Center for Biological Diversity · California Botanic Garden

September 15, 2020

Douglas Furtado, District Manager
Bureau of Land Management, Battle Mountain District
50 Bastian Road
Battle Mountain, NV 89820
dfurtado@blm.gov

Marc Jackson, Field Supervisor
US Fish and Wildlife Service, Reno Office
1340 Financial Blvd, Suite 234
Reno, NV 89502
marc_jackson@fws.gov

Kacey KC, State Firewarden/Forester
Nevada Division of Forestry
2478 Fairview Dr.
Carson City, NV 89701
kaceykc@forestry.nv.gov

Ioneer Corp, USA Office
9460 Double R Blvd, Suite 200
Reno, NV 89521
info@ioneer.com

Kris Kuyper, Biology Program Manager
EM Strategies
1650 Meadow Wood Lane
Reno, NV 89502
kris@emstrats.com

Re: *Tiehm's buckwheat large-scale destruction incident*

With great sadness we report that on September 13, 2020 a large-scale destruction/collection incident destroyed an estimated 40% of the global population of the imperiled Tiehm's buckwheat (*Eriogonum tiehmii* Reveal, Polygonaceae). This significant and possibly irreparable loss is likely a consequence of inaction to protect the species by the Bureau of Land Management, the U.S. Fish and Wildlife Service, the State of Nevada, and the Ioneer Corporation. We request that all parties to which this letter is addressed take immediate corrective,

protective, and restorative actions to ensure the long-term viability of Tiehm's buckwheat and to protect it from further loss.

On September 12, 2020 at approximately 4:00 p.m., Dr. Naomi Fraga of California Botanic Garden and Patrick Donnelly of the Center for Biological Diversity visited subpopulation 1 of Tiehm's buckwheat (*Eriogonum tiehmii*) at Rhyolite Ridge. We discovered that there was significant disturbance at subpopulation 1 adjacent to the road, and many plants were missing. It appeared to be a poaching incident.

We returned on September 13, 2020 to conduct a more thorough survey of the damage. It appears that **there has been a significant incident of collection and/or wanton destruction of Tiehm's buckwheat across the entirety of its range**. The buckwheats appear to have been dug up by small shovels or spades. There were three predominant ways the damage presented: the entire plant was dug up and all that was left was a hole in the ground (Figs. 6-7); a portion of a buckwheat mat was dug up or removed from the ground, leaving a badly damaged remaining plant/mat (Figs. 8-9); or holes were dug to extract plants and extant plants are remaining with taproots exposed and a large hole surrounding them (Fig. 10).We observed significant footprints and disturbance in all subpopulations, including what appeared to be newly created social trails, which we surmise were used to haul out buckwheats (Fig. 3). While there were remains of buckwheat plants around the site within the subpopulations, including whole plants and pieces of plants, the lack of a large amount of uprooted biomass makes very clear that the perpetrators took the majority of the uprooted plants offsite. Please see the end of this letter for photographs of the incident (Figs. 4-10).

We visited all six subpopulations as established by Morefield (1995) and found varying levels of destruction throughout the entirety of occupied habitat and across all subpopulations. As a whole the data presented in this letter are largely preliminary based on observations, though we did count specific holes in the ground at subpopulations 1 and 2. It is unclear how many plants are lost for each hole in the ground – at a minimum one, but it may be more. In subpopulations 3, 4, 5, and 6 we present here estimates of percentage of plants loss, since the holes became too numerous to count. This data may be better obtained during the vegetative growth period in the spring, when plants are green and photosynthetic and more apparent in the landscape. These are presented as provisional and observational data to understand the scope of the destruction.

Subpopulations 3, 4, and 5 were the most severely affected, experiencing severe loss and apparent near total extirpation. Subpopulation 6, far and away the largest of the subpopulations, experienced an estimated 35% loss of individuals, including much higher levels of loss in subpopulation 6b. Subpopulations 1 and 2 were also significantly affected, experiencing an estimated loss of 25%. Within subpopulations, some populations were targeted for more intensive removal/destruction creating areas of wholesale extirpation (Figs. 4-5).

In total, a preliminary field survey revealed an estimated loss of over 17,000 plants. The total global population per EM Strategies 2019 survey was 43,921. **Thus we estimate that approximately 40% of Tiehm's buckwheat's global population was lost to this wanton act of destruction.** Please see provisional field survey data in Table 1.

Subpopulation	Estimated number of plants per 2019 survey (Percent of population)	(Count of holes 2020)	(Visual assessment 2020)	(Count of plants destroyed based on visual assessment)
1	9,240 (21%)	1,500	25% extirpation	2,310
2	4,541 (10%)	650	25% extirpation	1,135
3	1,860 (4%)	N/A	90% extirpation	1,620
4	8,159 (19%)	N/A	80% extirpation	6,527
5	199 (1%)	49	100% extirpation	199
6 (a, b)	19,871 (45%)	N/A	35% extirpation	6,855
Total	43,921			**18,646**
Percent of total population	100%			**42.40%**

Table 1: data from preliminary field survey on September 13, 2020 of Tiehm's buckwheat destruction incident. Column 2 data per EM Strategies 2019 survey.

We are unclear on the timing of this incident. Our last visit was July 5, 2020, and we did not notice any of this destruction at that time.

We also want to note that for some number of months, Ioneer Corp. has had a "missing" poster for Tiehm's buckwheat posted in the general store in nearby Dyer, NV. The poster offers a $5,000 reward for confirming a new population of Tiehm's buckwheat. The poster can be seen below in Figure 1. The poster was also distributed as a two-page stapled document, which is scanned below as Figures 2. We are aware that the poster was up in the Dyer store at least as far back as June 3, 2020 when the picture in Figure 1 was taken. We have been told anecdotally that the poster was up as early as April of 2020 which is supported by a posting on Ioneer's website.[1] The handout scanned below in Figure 2 was obtained at the general store on July 5, 2020.

[1] https://rhyolite-ridge.ioneer.com/ioneer-is-offering-a-5000-reward-for-the-discovery-of-tiehms-buckwheat/

Figure 1: "missing" poster as posted in the Dyer general store on June 3, 2020.

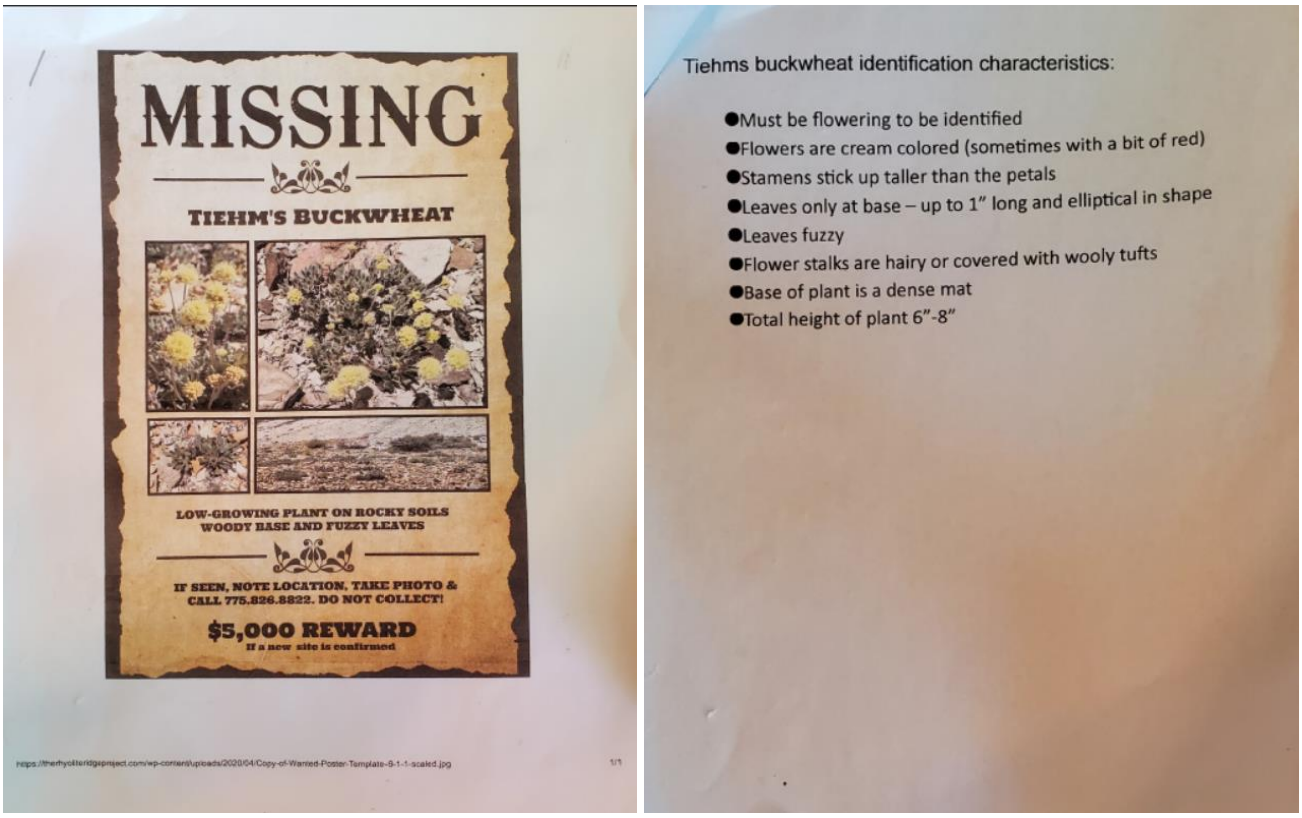


Figure 2: the Ioneer "missing" handout, which is identical to the poster in the store, obtained July 5, 2020.

Although it would be fruitless to speculate on the motives of the perpetrators of this incident, we will make a few observations. The plants were largely broken off from their taproots, and thus it was primarily the above-ground vegetative material that was taken. Such parts of a plant are highly unlikely to be viable in a transplanting situation. They are effectively dead. However, some great care was taken to haul out the dead pieces of buckwheat once they were unearthed, as was evidenced by recently trampled “social trails,” which had been barely discernable in past visits to the site. It seems unusual to go to such effort to remove the plants when they would be so certain not to survive.

The emerging social trail pictured below in Figure 3 was on the east side of subpopulation 2. This area of subpopulation 2 experienced almost 100% extirpation. This trail was not observed in previous visits to be of the same level of use and definition. One might surmise this trail was further developed by repeated trips to haul out the buckwheat plants. We saw similar trails in all populations.

Figure 3: emerging social trail within subpopulation 2.

Urgent Recommendations:

Tiehm's buckwheat faces a dire situation due to this new and active threat. Losing 40% of the global population in a single incident is catastrophic. Without immediate corrective, protective, and restorative action, we fear that other, similar incidents could occur and further jeopardize the long-term viability of the species, ultimately driving the species to extinction. But if your agencies take appropriate measures to protect the plant and restore the damage done to individual plants and habitat by this latest incident, we believe Tiehm's buckwheat can recover from this catastrophic event. Our recommendations are as follows:

Bureau of Land Management:

- Flag visible holes to enable assessment next spring during vegetative growth period;
- Backfill holes to prevent erosion, including focused effort on potentially viable plants that have had their roots exposed and are surrounded by holes;
- Repair damage to plants that is reparable and provide plant care to plants, including potentially supplemental water and/or other aids;
- Fence the entire habitat of Tiehm's buckwheat with secure fencing;
- Install security/game cameras;
- Install proper signage to inform the public of the sensitive resources present;
- Commence an investigation into this crime;
- Prosecute any violations of applicable federal law.

US Fish and Wildlife Service:

- Conduct a comprehensive re-survey of the population to confirm extent of damage;
- Immediately issue a 12-month finding to list Tiehm's buckwheat as endangered under the Endangered Species Act;
- Designate critical habitat for the entirety of the buckwheat's occupied range;
- Develop a recovery plan to ensure Tiehm's buckwheat does not go extinct.

Nevada Division of Forestry:

- Immediately adopt a rule to protect Tiehm's buckwheat under NRS 527.
- Create a plan for seed collection in 2021 and propagation.

Ioneer Corp. & EM Strategies:

- Immediately remove "missing" posters from Dyer store;
- Immediately cease offering a reward for new discoveries of Tiehm's buckwheat;
- Post a 24-hour security guard on-site until more appropriate security measures can be implemented by BLM.
- Cease any further disturbance of Tiehm's buckwheat individuals or native habitat for mining mitigation research until further information about the status and viability of the species in the aftermath of this destruction can be determined.

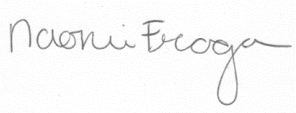
All Parties:

- Only a comprehensive seed banking, propagation, and outplanting effort can restore Tiehm's buckwheat to its former state in its native habitat. Conservation efforts must prioritize restoring Tiehm's buckwheat within formerly occupied habitat, not on mining mitigation.
- Permitting for mining activities within the native range of Tiehm's buckwheat should cease until the population can be stabilized.

