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Re: Proposed ESA Listing of Tiehm's Buckwheat (*Eriogonum tiehmii*)

Comments for Inclusion in Docket No. FWS-R8-ES-2020-0017:

This letter and its enclosures are submitted on behalf of Ioneer Rhyolite Ridge LLC (Ioneer) as comments on the proposal published[1] by U.S. Fish and Wildlife Service (FWS) on October 7, 2021, to list Tiehm's buckwheat (the Buckwheat) under the Endangered Species Act[2] as an endangered species (the Proposed Listing Rule).

FWS prepared the Proposed Listing Rule, as well as a 12-month finding and accompanying Species Status Assessment (SSA), under a tight court-ordered schedule. Presumably due to that rushed effort, the SSA and the Proposed Listing Rule fail to consider significant scientific data that was available to FWS and are relevant to listing criteria. Moreover, the analysis that FWS has presented in the Proposed Rule and SSA is shallow, conclusory and incomplete. This has led to fundamental errors in the characterization of the Buckwheat's habitat and needs, which, in turn, has caused FWS to mischaracterize the threats to the species. Unless corrected, these mistakes not only undercut the proposed listing decision, but also have negative implications for successful future conservation efforts. A proper understanding of the habitat and needs of the Buckwheat is fundamental to assuring the continued existence of this species.

Significant errors include:

- The agency's assertion that the Buckwheat is a soil specialist reliant on soils with high lithium and boron concentration is not supported by the data contained in the

[1] 86 Fed. Reg. 55775 (Oct. 7, 2021).
[2] 16 U.S.C. §§ 1531, *et seq*.

only soil study cited by FWS. This data shows that the Buckwheat is found at sites with high and low boron concentrations and lithium was not analyzed.

- FWS failed to address additional soils data and analysis clearly indicating that the Buckwheat is not highly associated with specific chemical constituents within the soil. Rather, the best available science indicates that soil structure and other parameters are the main correlates with the species.

- The sole greenhouse study performed to date does not support the agency's broad statements that the Buckwheat prefers the soils that it currently occupies and that "adjacent unoccupied sites are not suitable for all early life-history stages."[3] In fact, the data from that study shows that currently occupied sites are not more favorable than unoccupied sites for the Buckwheat's early life-history stages.

The Proposed Listing Rule also is premised on assumed mining impacts that are outdated and incorrect, in large part because FWS incorrectly treated Ioneer's May 2020 Plan of Operations (PoO) for the Rhyolite Ridge Lithium-Boron Project (Project) as likely to occur exactly as proposed. FWS should not have ignored the changes to the Project plans that Ioneer discussed with the Bureau of Land Management (BLM) and FWS before the Proposed Listing Rule was published. In any event, FWS must update its analysis of potential mining impacts consistent with Ioneer's revised PoO, submitted to BLM on November 10, 2021. As discussed in Appendix A, the revised PoO would avoid all direct impacts to the Buckwheat.

Due to these and other significant errors in the scientific underpinnings of the Proposed Listing Rule described below, as well as the changes to potential mining impacts, the analysis presented in the Proposed Listing Rule cannot support its ultimate conclusion that the Buckwheat faces severe and immediate threats to its continued existence. FWS must reassess the key characteristics of the Buckwheat's habitat and the plant's needs in light of the best available science and correct the multiple erroneous conclusions presented in the SSA. It must then also reassess the threats to the species in light of the best available science and current plans for development of Ioneer's Project. Only then will FWS be in a position to properly apply the ESA's listing criteria to the Buckwheat.

A. FWS cannot ignore the best available science in making listing decisions.

The ESA requires the Service to make its listing determinations "solely on the basis of the best scientific and commercial data available" concerning any one or a combination of five listing factors.[4] The analysis supporting the Proposed Rule fails to meet that standard. FWS is therefore obligated to reconsider its proposed listing decision after properly evaluating the best available science.

[3] 86 Fed. Reg. at 55782.
[4] 16 U.S.C. §1533(a)(1), (b)(1)(A).

"The obvious purpose of the requirement that each agency 'use the best scientific and commercial data available' is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise."[5] To comply with the "best available science" standard, FWS "cannot ignore available biological information [or] studies, even if it disagrees with or discredits them."[6] The agency must "thoroughly evaluate[ ] and incorporate[ ] the data" from contrary studies in "making its listing decision."[7] FWS has discretion in determining what studies and models constitute the best available data.[8] Still, the Service cannot ignore available material studies, even if it disagrees with them, and must address contrary data.[9] Unfortunately, FWS has materially failed to meet those obligations with regard to the Buckwheat.

As discussed in the comments that follow, FWS relies almost exclusively on McClinton, et al.,[10] for the agency's understanding of the Buckwheat's habitat and needs. That study was an initial investigation of a very poorly studied plant species, effectively providing scoping for future investigations, and not intended to provide definitive answers. The study has a number of limitations, not least of which being its small sample size and the lack of a statistically-based random design for its soil sampling effort, which also failed to differentiate between disturbed and undisturbed locations and over-selected for some locations. There also were a number of flaws in the study's analysis of its data, discussed below and in the attachments to this comment letter. The study cannot support the heavy weight that FWS has placed upon it. This is particularly true in light of the additional studies and investigations that have been completed and provided to FWS, which the agency unfortunately has ignored. The subsequent studies are better designed and more complete. The additional investigations, for example of prior translocation efforts and potential sites for establishing new populations, fill in questions left open by McClinton, et al. But rather than incorporate this more complete and higher quality data into the agency's analysis, FWS has ignored the existence of this information. In so doing, FWS has not met its statutory obligation to make listing decisions based upon the best scientific data available.

B. Species Habitat and Needs

1. Soil Requirements of the Species

The Proposed Listing Rule makes the unsupported assertion that the Buckwheat "is a soil specialist specifically adapted to grow on its preferred soil type,"[11] and that "a specific set of soil conditions are required for the growth of Tiehm's buckwheat, as the species is specifically adapted

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[5] *Bennett v. Spear*, 520 U.S. 154, 176, 117 S.Ct. 1154, 137 L.Ed.2d 281 (1997).
[6] *Center for Biological Diversity v. Zinke*, 900 F.3d 1053, 1060 (9th Cir. 2018) (quoting *San Luis & Delta-Mendota Water Auth. v. Locke*, 776 F.3d 971, 995 (9th Cir. 2014)).
[7] *Kern Cnty. Farm Bur. v. Allen*, 450 F.3d 1072, 1081 (9th Cir. 2006).
[8] *Zinke*, 900 F.3d at 1068.
[9] *Id*. at 1068-69.
[10] McClinton, J., E. Leger and R. Shriver , *Ecology of Eriogonum tiehmii*, University of Nevada Reno (Dec. 2020) (McClinton, et al.).
[11] 86 Fed. Reg. at 55777.

to grow on its preferred soil type."[12] The Proposed Listing Rule does not describe what the supposed "specific set of soil conditions" may be, other than to say that "[t]he specialized soils on which Tiehm's buckwheat occurs are high in lithium and boron."[13] Contrary to statements in the Proposed Listing Rule, the soil chemistry study that FWS has relied upon did not analyze lithium concentrations. Accordingly, FWS statements that the Buckwheat occurs in soils that are high in lithium are speculative. The assertion regarding high boron concentrations also is incorrect, as discussed below.

