). "Federal intergovernmental mandate" includes a regulation that "would impose an enforceable duty upon State, local, or Tribal governments" with two exceptions. It excludes "a condition of Federal assistance." It also excludes "a duty arising from participation in a voluntary Federal program," unless the regulation "relates to a then-existing Federal program under which \$500,000,000 or more is provided annually to State, local, and Tribal governments under entitlement authority," if the provision would "increase the stringency of conditions of assistance" or "place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding," and the State, local, or Tribal governments "lack authority" to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; Aid to Families with Dependent Children work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. "Federal private sector mandate" includes a regulation that "would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance or (ii) a duty arising from participation in a voluntary Federal program."

The designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would

not apply, nor would critical habitat shift the costs of the large entitlement programs listed above onto State governments.

(2) We do not believe that this rule would significantly or uniquely affect small governments because it is not anticipated to reach a Federal mandate of \$100 million in any given year; that is, it is not a "significant regulatory action" under the Unfunded Mandates Reform Act. The designation of critical habitat imposes no obligations on State or local governments. Small governments could be affected only to the extent that any programs having Federal funds, permits, or other authorized activities must ensure that their actions will not adversely affect the critical habitat. By definition, Federal agencies are not considered small entities, although the activities they fund or permit may be proposed or carried out by small entities. Consequently, we do not believe that the final critical habitat designation would significantly or uniquely affect small government entities. Therefore, a small government agency plan is not required.

Takings—Executive Order 12630

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

Federalism—Executive Order 13132

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

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

Civil Justice Reform—Executive Order 12988

In accordance with Executive Order 12988 (Civil Justice Reform), the Office of the Solicitor has determined that the rule would not unduly burden the judicial system and that it meets the

requirements of sections 3(a) and 3(b)(2) of the Order. We have designated critical habitat in accordance with the provisions of the Act. To assist the public in understanding the habitat needs of the species, this final rule identifies the PBFs essential to the conservation of the species. The designated areas of critical habitat are presented on maps, and the final rule provides several options for the interested public to obtain more detailed location information, if desired.

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

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

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

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

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal

Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. We have determined that no Tribal lands fall within the boundaries of the final critical habitat for Tiehm's buckwheat; therefore, no Tribal lands would be affected by the final designation of critical habitat.

References Cited

A complete list of references cited in this rulemaking is available on the internet at <https://www.regulations.gov> and upon request from the Reno Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

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

List of Subjects in 50 CFR Part 17

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

Regulation Promulgation

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

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

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

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

■ 2. Amend § 17.12 in paragraph (h), in the List of Endangered and Threatened Plants, by adding an entry for “*Eriogonum tiehmii* (Tiehm's buckwheat)” in alphabetical order under Flowering Plants to read as set forth below:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Scientific name	Common name	Where listed	Status	Listing citations and applicable rules
Flowering Plants				
*	*	*	*	*
<i>Eriogonum tiehmii</i>	Tiehm's buckwheat	Wherever found	E	87 FR [Insert Federal Register page where the document begins], 12/16/2022; 50 CFR 17.96(a). ^{CH}
*	*	*	*	*

■ 3. Amend § 17.96, in paragraph (a), by adding an entry for “Family Polygonaceae: *Eriogonum tiehmii* (Tiehm’s buckwheat)” in alphabetical order to read as follows:

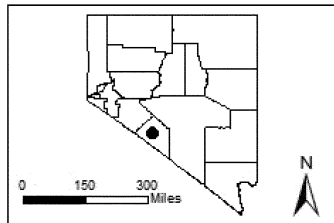
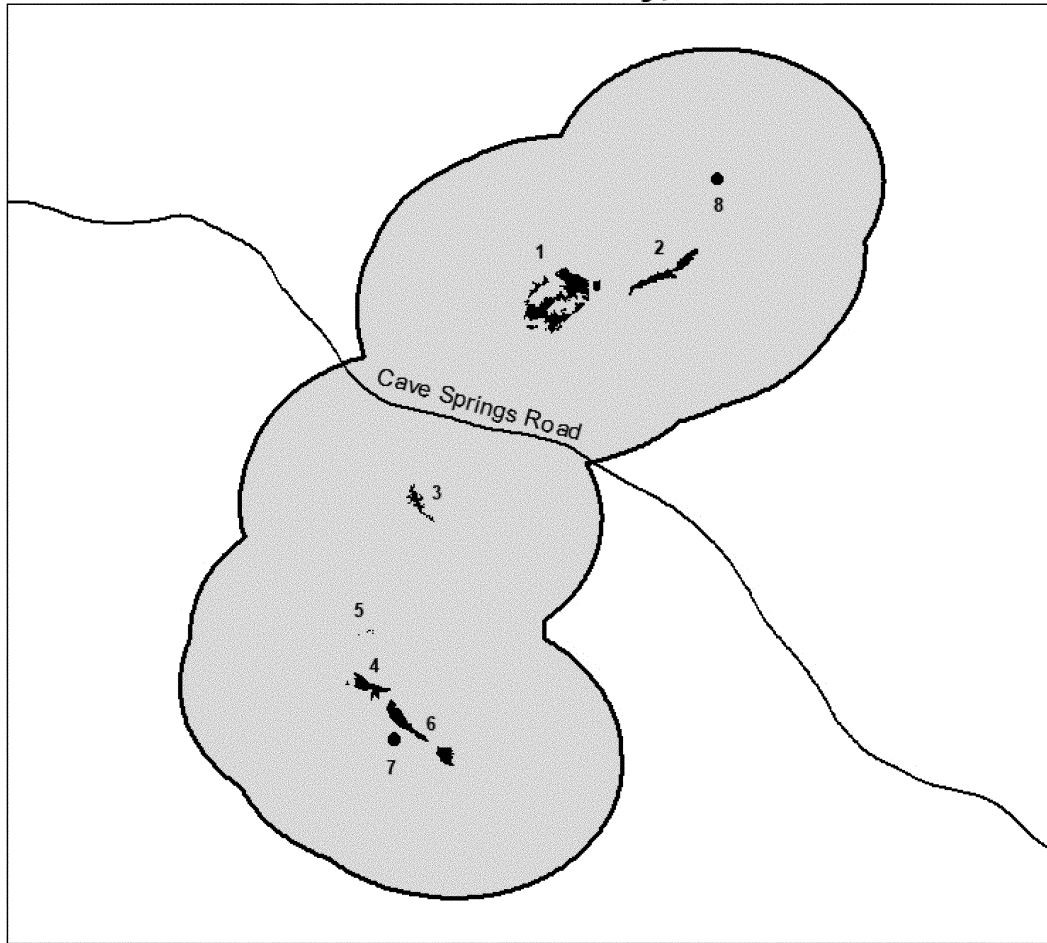
§ 17.96 Critical habitat—plants.