The agencies and other parties addressed by this letter can take protective, corrective, and restorative actions that are critical for the species' continued persistence. This species has faced threats from mining for decades, but USFWS and NDF have failed to take action to provide adequate protection for this species, despite repeated warnings of its precarity and limited range; by BLM's lack of management for the buckwheat and its habitat; and by Ioneer's disregard for the need to protect the species in its native environment. Considering the catastrophic damage that the species has already experienced, only direct and immediate action from all interested parties will restore Tiehm's buckwheat and prevent further decline and ultimate extinction.

We await your prompt action,

Patrick Donnelly
Nevada State Director
Center for Biological Diversity
pdonnelly@biologicaldiversity.org



Naomi Fraga, Ph.D.
Director of Conservation
California Botanic Garden
nfraga@calbg.org

CC: Bradley Crowell, Catherine Erskine, Nevada Department of Conservation and Natural Resources; Perry Wickham, BLM Tonopah; Justin Barrett, USFWS Reno; John Christopherson, Nevada Division of Forestry; Kirstin Szabo, James Morefield, Nevada Division of Natural Heritage; Zach Zaragoza, Kyle Chapman, office of Senator Cortez Masto; Kelly Riddle, office of Senator Jacky Rosen; Kevin Herzik, office of Representative Steven Horsford; Senator Melanie Scheible, Chair, Senate Natural Resources Committee.

Figure 4: destruction at a single site near the access road at subpopulation 1.

Figure 5: destruction in subpopulation 6b.

Figure 6: Dug up plants with detritus, subpopulation 2.

Figure 7: completely dug up plants, subpopulation 1.

Figure 8: Destroyed buckwheat with loose pieces, exposed taproot, and small remaining rooted plants in subpopulation 1.

Figure 9: Exposed taproot, subpopulation 1

Figure 10: extant plants are remaining with taproots exposed and a large hole surrounding them.

From:	Patrick Donnelly
To:	Furtado, Douglas W; Jackson, Marc A; kaceykc@forestry.nv.gov; info@ioneer.com; kris@emstrats.com
Cc:	bcrowell@dcnr.nv.gov; Catherine Erskine; Wickham, Perry B; Barrett, Justin S; jchrist@forestry.nv.gov; kszabo@heritage.nv.gov; James Morefield; Zaragoza, Zach; kyle_chapman@cortezmasto.senate.gov; Riddle, Kelly (Rosen); Herzik, Kevin; Melanie Scheible
Subject:	[EXTERNAL] letter regarding large-scale destruction incident of Tiehm"s buckwheat
Date:	Tuesday, September 15, 2020 10:38:20 AM
Attachments:	ERTI large-scale destruction incident letter.pdf

To representatives of the BLM, USFWS, NDF, Ioneer, and EM Strategies:

Please see the attached letter from myself and Dr. Naomi Fraga of California Botanic Garden regarding our documentation of a large-scale destruction incident of Tiehm's buckwheat by unknown persons. It appears that up to 40% of the global population of this plant has been destroyed or removed. We urge your prompt action to save this plant from extinction.

I have copied relevant personnel at agencies as well as representatives of elected officials, as this is a situation which warrants their attention.

Sincerely,
-Patrick Donnelly

Patrick Donnelly
Nevada State Director
Center for Biological Diversity
702.483.0449
pdonnelly@biologicaldiversity.org
Twitter: @bitterwaterblue

Center for Biological Diversity · California Botanic Garden

September 15, 2020

Douglas Furtado, District Manager
Bureau of Land Management, Battle Mountain District
50 Bastian Road
Battle Mountain, NV 89820
dfurtado@blm.gov

Marc Jackson, Field Supervisor
US Fish and Wildlife Service, Reno Office
1340 Financial Blvd, Suite 234
Reno, NV 89502
marc_jackson@fws.gov

Kacey KC, State Firewarden/Forester
Nevada Division of Forestry
2478 Fairview Dr.
Carson City, NV 89701
kaceykc@forestry.nv.gov

Ioneer Corp, USA Office
9460 Double R Blvd, Suite 200
Reno, NV 89521
info@ioneer.com

Kris Kuyper, Biology Program Manager
EM Strategies
1650 Meadow Wood Lane
Reno, NV 89502
kris@emstrats.com

Re: *Tiehm's buckwheat large-scale destruction incident*

With great sadness we report that on September 13, 2020 a large-scale destruction/collection incident destroyed an estimated 40% of the global population of the imperiled Tiehm's buckwheat (*Eriogonum tiehmii* Reveal, Polygonaceae). This significant and possibly irreparable loss is likely a consequence of inaction to protect the species by the Bureau of Land Management, the U.S. Fish and Wildlife Service, the State of Nevada, and the Ioneer Corporation. We request that all parties to which this letter is addressed take immediate corrective,

protective, and restorative actions to ensure the long-term viability of Tiehm's buckwheat and to protect it from further loss.

On September 12, 2020 at approximately 4:00 p.m., Dr. Naomi Fraga of California Botanic Garden and Patrick Donnelly of the Center for Biological Diversity visited subpopulation 1 of Tiehm's buckwheat (*Eriogonum tiehmii*) at Rhyolite Ridge. We discovered that there was significant disturbance at subpopulation 1 adjacent to the road, and many plants were missing. It appeared to be a poaching incident.

We returned on September 13, 2020 to conduct a more thorough survey of the damage. It appears that **there has been a significant incident of collection and/or wanton destruction of Tiehm's buckwheat across the entirety of its range**. The buckwheats appear to have been dug up by small shovels or spades. There were three predominant ways the damage presented: the entire plant was dug up and all that was left was a hole in the ground (Figs. 6-7); a portion of a buckwheat mat was dug up or removed from the ground, leaving a badly damaged remaining plant/mat (Figs. 8-9); or holes were dug to extract plants and extant plants are remaining with taproots exposed and a large hole surrounding them (Fig. 10).We observed significant footprints and disturbance in all subpopulations, including what appeared to be newly created social trails, which we surmise were used to haul out buckwheats (Fig. 3). While there were remains of buckwheat plants around the site within the subpopulations, including whole plants and pieces of plants, the lack of a large amount of uprooted biomass makes very clear that the perpetrators took the majority of the uprooted plants offsite. Please see the end of this letter for photographs of the incident (Figs. 4-10).

We visited all six subpopulations as established by Morefield (1995) and found varying levels of destruction throughout the entirety of occupied habitat and across all subpopulations. As a whole the data presented in this letter are largely preliminary based on observations, though we did count specific holes in the ground at subpopulations 1 and 2. It is unclear how many plants are lost for each hole in the ground – at a minimum one, but it may be more. In subpopulations 3, 4, 5, and 6 we present here estimates of percentage of plants loss, since the holes became too numerous to count. This data may be better obtained during the vegetative growth period in the spring, when plants are green and photosynthetic and more apparent in the landscape. These are presented as provisional and observational data to understand the scope of the destruction.

Subpopulations 3, 4, and 5 were the most severely affected, experiencing severe loss and apparent near total extirpation. Subpopulation 6, far and away the largest of the subpopulations, experienced an estimated 35% loss of individuals, including much higher levels of loss in subpopulation 6b. Subpopulations 1 and 2 were also significantly affected, experiencing an estimated loss of 25%. Within subpopulations, some populations were targeted for more intensive removal/destruction creating areas of wholesale extirpation (Figs. 4-5).

In total, a preliminary field survey revealed an estimated loss of over 17,000 plants. The total global population per EM Strategies 2019 survey was 43,921. **Thus we estimate that approximately 40% of Tiehm's buckwheat's global population was lost to this wanton act of destruction.** Please see provisional field survey data in Table 1.

Subpopulation	Estimated number of plants per 2019 survey (Percent of population)	(Count of holes 2020)	(Visual assessment 2020)	(Count of plants destroyed based on visual assessment)
1	9,240 (21%)	1,500	25% extirpation	2,310
2	4,541 (10%)	650	25% extirpation	1,135
3	1,860 (4%)	N/A	90% extirpation	1,620
4	8,159 (19%)	N/A	80% extirpation	6,527
5	199 (1%)	49	100% extirpation	199
6 (a, b)	19,871 (45%)	N/A	35% extirpation	6,855
Total	43,921			**18,646**
Percent of total population	100%			**42.40%**

Table 1: data from preliminary field survey on September 13, 2020 of Tiehm's buckwheat destruction incident. Column 2 data per EM Strategies 2019 survey.

We are unclear on the timing of this incident. Our last visit was July 5, 2020, and we did not notice any of this destruction at that time.

We also want to note that for some number of months, Ioneer Corp. has had a "missing" poster for Tiehm's buckwheat posted in the general store in nearby Dyer, NV. The poster offers a $5,000 reward for confirming a new population of Tiehm's buckwheat. The poster can be seen below in Figure 1. The poster was also distributed as a two-page stapled document, which is scanned below as Figures 2. We are aware that the poster was up in the Dyer store at least as far back as June 3, 2020 when the picture in Figure 1 was taken. We have been told anecdotally that the poster was up as early as April of 2020 which is supported by a posting on Ioneer's website.[1] The handout scanned below in Figure 2 was obtained at the general store on July 5, 2020.

[1] https://rhyolite-ridge.ioneer.com/ioneer-is-offering-a-5000-reward-for-the-discovery-of-tiehms-buckwheat/

Figure 1: "missing" poster as posted in the Dyer general store on June 3, 2020.

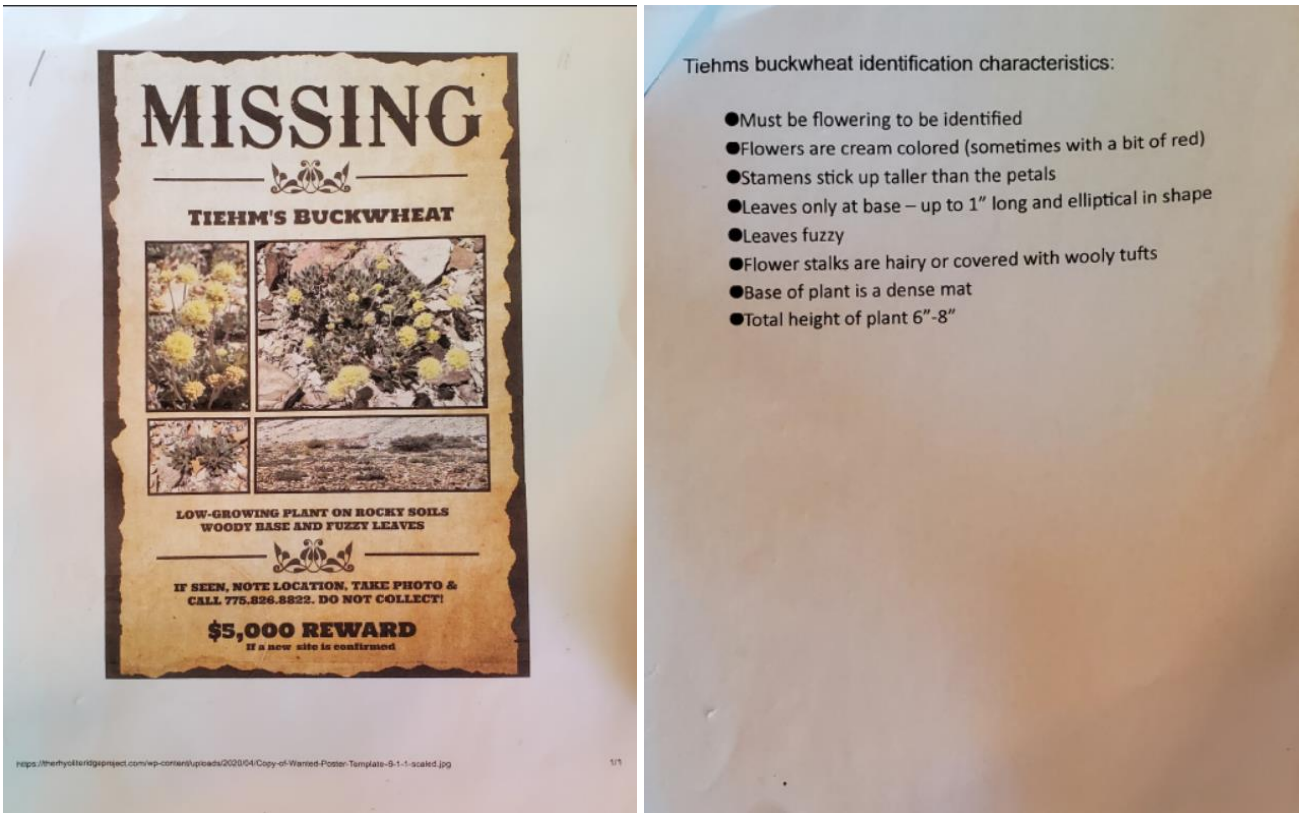


Figure 2: the Ioneer "missing" handout, which is identical to the poster in the store, obtained July 5, 2020.