The SSA is somewhat more expansive regarding the needs of the plant, stating that soils in areas occupied by the Buckwheat "have on average extremely low phosphorus, low nitrogen, high boron, and high pH" and that "boron and carbonates were commonly present at excessive levels and sulfur, calcium and potassium were commonly present at high levels."[14] The SSA further states that there were significant differences in characteristics between occupied and unoccupied soils: that potassium, zinc,[15] sulfur, and magnesium were "on average" lower in occupied soils, and boron, silt, bicarbonate, and pH were, "on average," higher in occupied soils.[16] All of these statements are drawn from McClinton, et al. Rather than critically evaluate the data presented by McClinton, et al., the SSA simply adopts that paper's conclusions as true and definitive. However, a closer examination of the available data indicates that the analyses and statements imbedded in McClinton, et al. are based upon small sample sizes and plagued by misleading interpretations. FWS also ignored the commentary provided by McClinton, et al., regarding the limitations of extrapolating findings from greenhouse studies to natural conditions.[17]

One problem with the almost complete reliance on findings from McClinton, et al., is that the results of these preliminary studies are extrapolated well beyond what is technically reasonable. A preliminary investigation that produced a small dataset that did not include a full suite of chemical analyses, using a sampling protocol that was not systematic, is used to describe the specific habitat characteristics of the Buckwheat and then drive the threats analysis to the species. Similarly, a greenhouse study that experimentally manipulated soil conditions was used to conclude that certain conservation efforts, including transplantation and translocation, were likely to be unsuccessful, thereby influencing the analysis of threats to the species. As described below, the SSA must be corrected or updated and substantial revisions to the Proposed Listing Rule are necessary to ensure that the best available science is incorporated and critically evaluated in the analysis of threats to the Buckwheat.

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[12] 86 Fed. Reg.at 55785.

[13] 86 Fed. Reg. at 55781

[14] SSA at 17.

[15] The pattern in soil magnesium, potassium, zinc and sulfur concentrations is very similar, in that several unoccupied locations have particularly high contents, resulting in a skewed-high average. If these high-value outliers are excluded then the range of concentrations is similar between the remaining unoccupied and all occupied sites.

[16] SSA at 17.

[17] McClinton, et al., pg. 37.

Of particular concern is the failure of the SSA to critically evaluate the data presented by McClinton, et al., especially in light of the additional information on soil associations of the Buckwheat provided to the FWS by Ioneer prior to publication of the SSA and the Proposed Listing Rule. The SSA:

1) Fails to fully consider data and analyses that Ioneer provided to FWS to inform soil associations with the Buckwheat;

2) Relies almost exclusively on a single study without critical evaluation of the data presented or conclusions reached in that study; and

3) Extrapolates findings from a small dataset to arrive at broad conclusions of species needs.

a. Failure to consider extensive data and analyses provided to FWS to inform soil associations

Concurrent with submittal of McClinton, et al., Ioneer provided FWS with a statistical review to discuss particular limitations and errors in McClinton, et al. (Shams, et al., 2021a).[18] Prior to publication of the SSA, Ioneer provided FWS with additional data and initial statistical analyses from a comprehensive soil sampling effort within and adjacent to the Buckwheat subpopulations (Shams, et al., 2021b).[19] These analyses clearly indicated that chemical constituents within the soil had little correlation with the occupancy of the Buckwheat. These data and analyses were not discussed in the SSA. Subsequent to the publication of the SSA and prior to publication of the Proposed Listing Rule, Ioneer provided FWS with a full statistical analysis of this soil sampling effort (NewFields 2021).[20] This analysis concluded that the presence of the Buckwheat was not related to a particular chemical constituent in the soil, including boron and lithium, but was related to high clay content, high sodicity, and high alkalinity, which were the primary characteristics of occupied soils. The Proposed Listing Rule does not disclose or discuss Shams, et al., 2021b or NewFields 2021. Rather, the Proposed Listing Rule states, without justification and contrary to the best available science, that the Buckwheat occurs in specialized soils that are high in lithium and boron and are thus threatened by mineral exploration and development. With this same logic and without justification, the Proposed Listing Rule also

[18] Shams, L., J. Jacobson and S. Rouhani, *Statistical Analysis of Soils Data Collected by University of Nevada-Reno, Rhyolite Ridge Project Area, Esmeralda County, NV.* NewFields (Jan 2021) (Shams, et al., 2021a).

[19] Shams, L., S. Rouhani and A. Miller, *Initial Statistical Analysis of Soil Data from Tiehm's Buckwheat-Occupied and non-Occupied Sites, Esmeralda County, NV.* NewFields (April 2021) (Shams, et al., 2021b).

[20] NewFields Companies LLC. *Statistical Analysis of Soil Data from Tiehm's Buckwheat-Occupied and non-Occupied Sites, Esmeralda County, NV.* NewFields (Jul 2021) (NewFields 2021).

concludes that because of these specialized soils high in boron and lithium, the success of translocation efforts is particularly uncertain.

Attachment A provides additional analyses of available soil data to clearly illustrate to FWS that soil concentrations of chemical constituents do not distinguish between occupied and unoccupied soils. The figures provided in this attachment depict a large overlap in soil parameters between occupied and unoccupied sites. As such, these data represent the third analysis available to FWS that consistently show that the focus by the SSA and Proposed Listing Rule on chemical constituents in the soil, including boron and lithium, is not supported by the best available science. Instead, the best available science supports the conclusion that the Buckwheat is not specially adapted to soils high in any particular chemical.

b. Inappropriate extrapolation of findings of a small dataset

The SSA's reliance on McClinton, et al.'s soil dataset suffers from a fundamental limitation of small sample size. Soil sampling for that effort included ten locations within sites occupied by the Buckwheat. However, two of these locations, ERTI1-orange and Trench1, were considered disturbed[21] and the locations of two other sites had the same location data (ERTI6B and ERTI8). Similarly, of the 11 locations that were unoccupied by the Buckwheat, two were already disturbed, Trench 2 and PTS-A. In addition, some of the sampling locations are from the same subpopulations, i.e., ERTI1-orange and ERTI1, and Trench 1 and ERTI6a. As such, at best there are only 7 occupied sites and 9 unoccupied sites in the McClinton, et al., dataset that can be reliably used in any statistical analysis of the current habitat needs of the Buckwheat. Neither the SSA nor the Proposed Listing Rule disclose the narrow foundation for FWS conclusions regarding soil associations but instead proceed to extrapolate findings from these few data points to conclude that only occupied soils can support the Buckwheat. Clearly this approach does not appropriately evaluate or disclose the best available science regarding soil requirements of the species.

c. Failure to critically evaluate McClinton et al.

Reviewing the SSA and McClinton, et al., the failure of the SSA (and FWS) to critically evaluate the data and findings of the study is clear, and the implications of this failure are pervasive throughout the SSA and Proposed Listing Rule.