(a) * * *
 Family Polygonaceae: *Eriogonum tiehmii* (Tiehm’s buckwheat)
 (1) The critical habitat unit is depicted for Esmeralda County, Nevada, on the map in this entry.
 (2) Within this area, the physical or biological features essential to the conservation of Tiehm’s buckwheat consist of the following:
 (i) *Plant community.* A plant community that supports all life stages of Tiehm’s buckwheat includes:
 (A) Open to sparsely vegetated areas with low native plant cover and stature.
 (B) An intact, native vegetation assemblage that can include, but is not limited to, shadscale saltbush (*Atriplex confertifolia*), black sagebrush (*Artemisia nova*), Nevada mormon tea (*Ephedra nevadensis*), James’ galleta (*Hilaria jamesii* (formerly *Pleuraphis jamesii*)), and alkali sacaton (*Sporobolus airoides*) to maintain plant–plant interactions and ecosystem resiliency and provide the habitats needed by Tiehm’s buckwheat’s insect visitors and pollinators.
 (C) A diversity of native plants whose blooming times overlap to provide insect visitors and pollinator species with flowers for foraging throughout the seasons and to provide nesting and egg-laying sites; appropriate nest materials; and sheltered, undisturbed habitat for

hibernation and overwintering of pollinator species and insect visitors.
 (ii) *Pollinators and insect visitors.* Sufficient pollinators and insect visitors, particularly bees, wasps, beetles, and flies, are present for the species’ successful reproduction and seed production.
 (iii) *Hydrology.* Hydrology that is suitable for Tiehm’s buckwheat consists of dry, open, relatively barren, upland sites subject to occasional precipitation from rain and/or snow for seed germination.
 (iv) *Suitable soils.* Soils that are suitable for Tiehm’s buckwheat consist of:
 (A) Soils with a high percentage (70–95 percent) of surface fragments that is classified as clayey, smectitic, calcareous, mesic Lithic Torriorthents; clayey-skeletal, smectitic, mesic Typic Calcicargids; and clayey, smectitic, mesic Lithic Haplargids.
 (B) Soils that have a thin (0–5.5 inch (in) (0–14 centimeter (cm))) A horizon; B horizons that are present as Bt (containing illuvial layer of lattice clays) or Bw (weathered); C horizons that are not always present; and soil depths to bedrock that range from 3.5 to 20 in (9 to 51 cm).
 (C) Soils characterized by a variety of textures and that include gravelly clay loam, sand, clay, very gravelly silty clay, and gravelly loam.
 (D) Soils with pH greater than 7.6 (*i.e.*, alkaline) in all soil horizons.
 (E) Soils that commonly have on average boron and bicarbonates present at higher levels and potassium, zinc,

sulfur, and magnesium present at lower levels.
 (3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on January 17, 2023.
 (4) Data layers defining the map unit were created by the Service, and the critical habitat unit was then mapped using Universal Transverse Mercator Zone 11N coordinates. The map in this entry, as modified by any accompanying regulatory text, establishes the boundaries of the critical habitat designation. The coordinates or plot points or both on which the map is based are available to the public at <https://www.regulations.gov> at Docket No. FWS–R8–ES–2020–0017 and at the field office responsible for this designation. You may obtain field office location information by contacting the Service regional office, the address of which is listed at 50 CFR 2.2.
 (5) Rhyolite Ridge Unit, Esmeralda County, Nevada.
 (i) The Rhyolite Ridge Unit consists of approximately 910 acres (368 hectares) of occupied habitat in the Rhyolite Ridge area of the Silver Peak Range in Esmeralda County, Nevada. All lands within this unit are under Federal ownership (Bureau of Land Management).
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 (ii) Map of the Rhyolite Ridge Unit follows:
 Figure 1 to *Eriogonum tiehmii* (Tiehm’s buckwheat) paragraph (5)(ii)

Rhyolite Ridge Unit: Critical Habitat for Tiehm's buckwheat Esmeralda County, Nevada



Legend

- Tiehm's buckwheat subpopulations
- Roads
- Tiehm's buckwheat critical habitat



* * * * *

Martha Williams,
Director, U.S. Fish and Wildlife Service.
[FR Doc. 2022-27225 Filed 12-14-22; 8:45 am]
BILLING CODE 4333-15-C