Although it would be fruitless to speculate on the motives of the perpetrators of this incident, we will make a few observations. The plants were largely broken off from their taproots, and thus it was primarily the above-ground vegetative material that was taken. Such parts of a plant are highly unlikely to be viable in a transplanting situation. They are effectively dead. However, some great care was taken to haul out the dead pieces of buckwheat once they were unearthed, as was evidenced by recently trampled “social trails,” which had been barely discernable in past visits to the site. It seems unusual to go to such effort to remove the plants when they would be so certain not to survive.

The emerging social trail pictured below in Figure 3 was on the east side of subpopulation 2. This area of subpopulation 2 experienced almost 100% extirpation. This trail was not observed in previous visits to be of the same level of use and definition. One might surmise this trail was further developed by repeated trips to haul out the buckwheat plants. We saw similar trails in all populations.

Figure 3: emerging social trail within subpopulation 2.

Urgent Recommendations:

Tiehm's buckwheat faces a dire situation due to this new and active threat. Losing 40% of the global population in a single incident is catastrophic. Without immediate corrective, protective, and restorative action, we fear that other, similar incidents could occur and further jeopardize the long-term viability of the species, ultimately driving the species to extinction. But if your agencies take appropriate measures to protect the plant and restore the damage done to individual plants and habitat by this latest incident, we believe Tiehm's buckwheat can recover from this catastrophic event. Our recommendations are as follows:

Bureau of Land Management:

- Flag visible holes to enable assessment next spring during vegetative growth period;
- Backfill holes to prevent erosion, including focused effort on potentially viable plants that have had their roots exposed and are surrounded by holes;
- Repair damage to plants that is reparable and provide plant care to plants, including potentially supplemental water and/or other aids;
- Fence the entire habitat of Tiehm's buckwheat with secure fencing;
- Install security/game cameras;
- Install proper signage to inform the public of the sensitive resources present;
- Commence an investigation into this crime;
- Prosecute any violations of applicable federal law.

US Fish and Wildlife Service:

- Conduct a comprehensive re-survey of the population to confirm extent of damage;
- Immediately issue a 12-month finding to list Tiehm's buckwheat as endangered under the Endangered Species Act;
- Designate critical habitat for the entirety of the buckwheat's occupied range;
- Develop a recovery plan to ensure Tiehm's buckwheat does not go extinct.

Nevada Division of Forestry:

- Immediately adopt a rule to protect Tiehm's buckwheat under NRS 527.
- Create a plan for seed collection in 2021 and propagation.

Ioneer Corp. & EM Strategies:

- Immediately remove "missing" posters from Dyer store;
- Immediately cease offering a reward for new discoveries of Tiehm's buckwheat;
- Post a 24-hour security guard on-site until more appropriate security measures can be implemented by BLM.
- Cease any further disturbance of Tiehm's buckwheat individuals or native habitat for mining mitigation research until further information about the status and viability of the species in the aftermath of this destruction can be determined.

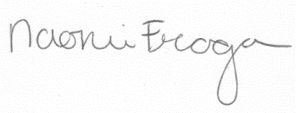
All Parties:

- Only a comprehensive seed banking, propagation, and outplanting effort can restore Tiehm's buckwheat to its former state in its native habitat. Conservation efforts must prioritize restoring Tiehm's buckwheat within formerly occupied habitat, not on mining mitigation.
- Permitting for mining activities within the native range of Tiehm's buckwheat should cease until the population can be stabilized.

The agencies and other parties addressed by this letter can take protective, corrective, and restorative actions that are critical for the species' continued persistence. This species has faced threats from mining for decades, but USFWS and NDF have failed to take action to provide adequate protection for this species, despite repeated warnings of its precarity and limited range; by BLM's lack of management for the buckwheat and its habitat; and by Ioneer's disregard for the need to protect the species in its native environment. Considering the catastrophic damage that the species has already experienced, only direct and immediate action from all interested parties will restore Tiehm's buckwheat and prevent further decline and ultimate extinction.

We await your prompt action,

Patrick Donnelly
Nevada State Director
Center for Biological Diversity
pdonnelly@biologicaldiversity.org



Naomi Fraga, Ph.D.
Director of Conservation
California Botanic Garden
nfraga@calbg.org

CC: Bradley Crowell, Catherine Erskine, Nevada Department of Conservation and Natural Resources; Perry Wickham, BLM Tonopah; Justin Barrett, USFWS Reno; John Christopherson, Nevada Division of Forestry; Kirstin Szabo, James Morefield, Nevada Division of Natural Heritage; Zach Zaragoza, Kyle Chapman, office of Senator Cortez Masto; Kelly Riddle, office of Senator Jacky Rosen; Kevin Herzik, office of Representative Steven Horsford; Senator Melanie Scheible, Chair, Senate Natural Resources Committee.

Figure 4: destruction at a single site near the access road at subpopulation 1.

Figure 5: destruction in subpopulation 6b.

Figure 6: Dug up plants with detritus, subpopulation 2.

Figure 7: completely dug up plants, subpopulation 1.

Figure 8: Destroyed buckwheat with loose pieces, exposed taproot, and small remaining rooted plants in subpopulation 1.

Figure 9: Exposed taproot, subpopulation 1

Figure 10: extant plants are remaining with taproots exposed and a large hole surrounding them.

From:	Fris, Michael
To:	Souza, Paul; Holzworth, Jody K; Senn, Michael J; Grim, Mary
Cc:	Jackson, Marc A; Meredith, Lauren K
Subject:	Fwd: letter regarding large-scale destruction incident of Tiehm"s buckwheat
Date:	Tuesday, September 15, 2020 12:33:18 PM
Attachments:	ERTI large-scale destruction incident letter.pdf ATT00001.htm

---

Paul, Jody: FYI for now on this unfortunate occurrence. We will do a hot topic. This will likely be in the press.

Sent from my iPhone

Begin forwarded message:

> **From:** "Jackson, Marc A" <marc_jackson@fws.gov>
> **Date:** September 15, 2020 at 12:24:55 PM PDT
> **To:** "Fris, Michael" <michael_fris@fws.gov>
> **Subject: Fw: [EXTERNAL] letter regarding large-scale destruction incident of Tiehm's buckwheat**
>
> Hi Mike,
>
> We just received this email this morning and are researching what happened and when. We are going to prepare a top ten report for you and Paul on this item. We are also going to prepare a hot topic paragraph for the Thacker Pass lithium mine as well. We have provided comments on the EIS and LCT BA and want this to be on your radar if you get any questions.
>
> Let me know if you want to discuss in more detail, and I hope to learn a little more in the next day or so. Thanks.
>
> Field Supervisor
> Reno Fish and Wildlife Office
> U.S. Fish and Wildlife Service
> 1340 Financial Boulevard, Suite 234
> Reno, NV 89502
> Phone: 775-861-6337
> Fax: 775-861-6301
>
> ---
>
> **From:** Patrick Donnelly <PDonnelly@biologicaldiversity.org>
> **Sent:** Tuesday, September 15, 2020 10:36 AM
> **To:** Furtado, Douglas W <dfurtado@blm.gov>; Jackson, Marc A <marc_jackson@fws.gov>; kaceykc@forestry.nv.gov <kaceykc@forestry.nv.gov>;

info@ioneer.com <info@ioneer.com>; kris@emstrats.com <kris@emstrats.com>
Cc: bcrowell@dcnr.nv.gov <bcrowell@dcnr.nv.gov>; Catherine Erskine <c.erskine@dcnr.nv.gov>; Wickham, Perry B <pwickham@blm.gov>; Barrett, Justin S <justin_barrett@fws.gov>; jchrist@forestry.nv.gov <jchrist@forestry.nv.gov>; kszabo@heritage.nv.gov <kszabo@heritage.nv.gov>; James Morefield <jdmore@heritage.nv.gov>; Zaragoza, Zach <Zach_Zaragoza@cortezmasto.senate.gov>; kyle_chapman@cortezmasto.senate.gov <kyle_chapman@cortezmasto.senate.gov>; Riddle, Kelly (Rosen) <Kelly_Riddle@rosen.senate.gov>; Herzik, Kevin <Kevin.Herzik@mail.house.gov>; Melanie Scheible <melaniefornvsenate@gmail.com>
Subject: [EXTERNAL] letter regarding large-scale destruction incident of Tiehm's buckwheat

To representatives of the BLM, USFWS, NDF, Ioneer, and EM Strategies:

Please see the attached letter from myself and Dr. Naomi Fraga of California Botanic Garden regarding our documentation of a large-scale destruction incident of Tiehm's buckwheat by unknown persons. It appears that up to 40% of the global population of this plant has been destroyed or removed. We urge your prompt action to save this plant from extinction.

I have copied relevant personnel at agencies as well as representatives of elected officials, as this is a situation which warrants their attention.

Sincerely,
-Patrick Donnelly

Patrick Donnelly
Nevada State Director
Center for Biological Diversity
702.483.0449
pdonnelly@biologicaldiversity.org
Twitter: @bitterwaterblue

From: Gilkeson, Joanna C
To: Carranza, Lee A; Jackson, Marc A
Subject: HT for Tiehm"s - please review
Date: Wednesday, September 16, 2020 9:59:45 AM
Attachments: 20200915 HT TB -CBD report_SK_JB__JG edits.docx

Good morning Lee Ann and Marc,

Sarah, Justin and I have developed the attached (and below) hot topic. Please review and edit as you see fit. Deadline for submission is 3 pm today.

Thanks!
Joanna

Center for Biological Diversity (CBD) Reports 40% of Tiehm's Buckwheat Population is Missing

On Sept. 15, 2020, CBD sent a letter to FWS, Nevada Division of Forestry (NDF), Bureau of Land Management (BLM), and Ioneer USA Corporation documenting recent impacts to *Erigonium tiehmii* (Tiehm's buckwheat). This species is found in Esmerelda County, Nevada and is the only population of Tiehm's buckwheat in the world. Initiated by a lithium-boron mine proposed by Ioneer and a petition from CBD, FWS is reviewing the plant for potential listing under the ESA. As reported by CBD, significant damage to plants was observed while visiting six subpopulations on Sept. 12 and 13, 2020. They also reported observing footprints and evidence of shovel/trowel use. CBD alleges a large-scale destruction/collection incident and estimates 40% of the overall population has been eliminated; and requests agencies addressed in this letter take steps to protect the species from additional loss. On Sept. 8, 2020 researchers from University of Nevada, Reno (UNR) also visited the site and found similar conditions. Based on additional site visits and examination of photos by UNR, BLM, NDF, and Nevada Department of Wildlife, it is suspected that damages are the result of herbivory by rodents and/or ungulates. CBD and UNR provided photos and observations to FWS. In response to these findings, FWS has reached out to partners to gather more information and determine next steps.

Joanna Gilkeson (she/her)
Public Affairs Specialist
Reno, Nevada
U.S. Fish and Wildlife Service
Office: 775/861-6336
Cell: 760/473-3954
https://www.fws.gov/reno/

Center for Biological Diversity (CBD) Reports 40% of Tiehm's Buckwheat Population is Missing

On Sept. 15, 2020, CBD sent a letter to FWS, Nevada Division of Forestry (NDF), Bureau of Land Management (BLM), and Ioneer USA Corporation documenting recent impacts to *Erigonium tiehmii* (Tiehm's buckwheat). This species is found in Esmerelda County, Nevada and is the only population of Tiehm's buckwheat in the world. Initiated by a lithium-boron mine proposed by Ioneer and a petition from CBD, FWS is reviewing the plant for potential listing under the ESA. As reported by CBD, significant damage to plants was observed while visiting six subpopulations on Sept. 12 and 13, 2020. They also reported observing footprints and evidence of shovel/trowel use. CBD alleges a large-scale destruction/collection incident and estimates 40% of the overall population has been eliminated; and requests agencies addressed in this letter take steps to protect the species from additional loss. On Sept. 8, 2020 researchers from University of Nevada, Reno (UNR) also visited the site and found similar conditions. Based on additional site visits and examination of photos by UNR, BLM, NDF, and Nevada Department of Wildlife, it is suspected that damages are the result of herbivory by rodents and/or ungulates. CBD and UNR provided photos and observations to FWS. In response to these findings, FWS has reached out to partners to gather more information and determine next steps.

From: Jeniffer Solis
To: Public Affairs, IR10; Balduini, Daniel; Jackson, Marc A; ann_carranza@fws.gov
Subject: [EXTERNAL] Request for statement on Tiehm"s Buckwheat in Nevada
Date: Wednesday, September 16, 2020 12:49:46 PM

Hello,

I'm a reporter for the Nevada Current and I'm reaching out to find the right person to send some questions to.