The SSA simply copied the findings of McClinton, et al. regarding soil associations of the Buckwheat. In particular, the SSA adopts McClinton, et al.'s statements that sites occupied by the Buckwheat are associated with higher average levels of boron than unoccupied sites.[22] This statement is subsequently used to support the Proposed Listing Rule's conclusion that mineral exploration and development, and by association Ioneer's Project, is a threat to the species. Although the SSA cites data provided by Ioneer to acknowledge that there is variation among occupied Buckwheat sites,[23] the SSA fails to critically evaluate McClinton, et al.'s conclusory

[21] *See* McClinton, et al., Appendix 2.
[22] SSA, pg. 17.
[23] Shams, et. al, 2021a.

statements in light of the additional data provided by Ioneer. In communications with Ioneer immediately prior to the publication of the Proposed Listing Rule, FWS admitted that "most of our current knowledge [of Buckwheat soils] is derived from studies conducted by McClinton et al. (2020)."[24]

Contrary to McClinton, et al.'s stated conclusion, the data presented in that paper clearly shows that the Buckwheat is not associated with high boron in soils. Rather, some occupied sites have high boron and other sites have extremely low boron concentrations. Figure 11 of McClinton, et al. explicitly illustrates this point; the box plot in this figure clearly shows that both occupied and unoccupied sites fall into two categories: high boron or low to no boron. No occupied sites are close to the average boron concentration of all occupied sites, and as such, an emphasis on average boron concentrations is statistically inappropriate. And yet, the SSA does not acknowledge the context of this result but rather persists with a focus on average boron concentrations, ignoring the scientific data presented in Figure 11 of McClinton, et al. It does so even though that data was analyzed and the inappropriateness of reliance on average boron concentration was discussed in subsequent analyses that Ioneer provided to FWS.[25] As such, the conclusions of the SSA and consequently the Proposed Listing Rule are unsupported by the data and analyses cited by the best available science; high boron concentrations are not associated with presence of the Buckwheat. In fact, the best available science, documented through studies transmitted to FWS prior to the publication of the Proposed Listing Rule, indicate that the presence of the Buckwheat is not related to any chemical constituent but rather to other soil characteristics.[26] Yet, these data and analyses are wholly absent from the Proposed Listing Rule.

The SSA and Proposed Listing Rule rely on the assumption that the Buckwheat requires, among other soil characteristics, high soil concentrations of specific chemical constituents, mainly boron, to argue that the potential habitat for the species is limited and that translocation and transplantation is unlikely to succeed. Those assumptions are refuted by the data presented in McClinton, et al., and Shams, which clearly indicate that chemical constituents within the soil are not highly associated with the presence of the Buckwheat. Rather, Shams provides evidence that soil structure and other parameters are the main correlates with the species. The SSA and Proposed Listing Rule fail to include these data in their analyses. Moreover, the SSA and the Proposed Listing Rule conclude that the Buckwheat occurs in soils high in lithium. Yet, no data are provided by either document to support this conclusion and notably McClinton, et al., did not even measure lithium. Shams provides information on lithium, but concludes that there is no meaningful difference in soil lithium between occupied and unoccupied sites. Clearly, the SSA and Proposed Listing Rule require revision to reflect the best available science regarding soil characteristics of occupied Buckwheat habitat.

[24] FWS untitled paper, transmitted to Ioneer via email (Oct. 2, 2021).
[25] Shams, et al., 2021b; NewFields 2021.
[26] *Id*.

d. Misinterpretation of greenhouse study.

The FWS's failure to critically evaluate the available scientific data is also prevalent in the discussion of the greenhouse study conducted by McClinton, et al., to evaluate the responses of the Buckwheat to available soils. The SSA states: (a) seedlings grown in soils collected from existing habitat developed higher overall biomass than seedlings grown in soils from surrounding unoccupied areas; (b) there is a strong positive association between emergence and survival in occupied soils; and (c) unoccupied soils were individually favorable for emergence, survival, or seedling growth, but there were no unoccupied soils that were favorable for all three life history stages.[27] Each of these statements uncritically adopts McClinton, et al., conclusions.[28] The Proposed Listing Rule simply makes a broad generalization: "adjacent unoccupied sites are not suitable for all early life-history stages."[29] In recent communications with Ioneer, FWS has reiterated these points, asserting that "regardless of soil chemistry, texture, coarse fragment component, or soil profile depth, Tiehm's buckwheat greenhouse plant growth responses (biomass, root allocation) differed between soils from occupied and unoccupied sites" and "there were no unoccupied soils that were favorable for all three early life history strategies (sic) of Tiehm's buckwheat (emergence, survival, and seedling growth)."[30] FWS concluded that there is no "scientific evidence to support the theory that the species has the ability to grow and persist at locations other than where it currently occurs."[31] In these statements, FWS has again relied entirely on statements within McClinton, et al., but the data presented in that paper do not support those statements, and that single study does not support the agency's broad conclusions.

Review of the data presented by McClinton, et al., illustrates that the conclusion that occupied sites are more favorable than unoccupied sites for early life history stages of the Buckwheat is not supported by the best available science. First, statistical analyses provided by McClinton, et al., indicated that occupied and unoccupied sites did not differ in emergence or survival. Neither the SSA nor the Proposed Listing Rule disclose, much less discuss, these statistical findings. Rather, the SSA, Proposed Listing Rule, and subsequent FWS 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. A simple correlation found in occupied sites, however, cannot be used to exclude all unoccupied soils as suitable for the Buckwheat. All that this correlation informs is the fact that within occupied sites, soils that do not promote emergence also do not promote survival and vice versa.

Second, the assertion that no unoccupied soils were favorable for all three life history stages (emergence, survival, and seedling growth) is false, as the data collected by McClinton, et al., show. In their experiment, some unoccupied soils preformed as well or better than occupied soils. As

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[27] SSA at 18.
[28] *See* McClinton, et al., at 32-34.
[29] 86 Fed. Reg. at 55782.
[30] FWS, untitled paper (Oct. 2, 2021).
[31] *Id*.

discussed in McClinton, et al., there is variability among soils in performance of plant growth parameters under greenhouse conditions. Interpretation of Figure 13 of McClinton, et al., however, clearly shows that unoccupied sites were favorable for all three life history stages (emergence, survival, and total biomass).[32] Figure 13 ranks soils by performance within each life history stage and one unoccupied soil, Alluvium 1, is within the top quartile (top 5 of 21 samples) of soils for each of these parameters. Two other unoccupied soils, PTS-B and PTS-G are within the top quartile in two of the three life history stages. PTS-G and Alluvium 1 are also in the top quartile for growth index. McClinton, et al., explicitly discusses the high rankings of these soils (pg. 33), yet the SSA and the Proposed Listing Rule fail to disclose these findings. The SSA implies that higher biomass in occupied soils provide further evidence that the Buckwheat can only grow and persist in the locations where it currently occurs. Statistical analyses that combine all sites, however, do not inform the question of whether there are unoccupied soils that are favorable for all life history stages of the Buckwheat. As such, the conclusion by the SSA and the Proposed Listing Rule that no unoccupied soils are favorable for all three life history stages is clearly not a reflection of the best available science.

It also is worth noting 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 two months.[33] In the greenhouse study, that site had the third worst plant survival rate of all the soil samples studied.[34]

Moreover, the FWS's focus on data regarding unoccupied soils ignores the fact that no occupied soil ranked highly for all early life history stages (emergence, survival, and seedling growth) of the Buckwheat. Figure 13 of McClinton, et al. demonstrates that no occupied soil was ranked within the top quartile for all three life history stages (emergence, survival, and total biomass). For example, one soil sample from subpopulation 1, ERTI-orange, ranked the worst of all soil samples for survival, total biomass, and growth index. Soil samples from the two most populous subpopulations, ERTI-1 and ERTI-6B, performed poorly for both survival and total biomass. Moreover, the subpopulation that ranked the highest of all occupied sites, ERTI 5, is a subpopulation with among the fewest individuals. The best available science does not show that only soils currently occupied by the Buckwheat can support the emergence, survival, and growth of the Buckwheat and McClinton, et al., does not support that claim.

Neither the available soil chemistry data nor the single available plant growth study support the claims in the SSA and the Proposed Listing Rule regarding the habitat needs of the species and the likelihood of success of translocation, transplantation, and seeding efforts. Consequently, the analysis of threats to the species requires a complete reexamination to include and properly evaluate the best available science.

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[32] Note Ioneer requested these data be made available and the University of Nevada Reno has yet to release the dataset in its entirety. Further analyses are likely to inform the effects of outliers on statistical results.

[33] McClinton, et al., at 41.

[34] McClinton, et al., Figure 13.B.

2. Availability of Suitable Unoccupied Areas

Ioneer has undertaken studies to characterize soils outside of the Project area but in the vicinity of Rhyolite Ridge to inform the availability of suitable soils for translocation, transplantation, and other conservation efforts. These efforts have identified at least seven sites with soil characteristics similar to occupied sites. These sites are characterized by shallow clay loam that is skeletal (over 30-35% rock), and typically are found on back slopes that are sparsely vegetated (Attachment B). In addition, most of these sites have evidence of expansive clay soils at the surface, as has been observed in occupied Buckwheat habitat. As such, there are data that support the occurrence of suitable areas for translocation, transplantation, and other conservations efforts outside of the Project area. Revisions to the Proposed Listing Rule should include these findings and revise the Proposed Listing Rule's declarative statements that the only suitable soils available to the Buckwheat are those that are currently occupied.

3. Vegetation and Arthropod Associations

The SSA and subsequently the Proposed Listing Rule conclude that the Buckwheat often occurs in monotypic stands and that the arthropods are particularly high for a plant community "dominated by a single plant species." These statements cite Morefield[35] as evidence that the Buckwheat occurs in monotypic stands and McClinton, et al., that occupied sites have unusually high arthropod abundance and diversity. These conclusions, however, are not supported by the best available science. First, Morefield provides no data to support the conclusion that the Buckwheat often occurs in pure stands. Rather, Morefield cites 3 photographs as evidence of this assertion; two of these are closeups of individual Buckwheat plants and the third is a wider angle photo with clear evidence of vegetation other than the Buckwheat. McClinton et al., provides no data to support the conclusion that occupied sites consist of pure stands of the Buckwheat, or are even dominated by the species. Attachment A provides the best available science regarding vegetation associations within occupied Buckwheat sites. The clear conclusion from the data provided in Attachment A is that there are no locations where the Buckwheat occurs in monotypic stands, and there are no locations where the species is dominant.

Review of arthropod data collected by McClinton, et al., also provide context that is missing from the SSA and Proposed Listing Rule regarding the abundance and diversity of arthropods within occupied habitat. The SSA concludes that the Buckwheat contributes substantially to the arthropod community in the area as evidenced by the unusually high diversity and abundance of arthropods in occupied sites, which were assumed to be dominated by a single plant species. This discussion misleads the reader to conclude that the Buckwheat is necessary for such high diversity and abundance. The SSA and Proposed Listing Rule, however, fail to disclose that McClinton, et al., concluded that occupied and unoccupied sites were similarly abundant and diverse; the presence

[35] Morefield, J., Current knowledge and conservation status of *Eriogonum tiehmii* Reveal (Polygonaceae), Status report prepared for the U.S. Fish and Wildlife Service, Reno, Nevada (1995).

of Buckwheat had no bearing on the overall abundance and diversity of the arthropod community.[36] Coupled with the fact that the Buckwheat does not occur as pure stands and is never a dominant species within the vegetation community, the data provided by McClinton, et al., do not support the conclusion that the Buckwheat provides an unusually high contribution to the arthropod community. Rather, data collected by McClinton, et al., indicate that beetles, wasps and flies are the most important pollinators for the Buckwheat and there were no apparent specialist pollinators[37]. These findings suggest that the Buckwheat is primarily served by generalist pollinators, and as such seed production in the Buckwheat is unlikely to be dependent on a single pollinator species, minimizing risk to the Buckwheat from fluctuations in the populations of any single pollinator species.

In addition, the reliance by the SSA and the Proposed Listing Rule on Morefield's description of vegetation associations potentially ignores a key threat to the Buckwheat; the threat from vegetation succession that could outcompete the species within occupied habitat. FWS has identified this as a limiting factor to a listed mat-buckwheat species, Steamboat buckwheat.[38] Clearly, revisions to the Proposed Listing Rule are required to appropriately disclose and analyze the best available science regarding the vegetation and arthropod communities associated with the Buckwheat.

4. Taxonomic Distinctness

The Proposed Listing Rule declares that, based on the available information, the Buckwheat is a valid and recognizable taxon and represents a distinct species.[39] It does not, however, cite to or describe the supporting information. The SSA includes a more fulsome discussion of taxonomy and genetics, largely relying on two genetic studies, Grady,[40] an unpublished doctoral thesis, and Davis,[41] an unpublished report of preliminary genetic findings.[42] While the SSA asserts, "[w]e have carefully reviewed the available taxonomic and genetic information to reach the conclusion that *E. tiehmii* is a valid and recognizable taxon," it is clear that the FWS did not critically evaluate the data presented in these studies.

In reference to Grady, the SSA discusses statements made on a few pages of these reports, but fails to disclose or analyze the specific findings of the genetic analyses. In particular, the SSA does not disclose the lack of resolution of the Buckwheat as a distinct species as shown on the gene tree analyses presented throughout Grady. The extensive polytomies and clear interdigitation of

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[36] McClinton, et al., observations also were quite limited, consisting of only two occupied sites and two unoccupied sites.
[37] McClinton, et al., at 11-22.
[38] FWS, Steamboat buckwheat, 5-Year review: Summary and Evaluation (2009) (FWS 2009).
[39] 86 Fed .Reg. at 55777.
[40] Grady, B., Unpublished dissertation, University of Wisconsin-Madison (2012) (Grady).
[41] Davis, B., *Eriogonum tiehmii* genome sequencing report, Unpublished report prepared for Ioneer (Oct. 2019) (Davis).
[42] SSA at 14-15.

Buckwheat sequences within the gene trees presented indicate that the results of Grady do not support a conclusion that the Buckwheat is a distinct species. However, the SSA does acknowledge that Grady used only one sample of the Buckwheat, "not fully allowing the conclusion to be made that E. tiehmii is genetically distinct."