The Center for Biological Diversity sent out a letter to the US Fish and Wildlife Service, Reno Office after discovering that over the weekend someone had dug up more than 17,000 Tiehm buckwheat plants.

In July, the U.S. Fish and Wildlife Services announced a 90-day finding for Tiehm's Buckwheat to add the species to the List of Endangered and Threatened Plants based on an initial review finding petitions for the plant may be warranted.

Based on those finding the Center for Biological Diversity has asked for the following actions from the FWS in order to protect the plant.

- Conduct a comprehensive re-survey of the population to confirm extent of damage;
- Immediately issue a 12-month finding to list Tiehm’s buckwheat as endangered under the Endangered Species Act;
- Designate critical habitat for the entirety of the buckwheat’s occupied range;
- Develop a recovery plan to ensure Tiehm’s buckwheat does not go extinct.

Here's a link to the letter.

Does FWS have a statement on the destruction of the Tiehm's buckwheat plants? Does it have a statement on these list of demands or the agency's ability to enact any of these demands?

I am on a deadline so if I could get a reply by the end of the day that would be great. Thanks!

Best,

Jeniffer Solis | General Assignment Reporter
email: jeniffer@nevadacurrent.com
cell: (702) 937- 4956

Marc Jackson
Field Supervisor
US Fish and Wildlife Service
Reno Office 1340 Financial Blvd, Suite 234
Reno, NV 89502
marc_jackson@fws.gov

CC: Kacey KC, State Firewarden/Forester
Nevada Division of Forestry
2478 Fairview Dr.
Carson City, NV 89701
kaceykc@forestry.nv.gov

Douglas Furtado, District Manager
Bureau of Land Management, Battle Mountain District
50 Bastian Road
Battle Mountain, NV 89820
dfurtado@blm.gov

September 28, 2020

Re: Letter regarding observations of damage to Tiehm's buckwheat (*Eriogonum tiehmii)*

Dear Mr. Jackson,

On September 12, 2020 I conducted a routine visit to subpopulation 1 of *Eriogonum tiehmii* (Polygonaceae) in the Silver Peak Range, Esmeralda County, Nevada with Patrick Donnelly. We observed damage to *E. tiehmii* plants including whole plants that were dug up, plants that were partially dug up, and pieces of plants that were left near the holes that were dug (Fig. 1). The damage appeared extensive and unusual. We observed hundreds of plants dug up in the small area we surveyed.

We returned on September 13, 2020 to conduct a more thorough survey across six subpopulations of *E. tiehmii* to assess the extent of the damage across the range of the species (Table 1). Prior to splitting up, and in an attempt to cover more ground, we defined a specific area to calibrate our counts. We counted the same holes independently, and came up with similar counts (66 and 68) in the same area. Thus, we decided to divide up our efforts to count all the holes we observed in subpopulations 1, 2, and 4. We felt our results would be comparable and consistent. Holes with damaged or missing plants were individually counted. However, when we arrived at subpopulation 4 the holes appeared too numerous to count, therefore we began estimating the percentage of plants damaged across the remaining subpopulations (4, 6 and 3 surveyed in that order).

Table 1. Estimated number of plants per EM Strategies 2019. Count of holes in and visual estimation of plant damage conducted by Fraga and Donnelly.

Subpopulation	Estimated number of plants per 2019 survey (% of pop)	(Count of holes 2020). September 13, 2020	Visual estimation of plant damage September 13, 2020
1	9,240 (21%)	1,500	25% extirpation
2	4,541 (10%)	650	25% extirpation
3	1,860 (4%)	N/A	90% extirpation
4	8,159 (19%)	N/A	80% extirpation
5	199 (1%)	49	100% extirpation
6 (a, b)	19,871 (45%)	N/A	35% extirpation

At the end of the day on September 13, we returned to subpopulation 1 and coincidentally ran into Laura Cunningham and Kevin Emmerich who arrived while we were finishing up our assessment. We did not stay for very long after their arrival since it was getting late in the day. I feel that their assessment would be independent from our own observations.

Upon submitting our initial report on September 15, 2020 (Donnelly and Fraga 2020), I was surprised to learn that there was an alternate hypothesis that rodents caused the damage to *E. tiehmii* plants (McClinton 2020). Rodent damage was not something that had come to my mind when visiting the site and it was not consistent with what I observed, especially given the extent of the damage to whole plants and root systems.

Following our initial visits, I surveyed the area two subsequent times on September 20, 2020 with Patrick Donnelly, Laura Cunningham, Kevin Emmerich, and Scott Lake, and on September 23, 2020 with Patrick Donnelly, Ben Grady, Laura Cunningham, and Kevin Emmerich. On September 20, we found concerning evidence that subpopulations 1 and 2 appeared altered, with holes partially filled in and some plants appearing to be replanted. It didn't look as if restoration efforts had been implemented because it was not consistent across the site and holes were only partially filled in. On September 23, subpopulations 4, 5, and 6 had also been altered, with holes partially filled in and several new foot prints and paths. I did not revisit subpopulation 3.

Below I provide several observations from all four of my surveys in the month of September, 2020. Over the past several weeks, I have consulted with numerous biologists who have decades of experience working with plants of the western U.S., including the genus *Eriogonum*, or small mammals. I also reviewed the literature on herbivory of rare plants, Polygonaceae, and plants of the western U.S. (*see section below on literature review on herbivory*). Based on my own observations during field visits, scientific consultation with respected colleagues, and literature review, I feel that it is highly unlikely that the damage to *Eriogonum tiehmii* plants was caused by small mammals or that it was a natural event. Below are some of the observations I made that seem inconsistent with small mammal herbivory.

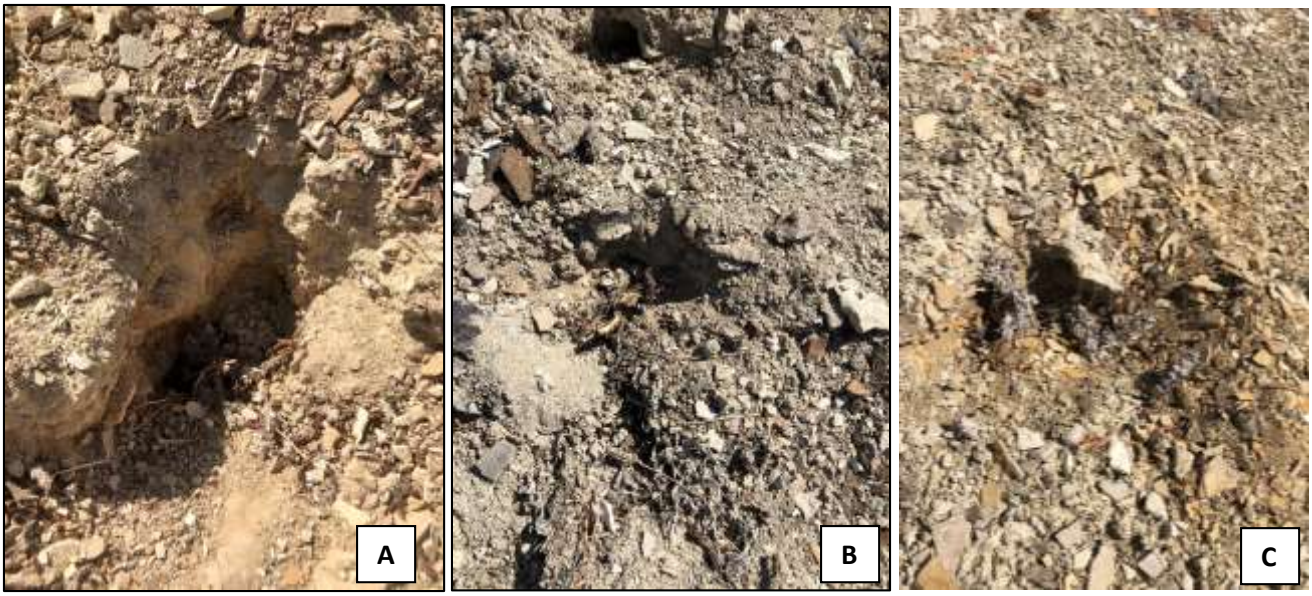


Figure 1. Example of the range of holes found throughout the site.

Fraga's observations

- The holes ranged in size (Fig 1), but did not generally appear to be holes dug by animals. Sometimes there was dirt at the base of the hole, but not consistently. Sometimes holes were dug at an angle, but not always (Fig 1A). The presence of plant material ranged from no plant material remaining in the hole with only remnant roots (Fig. 1A), to plants scattered outside the hole (Fig 1B) or whole plants left in the base of the hole (Fig 1C). We did not observe plant material blown around outside of the habitat.
- The damage was specific to *E. tiehmii* and occurred throughout the entire occupied range. No other *Eriogonum* species appeared to be significantly impacted, or any other associated plant species.
- Small mammal activity was apparent outside of *E. tiehmii* occupied habitat, however no other plant species outside of *E. tiehmii* habitat had any sort of similar damage.
- In some areas the damage looked quite systematic as if every single plant was dug up (in some cases near whole localized extirpation took place), however in other areas plants were only partially removed. I cannot provide an explanation for the inconsistent nature of the *E tiehmii* damage and removal, except to say that it was very confusing.
- A large portion of the uprooted biomass of buckwheats was no longer present at the site, and there were not significant amounts of plant parts that had blown out of the site into unoccupied habitat. I looked for nearby packrat nests, but I did not find any *E. tiehmii* material in rodent nests.
- The area was free of small mammal dropping, except for a small amount of rabbit scat. I could not find any rodent scat near any single hole I observed. Bighorn sheep or pronghorn scat was present in populations 1 and 2; however, we did not find an unusual amount of animal scat at the site.

- I observed some cut roots that had clean cuts (Fig. 2), however on most plants the bark was shredded. I do not think this is necessarily evidence of rodent activity. Herbarium specimens also show shredded bark and uneven cuts, but are collected with great care (Fig. 3). There could also be herbivory taking place on root tips after plants had been dug up because a I did observe a few roots that appeared to have been chewed.

Figure 2. The tip of cleanly cut root of *E. tiehmii* observed on September 20, 2020.

Figure. 3. Roots of herbarium specimens of *Eriogonum* species that have a similar habit as *E. tiehmii*

Literature review on herbivory

The literature concerning herbivory and the genus *Eriogonum* is not very extensive, but reveals that herbivory by small mammals primarily consists of damage to seedlings, leaves, and reproductive parts (Anderson 2006, Litle et al. 2019, Longland et al. 2009, Wikeem and Pitt 1991). Unfortunately, this does not shed light on herbivory of roots, or the woody caudex of cushion forming plants such as *E. tiehmii*. However, it is well documented that bighorn sheep (*Ovis canadensis*) frequently forage on *Eriogonum* species, and it has been noted that buckwheat plants have declined in response to bighorn herbivory (Anderson 2006, Wikeem and Pitt 1991). Bighorn sheep have been observed in the vicinity of Rhyolite Ridge on numerous occasions and its interactions with *E. tiehmii* can be further investigated. A study of a closely related buckwheat that occurs on specific soils found small mammals were responsible for clipping inflorescences, however this study is not really comparable since whole plants and roots were not impacted in that study, and the inflorescences of *E. tiehmii* were not clipped (Longland et al. 2009).

This event was large scale and significant to the population of *E. tiehmii*. Changes in species interactions tend to be associated with dramatic changes within the habitat including large scale wildfire, extreme drought, or other significant habitat alterations (Fox and Fox 2001). However, no large scale changes or habitat alternations, aside from mining exploration activities in 2018 have been documented at the site.

Other known incidence of human damage to rare plants

I cannot be certain of the exact cause of the significant damage to plants of *Eriogonum tiehmii*, but human caused damage is a possibility. There are several known cases of rare plant populations that have been damaged or an attempt was made to extirpate populations by private citizens to undermine listing under the Federal Endangered Species Act. I found documentation for two such instances in California. *Chorizanthe parryi* var. *fernandina* (Polygonaceae) had a population destroyed by Newhall Land and Farming Company which resulted in a criminal investigation by the California Department of Fish and Wildlife and an agreement to actively manage and restore the habitat of the species (CNPS 2016). A federally endangered species (*Pogogyne abramsii*, Lamiaceae) was deliberately destroyed "to ensure that subsequent requests for federal construction grants would not delayed." (Rolston 1990).

Final Comments

Eriogonum tiehmii has existed in its ecological setting within the Silver Peak Range for thousands of years, including co-existing with herbivores. This is the first instance of large scale plant damage that has ever been documented in the past 35 years since this species has been monitored by botanists. Mining continues to be the single greatest threat to the species, and it is a threat that is much more significant following this recent decline in the populations. Habitat protection, restoration, and monitoring will be vital activities going forward in order to advance recovery of this rare single site endemic. Protection of all subpopulations across the entire range of the species will be essential to preventing long term population decline and ultimate extinction.

Sincerely,

Naomi Fraga PhD
Research Assistant Professor, Claremont Graduate University
Director of Conservation Programs, California Botanic Garden
nfraga@calbg.org

Literature Cited:

Anderson, D.G. 2006 *Eriogonum brandegeei* Rydberg (Brandegee's buckwheat): A Technical Conservation Assessment. Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation Project. Accessed online at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5206849.pdf [September 27, 2020]

California Native Plant Society (CNPS). RE: Comments from California Native Plant Society on the Federal Register notice for the *Chorizanthe parryi* ssp. *fernandina* proposed rule. Accessed online: https://www.fws.gov/cno/Science/Review%20PDFs/2016/San-Fernando-Valley-Spineflower/CNPS_SFV_spineflower_final_TTsig.pdf September 26, 2020.

Donnelly P. and N.S. Fraga. 2020. Re: Tiehm's buckwheat large-scale destruction incident. Letter on file. September 15, 2020.

EM Strategies. 2019. 2019 Tiehm Buckwheat Survey Plan: Draft March 2019. On file with the Bureau of Land Management, Battle Mountain District, Tonopah Field Office. 1553 South Main Street. Po Box 911. Tonopah, Nevada 89049.

Fox B. and M.D. Fox 2001. Factors determining mammal species richness on habitat islands and isolates: habitat diversity, disturbance, species interactions and guild assembly rules. Lobal Ecology and Bioeography. 9: 19-37

Litle J., L.H. Quon., M.L. Anthill., E.J. Questad, E.J. 2019. Vertebrate herbivory on shrub seedlings in California sage scrub: important but understudied interactions. Plant Ecology. 220: 523-528.

Longland W.S., M. Aten, M. Swartz, an S. Kulpa. 2009. Who's Eating the Flowers of a Rare Western Nevada Range Plant? Rangelands. 31: 26-30.

McClinton J. 2020. *Eriogonum tiehmii* herbivory observations. Letter on file. Accessed online: https://sierranevadaally.org/wp-content/uploads/2020/09/ERTI-herbivore-digging-observations-9-8-20.pdf September 19, 2020

Rolston H. 1990. Property-Rights and Endangered Species. University of Colorado Law Review 61(no. 2,1990):283-306

Wikeem, B.M. and M.D. Pitt. 1991. Grazing effects and range trend assessment on California bighorn sheep range. Journal of Range Management 44:466-470.

From:	Naomi Fraga
To:	Jackson, Marc A
Cc:	kaceykc@forestry.nv.gov; Furtado, Douglas W
Subject:	[EXTERNAL] Letter regarding observations of damage to Tiehm"s buckwheat
Date:	Monday, September 28, 2020 9:53:30 AM
Attachments:	Fraga_buckwheat_damage_letter.pdf

Dear Mr. Jackson,

Please find attached a letter detailing my personal observations on the recent damage to the Tiehm's buckwheat (*Eriogonum tiehmii*) population. I hope you will consider this information as it relates to the ongoing investigations concerning the damage. This information is also pertinent to the current petition to list Tiehm's buckwheat as endangered under the Federal Endangered Species Act. Please don't hesitate to reach out if you have any questions.

Thank you for your consideration of this information,

Naomi

Naomi S. Fraga, Ph.D. (Director of Conservation Programs)
nfraga@calbg.org
Cell (626) 674-6746
California Botanic Garden (formerly Rancho Santa Ana Botanic Garden)
1500 N. College Avenue, Claremont, CA 91711
https://www.calbg.org/

From:	Laura Cunningham
To:	Jackson, Marc A
Cc:	pdonnelly@biologicaldiversity.org; Scott Lake; Naomi Fraga; K. Emmerich
Subject:	[EXTERNAL] Tiehm"s Buckwheat Field Report
Date:	Monday, September 28, 2020 9:56:41 AM
Attachments:	Report on Tiehm's Buckwheat Disturbance Event.docx

Dear Mr. Jackson,

Attached is a report by myself and Kevin Emmerich of Basin and Range Watch on the disturbance event of Tiehm's buckwheat on Rhyolite Ridge, NV.

Thank you,
Laura

--
Laura Cunningham
California Director
Western Watersheds Project
Cima CA 92323
Mailing address:
PO Box 70
Beatty NV 89003
(775) 513-1280

To: Marc Jackson, Field Supervisor
US Fish and Wildlife Service, Reno Office
1340 Financial Blvd, Suite 234
Reno, NV 89502

Report on Tiehm's Buckwheat Disturbance Event

Laura Cunningham and Kevin Emmerich, PO Box 70, Beatty NV 89003

September 28, 2020

All photos by Laura Cunningham.

We visited the Tiehms's buckwheat (*Eriogonum tiehmii*) site at Rhyolite Ridge in the Silver Peak Range, Nevada, three times, on September 13, 20, and 23, 2020. This was the first time we have visited the site and seen this rare plant. We observed plants in the area, wildlife, animal sign, human sign, and were accompanied by Patrick Donnelly of Center for Biological Diversity and Naomi Fraga of the California Botanic Garden. Other people met up with us at some of the dates.

On September 13, 2020, we independently decided to go see the Tiehm's buckwheat, and coincidentally met up with Fraga and Donnelly at the site. They were inspecting damaged plants and holes in the ground, counting how many buckwheats had been disturbed and removed. Fraga suspected possible vandalism, and the numerous holes appeared to be possibly of a small trowel of hoe digging plants up. It was quite a mystery.

The holes were a few inches deep, of similar sizes, and dozens were visible when standing in a buckwheat population looking around. Some plants were completely removed, others partially dig into, and still others removed but broken apart with pieces of buckwheat dropped around the hole. Sometimes a root was visible still in the ground where a buckwheat had been broken off; sometimes the plant was gone, other times it lay next to the hole.

September 13 holes where Tiehm's buckwheats used to be, White Hill. This did not look like rodent activity to us.

Strangely, only the Tiehm's buckwheat was dug up or disturbed. We carefully observed other plants in the area with the Tiehm's buckwheat, and none were dug into in this manner, and were not disturbed at all: including two other species of perennial *Eriogonum*, four-wing saltbush (Atriplex canescens), spiny menodora (*Menodora spinescens*), winterfat shrubs (*Krascheninnikovia lanata*), sagebrush (*Artemisia* sp.), Prince's plume (*Stanleya* sp.), Nevada ephedra (*Ephedra nevadensis*), James galleta grass (*Hilaria jamesii*), or alkali sacaton bunches (*Sporobolus airoides*).

We observed pellets of pronghorn antelope (*Antilocapra americana*) and tracks in the buckwheat areas where they had recently walked around on White Hill, and later that day at 3:30 PM Pacific we observed 5 antelope drinking at a small water trough next to a water truck a quarter mile up the road from White Hill and Population 1, and they ran into the hills to the east. The water truck had hoses stretching to three experimental buckwheat propagation projects.

^Water truck up the road from White Hill, with small water trough at its back end.

We observed very old cattle dung in one of the higher populations, but probably over a year old. Badger (*Taxidea taxus*) burrows were also observed.

On September 20 we returned and joined with Donnelly, Fraga, and Scott Lake of Center for Biological Diversity. Fraga and Donnelly took us to every population of the buckwheat and the disturbance was evenly the same over the entire global population. Our observations of holes and disturbance was similar to September 13. Only the Tiehm's buckwheats suffered damage and were dug up, no other species of plant.

This time we looked more closely for animal sign, and observed burrows of possible kangaroo rats *Dipodomys* spp.), pocket mice (*Perognathus* or *Chaetodipus* spp.), and kit fox (*Vulpes macrotis*). Pocket mice and kangaroo rats are primarily seed-eaters. Woodrat (*Neotoma* sp.) nests existed on some of the rock outcrops in places, with pellets, in Population 1 area. We examined the nests and they were full of collected and dried vegetation such as grass stems, ephedra stems, and old woody shrub sticks, but we could find no buckwheat plant parts in the nests. There were no rodent pellets next to the disturbance holes where Tiehm's buckwheat had been disturbed. We doubt the few woodrats present would venture more than a several yards away from their shelter to forage, and most of the Tiehm's buckwheats were out in the open and distant from any nests and rock outcrops. Some uncommon jackrabbit (*Lepus* sp.) scat was present, but fairly old and not widespread.

^Hole 4 inches across where a buckwheat used to be. This is not consistent with rodent herbivory.

^Four holes with bits of Tiehm’s buckwheat remains, but the plants are gone.

Broken Tiehm’s buckwheat near a hole.

Some roots appeared to have some bark stripped off, and there may have been some secondary rabbit or rodent damage after the plant roots were exposed and dug up.

Around Population 5, we observed numerous desert bighorn (*Ovis canadensis nelsoni*) fresh tracks, pellet piles, and some beds.

We observed a white-tailed antelope ground-squirrel (*Ammospermophilus leucurus*) on the dirt road in a wash below Population 3, but saw no ground squirrels in the buckwheat populations. They seemed uncommon and not widespread.

Two game cameras had been set facing Tiehm's buckwheat plants up at White Hill and an upper buckwheat population, with no identifying labels.

On September 23, 2020, we retuned with Fraga, Donnelly, Ben Grady—President of the Eriogonum Society, and two reporters to tour most of the populations again. Vehicles from agencies and other unidentified people were also in the area, including Nevada Department of Wildlife and Nevada Division of Forestry.

This time, human footprints were everywhere on each population, and the disturbance level had increased greatly, possibly from multiple agency and other investigators. We observed previously uprooted or broken buckwheat plants and holes stepped on, and what appeared to be some holes sloppily filled in. Much of the previous evidence was now greatly disturbed, and the Tiehm's buckwheat populations even more damaged. There was now possible secondary fresh digging by unidentified animals around some buckwheats.

^Highly disturbed Tiehm’s buckwheat population on White Hill, September 23. I do not believe this is rodent activity.

^Human footprints trampling the area, holes apparently filled in, and Tiehm's buckwheat debris, September 23.

The situation is complex and mysterious, yet the entire population of Tiehm's buckwheat is now greatly disturbed from perhaps multiple causes, and is in need of immediate protection and conservation measures.

Laura Cunningham is California Director at Western Watersheds Project and CoFounder of Basin and Range Watch. She studied mammalogy and botany at the University of California, Berkeley, and worked as a wildlife and fishery biologist at California Department of Fish and Wildlife and U.S Geological Survey, Biological Resources Division.

Kevin Emmerich is CoFounder of Basin and Range Watch, and formerly worked as a ranger with the National Park Service. He has worked on various lizard research projects, as a tortoise biological monitor, and as a bighorn sheep camera trap specialist.

California
BOTANIC GARDEN

September 28, 2020

Mr. Marc Jackson, Field Supervisor
US Fish and Wildlife Service, Reno Office
1340 Financial Blvd, Suite 234
Reno, NV 89502
Via email: marc_jackson@fws.gov

Dear Mr. Jackson:

I write in my capacity as Director of Research at California Botanic Garden (Cal BG) and with regard to the recent destruction of large numbers of plants of an endangered species of native buckwheat, *Eriogonum* (Polygonaceae), *Eriogonum tiehmii* in southwestern Nevada.

I have learned of the damage from Mr. Patrick Donnelly and Dr. Naomi Fraga, who have been working to secure this beautiful and precious plant for the future. I have seen numerous images of the damage and of the destroyed plants taken by a number of people.

A word on my qualifications to comment: both before and continuing since I began my position at Cal BG in 2006, I have extensive experience as a plant field biologist. Specifically, for more than 40 years, I have undertaken research projects on plants in diverse habitats from deserts to tropical rainforests. Most relevant to this incidence of destruction, I have worked in deserts in Arizona for almost 30 years (1992 - 2000) on a variety of projects. In particular, a long-term study of *Echinocatus horzontholonius* var. *nicholii* has brought me to the same plant populations over many years to census the same marked individual plants. The work of my colleagues and I has yielded several peer-reviewed publications; these are cited at the end of this letter. I have spent many days in the desert while conducting this study. It is this body of experience that qualifies me to express an opinion on this very unfortunate situation.

Working in the field and specifically in open habitats such as deserts, one inevitably sees destruction of plants from a wide variety of causes. Specifically with regard to the cacti we have studied, we have observed damage to the cacti by multiple species of animals, from insects to bighorn sheep.

It is my understanding that it has been alleged that the massive damage to the *Eriogonum tiehmii* plants was caused by small rodents, an idea that strains credulity. Responding to that idea, let me ask a question: if there were enough of these small rodents to do this degree of damage to these robust plants in a short period of time and across a sizable patch of desert, what is it thought that the rodents were doing until now? It would be very strange for a rodent species - across an area that is relatively large in the context of the home range of small rodents - to suddenly and en masse cause such damage to so many individuals of a single species of plant.