The SSA's distinctness conclusion therefore appears to rest on Davis. As to the analysis performed by Davis, the SSA provides only a figure that depicts the centerpoint of data from an analysis of four species with no variance around these data.[43] In that figure, data from the Buckwheat are situated closely to another species. Without additional information on the variance of these data, it is unclear whether Davis actually does provide evidence that the Buckwheat is distinct from other buckwheat species. Preliminary results from additional genetic studies funded by Ioneer indicate that there is still uncertainty regarding the distinctness of the Buckwheat as a species (Attachment C). While FWS has decided to recognize the Buckwheat as a distinct species, the genetic data supporting that determination appears inconclusive. FWS must recognize that uncertainty and be willing to revisit its determination as additional genetic information becomes available.

C. Threats to the Species

Under the ESA and its implementing regulations, the FWS must consider threats posed by "any one or a combination" of the five factors listed in the statute.[44] The Proposed Listing Rule identifies threats that influence the Buckwheat's current and future condition, but fails to differentiate between observed threats and potential threats that may occur in the future. While both may be relevant to the listing decision, the Service's failure to place the potential threats in temporal context obscures the ability to address those threats through existing regulatory processes. This has caused FWS to place great weight on potential impacts that, in fact, are not likely to occur.

1. Predation (Herbivory)

The Proposed Listing Rule reports on the 2020 herbivory event, in which rodents damaged or killed individual Buckwheat plants in each of the subpopulations and killed almost all of the seedlings that had been transplanted as part of an Ioneer-funded experiment.[45] The Proposed Listing Rule suggests that the 2020 herbivory event did sufficient damage to compromise the long-term viability of the Buckwheat as a species.[46] "[T]he naturally occurring subpopulations experienced greater than 50 percent damage or loss of individual plants."[47] However, FWS appears unable to reach a conclusion as to the likelihood of significant herbivory events in the future.

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[43] SSA at 15.
[44] 16 U.S.C. § 1533(a)(1)(A)-(E); see 50 C.F.R. § 424.11(c).
[45] 86 Fed. Reg. at 55781.
[46] 86 Fed. Reg. at 55781.
[47] 86 Fed. Reg. 55781.

As noted in the Proposed Listing Rule, the 2020 event was the first documentation of herbivory affecting the species (although surveys prior to 2019 were infrequent).[48] The Proposed Listing Rule goes on to state: "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 it was just a random catastrophic event that is not likely to occur on a regular basis."[49] The Proposed Listing Rule's discussion of the potential impact of climate change on the future risk of herbivory is likewise inconclusive: "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."[50]

The Buckwheat was not the only species affected by herbivory in 2020. Enclosed as Attachment D is information regarding herbivory that occurred elsewhere in the region in 2020, affecting other buckwheat species. This provides additional evidence that the damage done to the Buckwheat in 2020 was a consequence of herbivory by small mammals. This information supports the thesis, discussed in the Proposed Rule, that this unusual herbivory event was driven by a series of wetter years that fostered a rodent population that was larger than normal, followed by drought conditions, and that a large water-stressed rodent population sought moisture in the plants. However, as indicated in the Proposed Listing Rule, additional research is needed to understand the potential severity of the herbivory threat to the species, and to respond with protective measures should there be a recurrence of conditions that could result in significant herbivory events.

"The [FWS] may not base its listings on speculations or surmise or disregard superior data."[51] While the Proposed Listing Rule identifies herbivory to be one of the greatest threats to the Buckwheat's continued existence,[52] FWS has no record of similar herbivory events occurring in the past and is unable to project whether significant herbivory events are likely to occur in the future. The Proposed Listing Rule also suggests that climate change may exacerbate the threat of herbivory over the next eighty years,[53] but that is hardly an immediate threat. The Proposed Listing Rule's conclusion that the threat of future herbivory events is so severe and immediate as to warrant listing the Buckwheat as "endangered" is not supported by the information that FWS has presented.

2. Mining Exploration

The Proposed Listing Rule asserts that five of the Buckwheat subpopulations have been impacted by mineral exploration activity.[54] The Proposed Listing Rule also states – wrongly – that trenching in the past (before Ioneer's involvement) has resulted in the loss of some of the

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[48] It should be noted that this type of herbivory did not occur in 2021, when there was extensive monitoring undertaken.
[49] 86 Fed. Reg. at 55781.
[50] 86 Fed. Reg. at 55781.
[51] *Building Industry Assn. of Superior Cal. V. Norton*, 247 F.3d 1241, 1246 (D.C. Cir. 2001).
[52] 86 Fed. Reg. at 55785.
[53] 86 Fed. Reg. at 55784.
[54] 86 Fed. Reg. at 55782.

Buckwheat's habitat.[55] This statement is misleading and at least partly untrue. There is only one mineshaft present at Rhyolite Ridge and it is located in an area that is not occupied by the Buckwheat. In addition, there are three adits (horizontal underground openings) and all three are located in unoccupied areas. In contrast, there are exploration trenches (pre-Ioneer) within some of the subpopulations. The Buckwheat are currently growing within and adjacent to those trenches, in higher concentrations than in the surrounding area. For example, initial analyses indicate that within subpopulation 1, the density of the Buckwheat within identified trenches is between 4 and 10 times higher than the density within the entire subpopulation. Similarly, in subpopulation 2, density within trenches is between 2 and 7 times greater than the density of the Buckwheat within the entire subpopulation. Random samples within subpopulation 6 also have lower density than mining features within the subpopulation. These results also point to the possibility that some level of disturbance is a key habitat characteristic for the Buckwheat, as has been recognized for other buckwheat species[56], including by FWS for the endangered Steamboat buckwheat (FWS 2009). Contrary to the statements in the Proposed Listing Rule, past mineral exploration has not posed a material threat to the Buckwheat.

3. Potential Future Threats – Mineral Exploration and Mine Development

a. Future Mineral Exploration

The Proposed Listing Rule begins its discussion of potential mining impacts on the Buckwheat with a theoretical discussion of future mineral exploration. It states that the BLM-managed lands on which the Buckwheat grows are subject to the Mining Law of 1872, and so areas up to 5 acres can be disturbed after Notice to BLM and waiting 15 days.[57] The Proposed Listing Rule then contrasts this situation with the applicable rules if an ESA-listed species or designated critical habitat is present, in which case the operator must submit a plan of operations to BLM and receive agency approval for any surface disturbance beyond casual use.[58]

These comments are misleading. Ioneer conducted its exploratory work in the areas adjacent to the Buckwheat subpopulations without disturbing any of the Buckwheat. The Notice under which Ioneer conducted its exploration, approved by the BLM, specifically included a condition to avoid the Buckwheat, which was listed in the Notice as a BLM Sensitive Species present in the area. Ioneer also holds the mining claims under all of the Buckwheat subpopulations, so there is no other operator to consider. Ioneer's future planned exploration in the area will occur to the south as outlined in the revised PoO, nowhere near the Buckwheat. All comments about potential future impacts from mineral exploration caused by operators other than Ioneer are speculative at best; they are not reasonably foreseeable and cannot form the basis for a decision to list the species.