California BOTANIC GARDEN

The damage is also very strange. Whereas a few animals 'cut' plants and leave them lying on the ground where they fell when cut (it is tempting to anthropomorphize and accuse them of doing it just for 'fun'), most eat some or all parts of the plants that they bite into. Many of the destroyed *Eriogonum tiehmii* were left in situ or oddly shredded. Further, in my experience, it is frequent for plants to be damaged by animals digging in association with their burrows. To my knowledge, few rodents dig for the sake of digging but I see no evidence whatsoever in the images that I have seen that the holes made are in association with animal burrows. Also, those of us who work with and make collections for herbaria of species of *Eriogonum* find that they are rarely the targets of herbivory. Finally, and again, if there were enough rodents to cause this level of damage, what were they doing before they attacked these plants and what are they doing now? This is plague-of-locusts scale of damage to this plant: does the researcher who posits small rodents as the culprits envision a plague of rodents out there rampaging across the Nevada desert? Especially in the absence of any further evidence, that seems highly unlikely.

Having seen the images, I frankly do not know what caused such rampant damage to this special plant - a plant that holds absolutely unique and irreplaceable information about how to be a successful plant species on planet Earth. Under the circumstances, and given the scale of the damage, I would have to say that the first suspects would be humans. A couple of ill-intentioned humans could easily do this amount of damage in a matter of hours whereas it is frankly not plausible that it could have been done by small rodents.

Please step up and do what is necessary to protect these plants.

Sincerely,

Lucinda A. McDade, Ph.D.
Executive Director & Judith B. Friend Director of Research, California Botanic Garden
(and Professor & Chair, Botany Department, Claremont Graduate University)
Phone: (909) 625-8797 ext. 220
Email: lmcdade@calbg.org

---

cc: Kacey KC, State Firewarden/Forester
Nevada Division of Forestry
2478 Fairview Dr.
Carson City, NV 89701
kaceykc@forestry.nv.gov

Douglas Furtado, District Manager
Bureau of Land Management, Battle Mountain District
50 Bastian Road
Battle Mountain, NV 89820
dfurtado@blm.gov

References:

2019. Mcintosh, M. E., A. E. Boyd, A. E. Arnold, R. J. Steidl, and L. A. McDade. Growth and demography of a declining, endangered cactus in the Sonoran Desert. Plant Species Biology 1-10. DOI 10.1111/1442-1984.12251

2011. McIntosh, M. E., A. E. Boyd, P. D. Jenkins, and L.A. McDade. Growth and mortality in the endangered Nichol's turk's head cactus (*Echinocactus horizonthalonius* var. *nicholii* (Cactaceae)) in southeastern Arizona, 1995-2008. The Southwestern Naturalist 56: 333-340.

2007. Mcintosh, M. E., L. A. McDade, A. E. Boyd and P. D. Jenkins. Patterns of growth and mortality in the endangered Nichol's Turk's Head Cactus (*Echinocactus horizonthalonius* var. *nicholii* L. Benson; Cactaceae) in Southeastern Arizona. Pp. 77-82 in *Southwestern rare and endangered plants: Proceedings of the fourth conference; March 22-26, 2004; Las Cruces, New Mexico. Proceedings RMRS-P-XX*, Barlow-Irick, P., J. Anderson and C. McDonald (tech. eds.). Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

From:	Ming Posa
To:	Jackson, Marc A
Cc:	kaceykc@forestry.nv.gov; Furtado, Douglas W; Lucinda McDade
Subject:	[EXTERNAL] Letter from Lucinda McDade regarding E. tiehmii
Date:	Monday, September 28, 2020 11:57:36 AM
Attachments:	McDade E. tiehmii letter 092820.pdf

Dear Mr. Jackson,

Please find attached a letter, sent on behalf of Lucinda McDade regarding the endangered *Eriogonum tiehmii* plants in Nevada.

Regards,
Ming
--
Mary Rose "Ming" Posa
Executive Assistant/ CGU Botany Program Coordinator
California Botanic Garden
909.625.8767 ext 241
www.calbg.org
mposa@calbg.org

Christopher M. Moore
Assistant Professor of Biology
Department of Biology, Colby College
5746 Mayflower Hill Drive
Waterville, Maine 04901, U.S.
Email: christopher.moore@colby.edu
Office: (207) 859-5746

Marc Jackson
Field Supervisor
United States Fish and Wildlife Service, Reno Office
1340 Financial Blvd, Suite 234
Reno, Nevada 89502, U.S.

Dear Marc Jackson,

My name is Christopher Moore, and I am an Assistant Professor of biology at Colby College in Central Maine. I was trained as an ecologist in the western U.S. and earned my Ph.D. from the University of Nevada, Reno (UNR) from the Program in Ecology, Evolution, and Conservation Biology in 2014. I broadly study plant-animal interactions, and for 6 years while at UNR studied rodent-seed ecology in the eastern Sierra Nevada. The preceding 2 years before I was at UNR I worked for California State University, Fullerton. My primary project was to study rodent community composition and how small mammals affect plant communities in the at high-elevation sagebrush shrublands in Mojave National Preserve, but I also taught several field trip classes in Zzyzx, California at the Desert Studies Center on small mammals. From these 8 years of field studies across a variety of the arid southwest habitats studying small mammals I consider myself an expert on desert small mammal ecology, especially with rodents and their interactions on plants.

Background on small-to-medium mammal communities in the arid southwest. Rodent communities in the southwestern deserts of the United Sates (Chihuahua, Great Basin, Mojave, Sonora) are among the best-studied communities of animals in North America. They have a long and rich history of study beginning in the 1960s, but really exploding in the 1970s and 1980s, including extensive study on their natural history by community ecologists, behavior, and physiologists. On the biology of desert rodents, there have been symposia at scientific meetings, books,[1] numerous papers published in even the most prestigious of scientific journals,[2–6] and long-term studies that include one that has been conducted for over 4 decades.[7] In the Great Basin and Mojave deserts, and most of the southwest, meaningful classifications of rodents to understand what we know about them include taxonomy and behavior.

A taxonomy of rodents and other small-to-medium herbivorous mammals (i.e., Lagomorpha: rabbits, hares, and pikas) for the larger area around Silverpeak Range can be found in Table 1. Since we do not know exactly what species are there, I queried 2 databases that were assembled fairly independently of each other: one that creates range maps for the world's species[8] and one that aggregates digitized specimen information from collections around the world[9] (see Table 1 caption for specific collections that host specimens found in the area of Silverpeak Range). I searched as inclusively as possible, but many of the mammal species returned in these queries are not likely to be in the habitats near Rhyolite Ridge in the specific microhabitats where Tiehm's buckwheat is found. Therefore, I will exclude pikas (Ochontidae), beavers (Castoridae), porcupines (Erethizontidae), jumping mice (Dipodidae), and house mice (Muridae) from discussion in this letter, and focus on rabbits (Leporidae), New World mice (Cricetidae), pocket gophers (Geomyidae), kangaroo rats and pocket mice (Heteromyidae), and squirrels (Sciuridae).

A meaningful classification of the aforementioned rodent families is based on their diel activity, which is very similar within genus and similar within families. Behaviorally, there are diurnal and nocturnal rodents, with diurnal rodents being the squirrels and the nocturnal rodents being the New World mice, kangaroo rats and pocket mice, and pocket gophers. The pocket gophers (e.g., *Thomomys* spp.[10,11]) are fossorial rodents active all year and uncommon in low-productivity habitats. They consume roots, shoots, and full plants by pulling them underground into their tunnels. Heteromyids are probably the most abundant family of rodents in the area. Much study has been done on heteromyids, including on their diet[12,13] and behavior,[14–16] that shows that they are largely seed specialists (granivorous) and what little vegetation they consume is during the winter and spring months. During the summer and fall is when desert plants set seed, and heteromyid hoard and consume seeds over this period of time before transitioning to a diet with greater vegetative content when seed storage and availability are at low levels in the winter and spring. They are also known for

occupying open habitats (e.g., habitats without substantial vegetative cover like bajadas) and microhabitats (e.g., the spaces between shrubs in areas with at least some vegetative cover).[14,15,17] This is due to their specialized adaptations to forage efficiently (e.g., cheek pouches, bipedal locomotion [*Dipodomys* spp. and *Microdipodops* spp.]) and relatively outstanding ability to detect and outmaneuver predators (e.g., large eyes, enlarged auditory bullae, large surface area that touches the ground to detect predator vibrations, jumping ability). New World mice can be abundant and are likely the most diverse group of rodents in the area. Compared with their nocturnal counterparts (heteromyids), these rodents use entirely different types of macro- and microhabitats and differentially use other resources. These mice are behaviorally subordinate to the abundant because they are smaller, and they have general diets consisting of invertebrates, seeds, and some vegetative material. Habitat use varies widely among cricetids, with woodrats (*Neotoma* spp.) inhabiting rock crevices, fallen trees, or other large structures where they protect nests that they pass on through generations; grasshopper mice (*Onychomys* spp.) existing in very low densities;[18] voles (*Lemmiscus curatus*, *Microtus* spp.) and jumping mice (*Reithrodontomys* spp.) inhabiting areas with considerably more vegetation; muskrats (*Ondatra zibethicus*) being found in more mesic areas; and deer mice (*Peromyscus* spp.) occupying areas with sufficient shrub cover but tend to avoid open areas like playas, burned areas, desert pavement, etc. because of the threat of predation and insufficient resources. The two-year study I conducted in the sagebrush scrub in high-elevations in the Mojave effectively found no cricetids in the open (burned) areas, with the exception of few near a large boulder and living among a few burned shrubs (e.g., Figure 3, bottom row[19]). Lastly, the sciurid rodents in this area consist of chipmunks and ground squirrels. Note also, the top panel where heteromyid rodents occupy the open areas in Figure 3, top row.[19] The last major group of rodents are the squirrels. The ground squirrels (*Urocitellus* spp.) go dormant in the late spring or early summer and emerge in late winter.[20,21] The yellow-bellied marmot (*Marmota flaviventris*) and golden-mantled ground squirrel (*Callospermophilus lateralis*) are typically found at much more mesic and higher-elevational habitats than Rhyolite Ridge. This is also true of the chipmunks (*Neotamias* spp.) that require greater vegetative cover as well. The last genus of squirrels may be common in the area, which are white-tailed antelope squirrels (*Ammospermophilus leucurus*). These squirrels have generalist diets with green vegetation most common in the spring and seeds in the fall, and do not estivate. Vegetation in the autumn, fallowing dry summers, fails to meet water and nitrogen requirements, so it makes up a small proportion of their diet.[22–24]

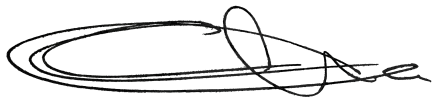
The other groups of small-to-medium sized herbivorous mammals in the area are the lagomorphs. All of these mammals are large, herbivorous, and some are most certainly found in this area. The jackrabbits (*Leups* spp.) are considerably larger and behave differently than their smaller counterparts, cottontails (*Sylvilagus* spp.). I will not go into detail about their diets or behaviors here because they are much too large to have made the holes in the report from the Center of Biological Diversity. Jackrabbits are known to occupy use more open habitats, but these animals are very large, and even a few dig marks would be considerably larger than even the largest hole in any of the photos in the report.

My opinion on the likelihood that small-to-medium mammals damaged Tiehm's buckwheat. Three lines of evidence suggest that the damage to Tiehm's buckwheat documented by the report by the Center for Biological Diversity was not likely done by small-to-medium mammals. The previous section hopefully provided relevant background on the dietary and behavioral ecology of mammals in the region that were ostensibly responsible for the uprooting and other damage to Tiehm's buckwheat. Based on habitat use in the area, the mammals that are likely most abundant are heteromyids, cricetids, and sciurids. The heteromyids eat little vegetation but are found in open habitats like the areas where Tiehm's buckwheat is found. Cricetids are likely present in the area and consume some vegetation, but are not likely foraging in open areas where Tiehm's buckwheats are found. The one sciurid species in the area, white-tailed antelope squirrel, that may use open areas, as a diurnal rodent in an arid desert, is reported to consume little vegetation following summer until winter precipitation and productivity increases. This is the first summary of lines evidence that would suggest that small-to-medium mammals are not responsible for what the damage to Tiehm's buckwheat. The second line of evidence would be the 8 years that I spend working on rodents in the sagebrush shrubland, eastern Sierra Nevada, and low-elevation Mojave desert. In that period of time I had thousands of trapnights and handled every genus and almost every species of heteromyid, cricetid, and sciurid mammal in Table 1. Spending days or weeks at time in the field for some years and multiple days on others additionally accumulated hundreds of days and nights in the field as well. In that amount of time I have not seen anything like what was presented in the Center for Biological Diversity's report. I have seen many holes dug by rodents because I studied rodent caching (hole dug for food storage and retrieval), but the holes in the images largely do not seem to fully conform to rodent holes. Most of the holes are too large,

and are the hundreds of holes I have observed rodents make for caching and pilfering food items are not that shape. That being written, these holes were not made for caching and pilfering, but presumably for accessing roots, which is something not mentioned in any dietary habit literature or not collective knowledge so far as I am aware. Third, and perhaps the most direct and strongest evidence of all, in my opinion, is that looking at the damage to the plants in the photographs, I can say that not a single looked like the work of rodents. 'Rodent,' etymologically-speaking, is from Latin, from the verb meaning 'to gnaw' (*rodere* L.). Rodents have the most species within any order in mammalia, and all of them graw, which maybe the most important key to their evolutionary and ecological success. From the field, but also personal experience with mice, chipmunks, squirrels, and rats I observe on a daily basis, I see them gnaw and evidence of past gnawing with their ever-growing, chisel-like incisors on traps, seeds, acorns, my house, etc. When evaluating the images, the kinds of damage I observe are clean, single cuts to the roots (Fig. 1a, b); stripping of the root bark (Fig. 1c); and tearing (Fig. 1d). None of this damage is consistent with characteristic rodent behavior. I do not feel confident to comment on how the holes were made, but I can ultimately claim with confidence that, in my opinion, they were likely not made by small-to-medium mammals.