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[55] 86 Fed. Reg. at 55782.
[56] Wallace, D.R., *Presumed extinct, a wildflower reappears on Mount Diablo*, Bay Nature (2017).
[57] 86 Fed. Reg. at 55782.
[58] 86 Fed. Reg. at 55782; *see* 43 C.F.R. §3809.11(c)(6).

b. Mischaracterized Impacts of Ioneer's original PoO

As noted above, the Proposed Listing Rule's discussion of Ioneer's PoO is outdated. It also mischaracterizes the potential impacts of Ioneer's original plan. Ioneer's May 2020 PoO called for translocating several Buckwheat subpopulations.[59] The Proposed Listing Rule wrongly states that the subpopulations would have been "lost"; Ioneer actually proposed digging up the plants in those populations and replanting them in locations outside of mining impacts.[60] The Proposed Listing Rule dismisses the prospect for successful translocation based on two false assertions: (1) that the Buckwheat is a soil specialist, meaning it only thrives on soils having the characteristics discussed in the SSA, and (2) adjacent, unoccupied sites are not suitable for all early life-history stages.[61] Both statements are demonstrably false, as discussed above and in the accompanying data and analysis. Accordingly, the Proposed Listing Rule's analysis of potential threats to the Buckwheat from mining activity is fundamentally flawed.

Moreover, the SSA and Proposed Listing Rule fail to acknowledge that successful translocations of mat-buckwheat have been documented. In particular, the FWS concluded that translocation efforts of the endangered Steamboat buckwheat, a perennial soil specialist, have been successful as mitigation for loss of habitat and that plants "appear to be self-maintaining" and have either "been successful in maintaining individuals through asexual reproduction, or they are successfully reproducing seedlings, or both, in the mitigation areas.[62] Notably, FWS made this conclusion without long-term monitoring data as the results of successful establishment where it previously was not present was readily apparent.

Similarly, translocation efforts with Crosby's buckwheat, another perennial mat-buckwheat, in northern Nevada have demonstrated success in that individuals continue to survive at translocation sites and have become established in disturbed areas adjacent to translocation sites. Although long-term monitoring data are not available for this effort, the establishment of buckwheat individuals in disturbed areas adjacent to translocation sites is clear evidence of the successful establishment of self-maintaining populations of mat-buckwheat. Despite the data documented by FWS (Steamboat) and presented to FWS prior to the publication of the Proposed Listing Rule (Crosby's, resubmitted here as Attachment E), it was completely ignored in the Proposed Listing Rule. Instead, FWS concludes that the success of translocation efforts for the Buckwheat is uncertain and adopts a threat assessment that assumes translocation will be unsuccessful.[63] As such, the Proposed Listing Rule is not based on the best available science, and patently ignores prior evidence and findings by FWS and others.

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[59] 86 Fed .Reg. at 55782.
[60] *Id*.
[61] 86 Fed. Reg. at 55782.
[62] USFWS 2009, pg. 16
[63] Also undercutting the FWS position: McClinton, et al, which FWS relies upon so heavily, reports on the outplanting of seedlings to three of the so-called "unsuitable" sites, where the plants did well for two months, until the herbivory event. McClinton, et al. at 41.

The Proposed Listing Rule does state that Ioneer is developing a conservation plan to protect and preserve the continued viability of the Buckwheat on a long-term basis.[64] It does not mention that Ioneer has been working with FWS and BLM since early 2021 on a conservation agreement to prevent, reduce and eliminate the threats to the Buckwheat (including non-mining threats) and to increase the number and geographic range of the species. FWS also has failed to mention that in the context of those discussions, Ioneer proposed delaying direct disturbance of the two largest affected subpopulations (4 and 6), with future disturbance subject to FWS agreement regarding the long-term viability of the species. The Proposed Listing Rule overstates potential mining impacts by failing to acknowledge the steps Ioneer proposed to reduce impacts before FWS published the Proposed Listing Rule.

The Proposed Listing Rule also states that the "loss" of subpopulation 6 under Ioneer's May 2020 PoO "may have an immense impact on the overall resiliency and continued viability of the species, beyond just the numeric loss of redundancy and representation."[65] This comment is gratuitous and speculative, at best. It certainly is not supported by the analysis presented in the Proposed Listing Rule.

The Proposed Listing Rule also asserts that under Ioneer's May 2020 PoO, the Project would have caused habitat fragmentation, the effects of which may be compounded by "the inherently poor dispersal of the species and its specific soil requirements."[66] Once again, this comment is speculative and unsupported. As discussed above, FWS has incorrectly characterized the Buckwheat's soil requirements.

c. Future Mine Development – Direct Mining Impacts Avoided

Putting aside the errors in the Proposed Listing Rule's discussion of Ioneer's original mine plan, FWS must update its analysis of potential mining impacts to be consistent with Ioneer's revised PoO, submitted to BLM on November 10, 2021. As discussed in Appendix A, the proposed Quarry would avoid all direct impacts on the Buckwheat and Ioneer would fence and maintain buffers around the adjacent subpopulations. Mining activities will not occur within the buffer zones under the revised PoO. Mining within the buffers could not occur without a future BLM action approving a future PoO amendment. If FWS finally concludes that the Buckwheat should be ESA listed, or even with it having been proposed for listing, BLM would be required to consult with FWS under ESA Section 7 before it could grant that approval.

The PoO also proposes exploration activities to the south of the proposed quarry, away from the Buckwheat subpopulations. Should the exploration activities outlined in the PoO provide sufficient geological and geotechnical information to modify the quarry plan, Ioneer anticipates future expansion of the mine would proceed in that direction, away from the Buckwheat.

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[64] 86 Fed. Reg. at 55784.
[65] 86 Fed. Reg. at 55782.
[66] 86 Fed. Reg. at 55782.

Ioneer also could propose translocation of one or more Buckwheat populations in the future, but that would occur only after the FWS reservations regarding the likelihood of successful translocation have been successfully addressed. In that event, Ioneer would obtain all necessary permits or amendments from the appropriate regulatory agencies at that time, which would include BLM consultation with FWS regarding potential impacts on the Buckwheat.

4. OHV Use, Road Development and Nonnative Plants

The Proposed Listing Rule wrongly lumps together the potential impacts of off-highway vehicles (OHVs), road development for the Project, and vehicle traffic associated with the Project.[67] It notes that OHVs have driven through subpopulation 1, and that OHVs can kill or damage individual plants and modify habitat, and speculates that Ioneer's Project could allow easier and greater access for OHVs.[68] However, the Proposed Listing Rule mischaracterizes Ioneer's potential impact on OHV use in the area. First, Ioneer has asked for BLM and FWS approval to place fencing around the existing populations to exclude OHVs. Second, all Ioneer access roads will be closed to the public. The development of Ioneer's Project will make it more difficult, not less difficult, for OHVs or other recreational users to obtain access.

The Proposed Listing Rule also suggests that vehicle traffic associated with the mine: (a) would produce dust, which could indirectly affect the Buckwheat, and (b) "may" create conditions that favor the establishment of nonnative, invasive species. It is standard practice for BLM to require dust control and measures to reduce the risk of introducing nonnative, invasive species (i.e., weeds). Ioneer has included comprehensive dust monitoring, control and suppression methods in its PoO. The Proposed Listing Rule acknowledges that saltlover (*Halogeton glomeratus*) is already established and is part of the associated plant community in all of the Buckwheat's subpopulations.[69] Vegetation studies indicate that the species is currently co-dominant in all of the subpopulations of Buckwheat (Attachment A). As such, the management practices incorporated into Ioneer's Project that explicitly address the control and management of nonnative invasive weed species currently address the threat of saltlover establishment. The Proposed Listing Rule should be revised to acknowledge that Ioneer's Project explicitly address this threat.