I would be happy to provide further information; please do not hesitate to contact me.

Sincerely,



Dr. Christopher M. Moore
Assistant Professor of Biology
Department of Biology, Colby College

Table 1: Table of species found near the Silverpeak Range from 2 databases: the International Union for Conservation of Nature's Red List of Threatened Species (IUCN; from species' range maps of the area)[8] and the Global Biodiversity Information Facility that compiles records from museums or other sources from around the world (GBIF; from individual collection points).[9] GBIF records include specimens from collections at the Museum of Vetebrate Zoology at the University of California, Berkeley; University of Michigan Museum of Zoology; University of Kansas Biodiversity Institute & Natural History Museum; Museum of Southwestern Biology at University of New Mexico; New Mexico Museum of Natural History & Science; Moore Laboratory of Zoology, Occidental College; Colección Nacional de Mamferos; Universidad Nacional Autónoma de México, Field Museum of Natural History in Chicago, Illinois; and the Michigan State University Mammalogy Ornithology and Vertebrate Paleontology Collections. There were a total of 41 unique species quarried, 38 from the IUCN database, 26 from the GBIF database, 23 found in both databases. In the table, parenthetical values correspond to the number of species in each higher-order taxonomic group (i.e., for order, family, genus). For the "Database" column, the code for which database(s) found each species is: I = IUCN, G = GBIF, B = both.

Order	Family	Genus	Species	Common name	Database	Notes
Lagomorpha (5)				Rabbits, hares, pikas	B	
	Leporidae (4)			Rabbits, hares	B	Members of this family are small-to-medium herbivorous mammals, but soil perturbations made by members of this group are unmistakably larger.
		Lepus (2)		Hares, jackrabbits	B	
			L. californicus	Black-tailed jackrabbit	B	
			L. townsendii	White-tailed jackrabbit	I	
		Sylvilagus (2)		Cottontail rabbits	B	
			S. audubonii	Desert cottontail	B	
			S. nuttallii	Mountain cottontail	B	
	Ochontidae (1)			Pikas	I	Members of this family are not likely found at Rhyolite Ridge.
		Ochotona (1)		Pikas	I	
			O. princeps	American pika	I	
Rodentia (36)				Rodents	B	
	Castoridae (1)			Beavers	I	Members of this family are not likely found at Rhyolite Ridge.
		Castor (1)		Beavers	I	
			C. canadensis	American beaver	I	
	Crecetidae (13)			New World mice	B	Members of this family are likely to be be in the area, but not the specific open habitats lacking vegetation and other cover. Additionally, most, with the exception of *Neotoma* spp., are too small to dig holes like the ones are Rhyolite Ridge.

	Lemmiscus (1)		Sagebrush voles (monospecific)	B	Insufficient cover and cover type.
		L. curtatus	Sagebrush vole	B	
	Microtus (2)		Voles	B	Insufficient cover and cover type.
		M. longicaudus	Long-tailed vole	B	
		M. montanus	Montane vole	B	
	Neotoma (2)		Woodrats	B	Insufficient cover and cover type.
		N. cinerea	Bushy-tailed woodrat	I	
		N. lepida	Desert woodrat	B	
	Peromyscus (4)		Deermice	B	Insufficient cover, one or more species probably present at low densities, but holes are too small since most of these animals are < 25g.
		P. boylii	Bush deermouse	I	
		P. crinitus	Canyon deermouse	B	
		P. maniculatus	Deermouse	B	
		P. truei	Pinyon deermouse	I	
	Ondatra (1)		Muskrats	B	Not likely present; preferred habitats are considerably more mesic.
		O. zibethicus	Muskrat (monospecific)	B	
	Onychomys (2)		Grasshopper mice	B	Carnivorous, not known to dig, and present at very low densities.
		O. leucogaster	Northern grasshopper mouse	B	
		O. torridus	Southern grasshopper mouse	B	
	Reithrodontomys (1)		Harvest mice	B	Insufficient cover and cover type.
		R. megalotis	Western harvest mouse	B	
Dipodidae (1)			Jumping mice	I	Members of this family are not like found in habitats/microhabitats with Tiehm's buckwheat.
	Zapus (1)		Jumping mice	I	
		Z. princeps	Western jumping mouse	I	
Erethizontidae (1)			New world porcupines	B	Members of this family are not like found at Rhyolite Ridge.
	Erethizon (1)		North American porcupines (monospecific)	B	

		E. dorsatum	North American porcupine	B	
Geomyidae (2)			Gophers	B	Not likely present, feeding patterns are inconsistent with damage done to Tiehm's buckwheats at Rhyolite Ridge, and no evidence of presence (e.g., tunnels).
	Thomomys (2)		Western pocket gophers	B	
		T. bottae	Botta's pocket gopher	B	
		T. talpoides	Northern pocket gopher	G	
Heteromyidae (9)			Kangaroo rats and mice, pocket mice, spiny pocket mice	B	Members of each genus is likely present, but not all species.
	Chaetodipus (1)		Pocket mice	B	Likely to be present, but tend not to occupy open habitats, and are too small (≈14g) to cause such damage.
		C. formosus	Long-tailed pocket mouse	B	
	Dipodomys (4)		Kangaroo rats	B	Likely present and the most common nocturnal rodent in the open areas where Tiehm's buckwheat is found. They are large enough (*D.* deserti and *D.* ordii have respective average masses of approximately 100g and 75g) to make holes approaching that size. Most *Dipodomys* spp. are granivorous; especially in the fall when seeds are abundant. They are known to consume green vegetation in the spring.
		D. deserti	Desert kangaroo rat	B	
		D. merriami	Merriam's kangaroo rat	G	
		D. microps	Chisel-toothed kangaroo rat	B	
		D. ordii	Ord's kangaroo rat	B	
	Microdipodops (2)		Kangaroo mice	B	Likely to be present, but tend not to occupy open habitats, and are too small (≈15g) to cause such damage.
		M. megacephalus	Dark kangaroo mouse	B	
		M. pallidus	Pale kangaroo mouse	B	

	Perognathus (2)		Pocket mice	B	Likely to be present, but tend not to occupy open habitats, and are too small (e.g., *P. longimembris* ≈10g) to cause such damage.
		P. longimembris	Little pocket mouse	B	
		P. parvus	Great Basin pocket mouse	I	
Muridae (1)			Mice	I	Human commensal; not likely present.
	Mus (1)		Mice	I	
		M. musculus	House mouse	I	
Sciuridae (8)			Squirrels	B	
	Ammospermophilus (1)		Antelope squirrels	B	
		A. leucurus	White-tailed antelope squirrel	B	*A. leucurus* is likely abundant, consumes vegetation, and large enough to make dig marks like the ones in the photographs. *A. leucurus* feeds on less vegetation in the summer at fall.
	Callospermophilus (1)		Golden-mantled ground squirrels	B	Members of this genus are not likely found in habitats/microhabitats with Tiehm's buckwheat.
		C. lateralis	Golden-mantled ground squirrel	B	
	Marmota (1)		Marmots	I	Members of this genus are not likely found at Rhyolite Ridge.
		M. flaviventris	Yellow-bellied marmot	I	
	Neotamias (3)		Chipmunks	B	Members of this genus are not likely found in habitats/microhabitats with Tiehm's buckwheat.
		N. minimus	Least chipmunk	B	
		N. panamintinus	Panamint chipmunk	B	
		N. umbrinus	Uinta chipkunk	B	
	Urocitellus (2)		Ground squirrels	B	Both members of this genus are large enough to make holes and consume green vegetation, but go dormant in the late spring or early summer and emerge in late winter.
		U. mollis	Piute ground squirrel	B	

	U. townsendii	Townsend's ground squirrel	G

(a) A clean, single cut of a root without evidence of gnawing.

(b) Another clean, single cut of a root without evidence of gnawing.

(c) Stripping of a root's bark.

(d) Tearing of a plant from its root

Figure 1: Examples of types of damage that I classified from photographs. The top row (a, b) show what appears to be a single, clean cut across the root of Tiehm's buckwheat. Notice, too, in b, that the cut seems to include the vascular tissue (light-colored tissue), but also the root bark. Panel c shows stripping of the bark, which is not indicative of rodent behavior, but also not found in the other damaged plants. Last, d shows damage that appears to be from tearing the above- and below-ground parts of the plant, which is not something that any mammal would do, unless kicked or pulled by a very large mammal.

References

[1] HH Genoways and JH Brown. *Biology of the Heteromyidae*. American Society of Mammalogists, 1993.

[2] JH Brown and DW Davidson. Competition between seed-eating rodents and ants in desert ecosystems. *Science*, 196(4292):880–882, 1977.

[3] JH Brown and EJ Heske. Control of a desert-grassland transition by a keystone rodent guild. *Science*, 250(4988):1705–1707, 1990.

[4] TJ Valone and JH Brown. Effects of competition, colonization, and extinction on rodent species diversity. *Science*, 267(5199):880–883, 1995.

[5] JH Brown, TG Whitham, SKM Ernest, and CA Gehring. Complex species interactions and the dynamics of ecological systems: long-term experiments. *Science*, 293(5530):643–650, 2001.

[6] SKM Ernest and JH Brown. Delayed compensation for missing keystone species by colonization. *Science*, 292(5514):101–104, 2001.

[7] SKM Ernest, GM Yenni, G Allington, EK Bledsoe, EM Christensen, RM Diaz, JR Goheen, Q Guo, E Heske, D Kelt, et al. The portal project: a long-term study of a chihuahuan desert ecosystem. *BioRxiv*, page 332783, 2018.

[8] IUCN 2020. The IUCN red list of threatened species. Version 2020-2. https://www.iucnredlist.org. Downloaded on 09 July 2020.

[9] GBIF.org. Gbif occurrence download. https://doi.org/10.15468/dl.jctq6e.

[10] BJ Verts and Leslie N Carraway. *Thomomys talpoides*. *Mammalian Species*, (618):1–11, 1999.

[11] CA Jones and CN Baxter. *Thomomys bottae*. *Mammalian Species*, (742):1–14, 2004.

[12] OJ Reichman and KM Van De Graaff. Association between ingestion of green vegetation and desert rodent reproduction. *Journal of Mammalogy*, 56(2):503–506, 1975.

[13] OJ Reichman. Relation of desert rodent diets to available resources. *Journal of Mammalogy*, 56(4):731–751, 1975.

[14] SD Thompson. Microhabitat utilization and foraging behavior of bipedal and quadrupedal hetermoyid rodents. *Ecology*, 63(5):1303–1312, 1982.

[15] SD Thompson. Structure and species composition of desert heteromyid rodent species assemblages: effects of a simple habitat manipulation. *Ecology*, 63(5):1313–1321, 1982.

[16] OJ Reichman and MV Price. Ecological aspects of heteromyid foraging. *Biology of the Heteromyidae (HH Genoways and JH Brown, eds.). Special Publication*, 10:539–574, 1993.

[17] PM Waser and JM Ayers. Microhabitat use and population decline in banner-tailed kangaroo rats. *Journal of Mammalogy*, 84(3):1031–1043, 2003.

[18] R McCarty. *Onychomys torridus*. *Mammalian Species*, (59):1–5, 1975.

[19] PT Stapp. Effects of small mammals on post-fire vegetation recovery in the mojave desert. Unpublished report, National Park Service, 2008. url: https://www.nps.gov/moja/learn/nature/upload/PStapp-WNPA-Final-Report-1-Aug-2008.pdf.

[20] JR Alcorn. Life history notes on the piute ground squirrel. *Journal of Mammalogy*, 21(2):160–170, 1940.

[21] EA Rickart. *Spermophilus townsendii*. *Mammalian species*, (268):1–6, 1987.