5. Livestock Grazing

The Proposed Listing Rule identifies BLM's management of livestock grazing in the area as a potential threat to the Buckwheat.[70] However, it acknowledges that no current grazing damage to the Buckwheat has been observed.[71] Whether grazing poses an actual threat to the Buckwheat is uncertain, at best. But regardless, as with OHVs, Ioneer's proposal to enclose the existing populations with fencing would prevent grazing impacts from occurring.

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[67] 86 Fed. Reg. at 55782.
[68] 86 Fed. Reg. at 55782.
[69] 86 Fed. Reg. at 55783.
[70] 86 Fed. Reg. at 55782-83.
[71] 86 Fed. Reg. at 55783.

6. Climate Change

The Proposed Listing Rule discusses modeling that suggests that climate change may result in a small increase in annual precipitation over the next eighty years and may contribute to variability in interannual precipitation, which in turn could bolster local rodent populations.[72] As noted above in the discussion of herbivory, even assuming that climate change may exacerbate the risk of rodent herbivory, climate change does not pose the sort of immediate threat to the Buckwheat that could justify listing the Buckwheat as "endangered."

D. Adequacy of Existing Regulatory Mechanisms

The Proposed Listing Rule makes a significant temporal error in its discussion of potential mining impacts. It treats the potential impacts of Ioneer's May 2020 PoO as a foregone conclusion, but treats the measures Ioneer has proposed to protect the Buckwheat as uncertain to occur. Both assumptions are incorrect. BLM had not acted on Ioneer's May 2020 PoO when FWS issued the SSA, or when it published the Proposed Listing Rule. On November 10, 2021, Ioneer submitted a revised PoO that avoids direct impacts to the Buckwheat. As FWS updates its analysis, it must take into account Ioneer's revised PoO.

FWS also was 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. The Proposed Listing Rule identifies some of the Buckwheat protective measures proposed as part of the May 2020 PoO, but states that the measures may or may not be fully implemented because BLM may or may not permit the Project.[73] Ioneer has requested that protective measures become conditions of BLM's approval of the PoO. Thus, the potential mining impacts that FWS has relied upon to propose listing of the Buckwheat will not occur without the accompanying protective measures. It is important that FWS, as it reevaluates potential mining impacts in light of Ioneer's revise PoO, also take into account the revised Buckwheat Protection Plan and recognize that mining will not occur without the accompanying protective measures.

FWS apparently made this error because it incorrectly assumes that BLM cannot enforce species protective measures for mining operations. The Proposed Listing Rule recognizes that BLM manages the Buckwheat as a sensitive species, but asserts that BLM is not allowed to require conservation measures for sensitive species as a condition of mineral exploration or development.[74] As with the similar discussion regarding BLM's jurisdiction over mineral exploration activity, while this statement may be true theoretically, it is misleading in the context of the Buckwheat and Ioneer's Project.

BLM recently issued Instructional Memorandum 2021-046, reinstating the BLM's Mitigation Manual Section (MS-1794) and Handbook (H-1794-1). These documents provide

[72] 86 Fed. Reg. at 55784.
[73] 86 Fed. Reg. at 55784.
[74] 86 Fed. Reg. at 55784.

policy and guidance on implementing mitigation to address impacts to resources from public land uses. BLM's Mitigation Manual provides as follows:

> [M]itigation measures may be incorporated in the plan of operations decision with the agreement of the operator, along with any mitigation proposed by the operator. Even though these mitigation measures would not be required to prevent unnecessary or undue degradation, they are enforceable if included in the plan of operations decision with the operator's consent.

Here, Ioneer has voluntarily proposed a suite of measures to protect the Buckwheat. Assuming BLM does approve Ioneer's revised PoO, that approval will be conditioned on Ioneer's compliance with its updated Buckwheat Protection Plan. While voluntarily proposed, those conditions will become enforceable elements of BLM's decision regarding the PoO. Of course, the same is true for measures to control dust from mine-related traffic, as well as measures to control the establishment and spread of nonnative invasive species.

E. Consideration for Ioneer's Conservation Measures

FWS should take into account the conservation benefits for the Buckwheat that will only occur if Ioneer's Project proceeds. Under the agency's Policy for Evaluation of Conservation Efforts (PECE),[75] FWS must evaluate the certainty that conservation efforts that have not yet been implemented will actually occur. There are two sets of conservation measures for the Buckwheat that FWS should be evaluating as it makes its listing decision. The Proposed Listing Rule notes that Ioneer has been working on a conservation plan for the Buckwheat.[76] It does not mention that Ioneer has been developing that plan in conjunction with FWS and BLM. In any event, the terms of the conservation plan are still under development and so appropriately under the PECE policy have not been taken into account.

However, the Proposed Listing Rule also recognizes that Ioneer has proposed and already has implemented a number of protection measures for the Buckwheat.[77] Ioneer already has funded a substantial amount of research directed at understanding the 2020 herbivory event and its impact on the Buckwheat. Ioneer also has funded a variety of research regarding the Buckwheat, and is the only party doing so. The proposed protective measures that have not yet been implemented are certain to occur if BLM approves the mine Project, for reasons discussed in the prior section. Ioneer has demonstrated its willingness to conduct additional research and to fund passive or active measures to protect the Buckwheat from rodents and other threats. Neither FWS nor BLM appear to have the resources to conduct this work. Accordingly, Ioneer's ongoing involvement is likely the best prospect for this research to occur, and if necessary, for rodent protection and controls to be put in place, thereby countering the most significant threat to the species. Ioneer encourages FWS to take this into account in making its listing decision.

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[75] 68 Fed. Reg. 15100 (March 28, 2003).
[76] 86 Fed. Reg. at 55784.
[77] 86 Fed. Reg. at 55784.

F. Status of the Species

The errors in the FWS analysis outlined above are reflected in the Proposed Listing Rule's determination of the status of the Buckwheat. FWS wrongly asserts, again, that the Buckwheat has specialized habitat requirements.[78] In discussing threats to the species, the Proposed Listing Rule lumps together herbivory, which already has occurred, and mining impacts, which have not yet been authorized, let alone been initiated.[79] The result is a misleading picture of the threat to the species. FWS also repeats its conclusions regarding vehicle traffic, grazing, invasive plants and climate change, each of which suffers from the flaws discussed above.

Ultimately FWS finds that the 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."[80] This finding is not supported by the information presented in the Proposed Listing Rule, which is inconclusive as to whether herbivory events are likely to recur. Its evaluation of potential mining impacts is not based upon the current PoO and ignores the reduction of threats associated with mining activities from the protective measures that Ioneer has proposed, as well as BLM's ability to condition its approval of the PoO on compliance with those measures, which address each of the threats identified in the Proposed Listing Rule. FWS cannot find, based upon the information presented in the Proposed Listing Rule, that the Buckwheat is under severe and immediate threats currently or in the near term.

G. Correcting the Foundations of the FWS Analysis

The Proposed Listing Rule wrongly asserts that the SSA "represents a compilation of the best scientific and commercial data available concerning the status of the species."[81] In fact, as demonstrated above, the SSA ignores significant available scientific data and misinterprets key data that it does discuss. The Peer Review Plan for the SSA states that it will be a "living document" upon which listing rules, recovery plans, and 5-year reviews will be based. Like the Proposed Listing Rule, all future agency decisions that rely on the SSA will be fundamentally flawed, unless FWS recognizes and corrects the errors in the SSA's summary of the best available data regarding the Buckwheat.

Ioneer also notes that FWS sought peer review of a draft of the SSA in accordance with the joint peer review policy and the FWS Director's 2016 Memorandum clarifying the role of peer review in listing actions.[82] The Director's Memorandum calls for posting of the complete review provided by peer reviewers in the docket on regulations.gov. To date, FWS has not posted the peer reviews of the draft SSA. FWS also does not appear to have posted the required conflict of interest disclosures for its peer reviewers. FWS should have posted these documents prior to or during the

[78] 86 Fed. Reg. at 55785.
[79] 86 Fed. Reg. at 55785.
[80] 86 Fed. Reg. at 55785.
[81] 86 Fed. Reg. at 55777.
[82] 86 Fed. Reg. at 55776.

public comment period on the Proposed Listing Rule, since it has relied upon peer review of the SSA to satisfy its obligation to seek review of its proposed listing decision.[83]

Conclusion

For all the reasons set forth above, FWS has not met its statutory obligation to make its proposed listing decision based upon the best available scientific data. The data and analysis presented in the Proposed Listing Rule and the SSA is flawed and cannot support the proposed finding that the Buckwheat is in danger of extinction throughout all of its range, currently or in the near term. The SSA and the Proposed Listing Rule rely on speculation and surmise that is not supported by, and in key instances is refuted by, data that was available to FWS as it prepared these documents. The time pressure that FWS was under to complete the analysis is no excuse for these lapses. FWS must reconsider its analysis and its listing decision, taking into account and properly analyzing all of the scientific data that is available to the agency.

FWS also must update its analysis of potential mining impacts to reflect Ioneer's current plans for avoiding direct impacts to the Buckwheat, as well as the protective measures that Ioneer has proposed. The mining impacts cannot occur without BLM approval and Ioneer has asked BLM to include the protective measures as conditions of that approval. Accordingly, FWS should consider those protective measures in its listing decision.

Sincerely,

Svend Brandt-Erichsen
Nossaman LLP

SB3:
Enclosures
Appendix A
Attachments A-E

[83] 86 Fed. Reg. at 55777.

Ioneer Comments on
Tiehm's Buckwheat Proposed Listing Rule
Appendix A

Updated Description of Ioneer's Rhyolite Ridge Project

In analyzing the potential impact of mine development on the Buckwheat, the Proposed Listing Rule assumes that the Rhyolite Ridge Lithium-Boron Project (Project) will be developed in accordance with Ioneer's May 2020 Plan of Operations (PoO) for the Project.[84] However, FWS knows that is has incorrectly described the current plans for development of the mine. Ioneer has been discussing additional voluntary conservation measures with BLM and the Service since January 2021, including a delay in any direct impacts to the Buckwheat populations. Moreover, Ioneer recently submitted an updated PoO to BLM under which there would be no direct disturbance of the Buckwheat during the first phase of mining.

On November 10, 2021, Ioneer submitted a revised PoO to BLM describing how Ioneer plans to develop, operate and reclaim the Project. Rhyolite Ridge holds the largest known lithium and boron deposit in North America. The Project is located approximately 40 air miles southwest of Tonopah and 13 miles northeast of Dyer. The Project as currently proposed will consist of an Operational Project Area, an Access Road, and three small areas of existing ancillary Project-related disturbance.

The Operational Project Area is bisected by an ephemeral drainage (locally referred to as Cave Springs) which runs northwest from Silver Peak toward the Fish Lake Valley. The Access Road portion of the Project Area consists of approximately 13 miles of roadway from SR 264 to the western edge of the Operational Project Area (8 miles along Hot Ditch Road then 5 miles along Cave Springs Road).

The proposed Project will be developed by excavating overburden rock and ore from a surface quarry (Quarry), then transporting the ore to a facility within the Processing Plant Area and the overburden rock to an Overburden Storage Facility (OSF). The extracted ore will be crushed and placed into a vat leach system where sulfuric acid will be used to liberate the lithium and boron. An evaporation/crystallization process will then be used to produce the lithium and boron products, which will be shipped off-site in solid form. Residue from the vat leach and evaporation/crystallization processes will include the spent ore, sulfate salts, and filter cake, which will be dewatered at the Processing Plant Area and then trucked to an on-site Spent Ore Storage Facility (SOSF). All of these activities will occur within the Operational Project Area.

Ioneer's products (lithium and boron) will be produced using energy produced on site from a non-petroleum-based power plant, and the Project will not be connected to the power distribution grid. In addition, the Project will have low emissions of greenhouse gases (and minimal hazardous air pollutants). Water usage associated with the mineral extraction process is a fraction of that of other lithium producers in the US and abroad that utilize a more conventional brine extraction and solar evaporation methodology. Ioneer's design is directed toward recycling water, to the extent possible, which further reduces makeup water demands.

[84] 86 Fed. Reg. at 55782.

Ioneer will install processing facilities and infrastructure during the construction phase and the Quarry will be excavated during the operations phase. Exploration activities to identify additional mineral reserves will continue within the Operational Project Area to the south of the proposed Quarry, concurrent with construction and operations. Should the exploration activities outlined in this PoO provide sufficient geological and geotechnical information to modify the quarry plan, Ioneer will evaluate the potential to extend the life of the Project and obtain all necessary permits or amendments from the appropriate regulatory agencies at that time.

Eight subpopulations of the Buckwheat have been mapped within the Mine's Operational Project Area. None of Ioneer's exploration activities have disturbed any of these subpopulations. In any event, the Buckwheat appears to have benefited from the soil disturbance that occurred during historic exploration activity; the plants are commonly found within and immediately around former exploration trenches.

The revised PoO seeks BLM approval for the Project Quarry, and for exploration activity to the south, where no Buckwheat are present. The Quarry has been located to avoid direct disturbance of any of the Buckwheat populations. The PoO also includes an updated Buckwheat Protection Plan that provides for: (1) "no disturbance" buffers around the existing populations, varying from 130 to 310 feet in width; (2) installing fencing around known populations as soon as a continuous Ioneer presence is on-site; (3) implementing a propagation and transplant program to test transplant success and establish new populations; and (4) constructing a growth media area on the reclaimed Overburden Storage Area that reflects the geochemical and physical characteristics of the occupied Buckwheat habitat.

Development of the Quarry would not cause surface disturbance within any of the Buckwheat populations or within the designated buffer areas. At some future date, should Ioneer want to engage in mining activities within the buffers (or Buckwheat subpopulations), it would have to obtain BLM approval for a PoO amendment. Since the Buckwheat has been proposed for ESA listing, BLM would be obligated to consult with USFWS as required by the ESA before it could approve any such PoO amendment.