[22] WH Karasov. Energy assimilation, nitrogen requirement, and diet in free-living antelope ground squirrels *Ammospermophilus leucurus*. *Physiological Zoology*, 55(4):378–392, 1982.

[23] WH Karasov. Water flux and water requirement in free-living antelope ground squirrels *Ammospermophilus leucurus*. *Physiological Zoology*, 56(1):94–105, 1983.

[24] WH Karasov. Nutrient constraints in the feeding ecology of an omnivore in a seasonal environment. *Oecologia*, 66(2):280–290, 1985.

From:	Chris Moore
To:	Jackson, Marc A
Cc:	kaceykc@forestry.nv.gov; Furtado, Douglas W; pdonnelly@biologicaldiversity.org; RFWO Correspondence, FW8
Subject:	[EXTERNAL] Tiehm"s buckwheat damage by rodents
Date:	Monday, September 28, 2020 2:44:35 PM
Attachments:	CMoore_CommentOnTiehmsBuckwheat.pdf

Dear Marc,

My name is Christopher Moore, Ph.D. and I'm and ecologist who worked on rodent-plant interactions in the southwest from 2006–2014. I was asked to comment on the recent damage documented on Tiehm's buckwheat, and would like to submit the attached letter (.pdf) on my analysis of the damage and the likelihood that it was small-to-medium mammals. I hope you find this information helpful. Please feel free to contact me I can be of further assistance.

Sincerely,

--
Christopher M. Moore
Pronouns: he/him/his
Assistant Professor of Biology
Department of Biology, Colby College
Office/Lab: Olin 216/214
Office: (207) 859-5746
Email: cmmoore@colby.edu
Website: mutualismecology.com

From: Patrick Donnelly
To: Jackson, Marc A
Subject: RE: [EXTERNAL] letter re: Tiehm"s buckwheat observations
Date: Tuesday, September 29, 2020 12:51:32 PM

Marc, if you have a second please give me a call.
Thanks,
-Patrick

Patrick Donnelly
Nevada State Director
Center for Biological Diversity
702.483.0449
pdonnelly@biologicaldiversity.org
Twitter: @bitterwaterblue

From: Jackson, Marc A <marc_jackson@fws.gov>
Sent: Tuesday, September 29, 2020 10:37 AM
To: Patrick Donnelly <PDonnelly@biologicaldiversity.org>
Subject: Re: [EXTERNAL] letter re: Tiehm's buckwheat observations

Dear Mr. Donnelly,

Thank you for sending us your detailed description of the ongoing activity at the Tiehm's buckwheat site. We are currently evaluating all available information, and your additional observations are very helpful. We anticipate making a decision on our plan of action very soon.

Sincerely,

Marc Jackson

Field Supervisor

Reno Fish and Wildlife Office
U.S. Fish and Wildlife Service
1340 Financial Boulevard, Suite 234
Reno, NV 89502
Phone: 775-861-6337

Fax: 775-861-6301

From: Patrick Donnelly <PDonnelly@biologicaldiversity.org>
Sent: Monday, September 28, 2020 1:33 PM
To: Jackson, Marc A <marc_jackson@fws.gov>; kaceykc@forestry.nv.gov <kaceykc@forestry.nv.gov>; Furtado, Douglas W <dfurtado@blm.gov>
Subject: [EXTERNAL] letter re: Tiehm's buckwheat observations

Hello,

Attached you will find a letter regarding significant and concerning alterations to the Tiehm's buckwheat habitat between September 13th and September 23rd.

-Patrick Donnelly

Patrick Donnelly
Nevada State Director
Center for Biological Diversity
702.483.0449
pdonnelly@biologicaldiversity.org
Twitter: @bitterwaterblue

From: Young, Adele R
To: Jackson, Marc A
Cc: O"Hara, Kerry
Subject: Re: DRAFT NR for Tiehms Buckwheat Investigation
Date: Friday, October 2, 2020 5:01:09 PM

Thank you Marc, I will take a look at it and provide comments.

Adele

Adele R. Young
U.S. Department of the Interior
Office of the Solicitor, Pacific Southwest Region
2800 Cottage Way, E-1712, Sacramento, CA 95825
Phone 916.978.4667
Fax 916.978.5694
adele.young@sol.doi.gov

From: Jackson, Marc A <marc_jackson@fws.gov>
Sent: Friday, October 2, 2020 4:06 PM
To: Young, Adele R <adele.young@sol.doi.gov>
Cc: O'Hara, Kerry <Kerry.O'Hara@sol.doi.gov>
Subject: Re: DRAFT NR for Tiehms Buckwheat Investigation

Hi Adele,

Today kind of went off the rails, but better late than never. Attached is our draft Tiehm's response for your review. Thanks.

Marc Jackson
Field Supervisor
Reno Fish and Wildlife Office
U.S. Fish and Wildlife Service
1340 Financial Boulevard, Suite 234
Reno, NV 89502
Phone: 775-861-6337
Fax: 775-861-6301

From: Young, Adele R <adele.young@sol.doi.gov>
Sent: Friday, October 2, 2020 9:56 AM
To: Jackson, Marc A <marc_jackson@fws.gov>
Cc: O'Hara, Kerry <Kerry.O'Hara@sol.doi.gov>
Subject: Re: DRAFT NR for Tiehms Buckwheat Investigation

Hello Marc,

I am a bit confused. If you have the Service's draft response to CBD's Sept. 17th emergency petition for my review, can you forward it to me?

As far as the BLM releasing the results of their investigation, that is a separate matter and BLM has their own Solicitor assigned (Erica Anderson) who is handling all of the BLM issues related to Tiehm's.

Best,
Adele

Adele R. Young
U.S. Department of the Interior
Office of the Solicitor, Pacific Southwest Region
2800 Cottage Way, E-1712, Sacramento, CA 95825
Phone 916.978.4667
Fax 916.978.5694
adele.young@sol.doi.gov

From: Jackson, Marc A <marc_jackson@fws.gov>
Sent: Friday, October 2, 2020 8:48 AM
To: Young, Adele R <adele.young@sol.doi.gov>; O'Hara, Kerry <Kerry.O'Hara@sol.doi.gov>
Subject: Fw: DRAFT NR for Tiehms Buckwheat Investigation

FYI - we have a response drafted for your review and are awaiting your decision.

Marc Jackson
Field Supervisor
Reno Fish and Wildlife Office
U.S. Fish and Wildlife Service
1340 Financial Boulevard, Suite 234
Reno, NV 89502
Phone: 775-861-6337
Fax: 775-861-6301

From: Harvey, Jess D <jharvey@blm.gov>
Sent: Thursday, October 1, 2020 10:35 AM
To: Barrett, Justin S <justin_barrett@fws.gov>; Jackson, Marc A <marc_jackson@fws.gov>; Gilkeson, Joanna C <joanna_gilkeson@fws.gov>
Cc: Furtado, Douglas W <dfurtado@blm.gov>; Bush, Christopher I <cbush@blm.gov>; Evenson, Ronald (Rudy) R <revenson@blm.gov>
Subject: DRAFT NR for Tiehms Buckwheat Investigation

Sir/Ma'am,

We are currently putting together a draft release for the Tiehms Buckwheat Investigation.

I wanted to reach out to you and let you know that I have been asked to wait until the investigation is done and the solicitor concurs before I forward it to anyone.

As soon as that happens, I will send it to you.

Respectfully,

Jess D. Harvey
Public Affairs Specialist
Battle Mountain District Office
50 Bastian Road
Battle Mountain, Nevada 89820
Work: 775.635.4054

November 2, 2020

Marc Jackson
Field Supervisor
US Fish and Wildlife Service
Reno Office 1340 Financial Blvd, Suite 234
Reno, NV 89502
marc_jackson@fws.gov

Kacey KC, State Firewarden/Forester
Nevada Division of Forestry
2478 Fairview Dr.
Carson City, NV 89701
kaceykc@forestry.nv.gov

Douglas Furtado, District Manager
Bureau of Land Management, Battle Mountain District
50 Bastian Road
Battle Mountain, NV 89820
dfurtado@blm.gov

Re: Ongoing damage to plants and habitat at Tiehm's buckwheat population at Rhyolite Ridge constitutes an emergency threat to the continued existence of the species

On October 31, 2020, Naomi Fraga and Patrick Donnelly conducted a visit to subpopulations 1, 2, 4, 5, and 6 of *Eriogonum tiehmii* (Polygonaceae) in the Silver Peak Range, Esmeralda County, Nevada to assess its current status. We last visited the site on September 23, 2020, and described what we saw at that time in separate letters to you dated September 28, 2020.

On October 31, 2020, we observed new and recent damage to plants and habitat that indicate the threat of damage and destruction to plants, and habitat degradation, is active and still ongoing. This constitutes an emergency threat to the continued existence of this species.

Our new observations from October 31, 2020 are outlined below.

- Subpopulation 1 is experiencing increased damage from unauthorized off highway vehicle use. We observed fresh tire tracks that went to the top of the hill and back down. We last visited subpopulation 1 on September 23, 2020; these tire tracks were not present at that time indicating this is new damage (Figs. 1-2, map Fig. 3).

- Fresh holes have been dug and there is evidence of increased damage and destruction of plants. We observed evidence of freshly dug holes (Figs. 4-5) that were clearly defined, and additional plants that have been damaged or dug up with fresh and clean cuts (Fig. 6). The plant material

that appeared newly damaged was not fully desiccated or shredded to the same degree as the destroyed plants we first observed on September 12-13, 2020.

- Areas in subpopulation 6A which formerly had relatively less disturbance are seeing significant new disturbance (Fig. 7). This is of concern as subpopulation 6A is the most robust remaining subpopulation and is of importance for the long-term conservation of the species.

- We observed an increase in the number of foot prints and more well-defined social tails emerging. Social trails in subpopulation 6 were clearly visible (Figs. 8-9). There were new footprints and increased trampling throughout subpopulations 1, 2, 4 and 6.

Tiehm's buckwheat is experiencing active and ongoing threats that are placing this species on an accelerated path to extinction. If the active threat of plant damage and destruction, and habitat degradation, we have observed continue at the current pace and if no meaningful conservation actions are put in place, then this species will continue to decline so severely that it will likely go extinct before its next reproductive season (May-June 2021).

We request that all parties to which this letter is addressed take immediate actions to advance protection for *Eriogonum tiehmii*. In our later dated September 15, 2020 we listed several recommendations that would improve the species' status and would forge a path towards recovery. We will reiterate some of these recommendations here. They are of even greater urgency now, given the clear ongoing nature of the threat to the only known population this species.

Bureau of Land Management:

- Conduct stabilization and restoration of damaged buckwheat habitat, and provide plant care to damaged plants;
- Post a 24-hour security guard on-site until more appropriate security measures can be implemented;
- Fence the entire habitat of Tiehm's buckwheat with secure fencing to guard against any potential threats;
- Install security/game cameras to capture multiple views at each subpopulation;
- Install proper signage to inform the public of the sensitive resources present;
- Cease any further disturbance of Tiehm's buckwheat individuals or native habitat for mining mitigation research until further information about the status and viability of the species in the aftermath of this destruction can be determined.

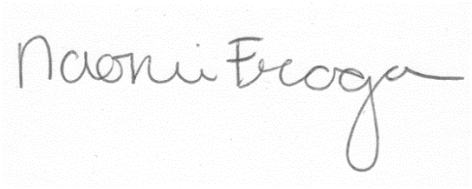
US Fish and Wildlife Service:

- Conduct a comprehensive re-survey of the population to confirm extent of damage;
- Immediately list Tiehm's buckwheat as endangered under the Endangered Species Act on an emergency basis;
- Issue a 12-month finding to list Tiehm's buckwheat as endangered under the Endangered Species Act and designate critical habitat for the entirety of the buckwheat's occupied range;
- Develop a recovery plan to ensure Tiehm's buckwheat does not go extinct.

Nevada Division of Forestry:

- Immediately adopt a rule to protect Tiehm's buckwheat under NRS 527.
- Create a plan for seed collection in 2021 and propagation.

Sincerely,



Naomi Fraga PhD
Research Assistant Professor, Claremont Graduate University
Director of Conservation Programs, California Botanic Garden
nfraga@calbg.org

Patrick Donnelly
Nevada State Director, Center for Biological Diversity
pdonnelly@biologicaldiversity.org

CC:
Jon Raby, State Director; Bureau of Land Management Nevada
Kevin Herzik; office of Congressman Steven Horsford
Kelly Riddle; office of Senator Jacky Rosen
Kyle Chapman; office of Senator Catherine Cortez Masto
Brad Crowell; Director, Nevada Department of Conservation and Natural Resources
James Morefield, PhD; Botanist, Nevada Division of Natural Heritage
Senator Melanie Scheible, Chair; Nevada State Senate Committee on Natural Resources

Figures 1-2. New OHV tracks in subpopulation 1.

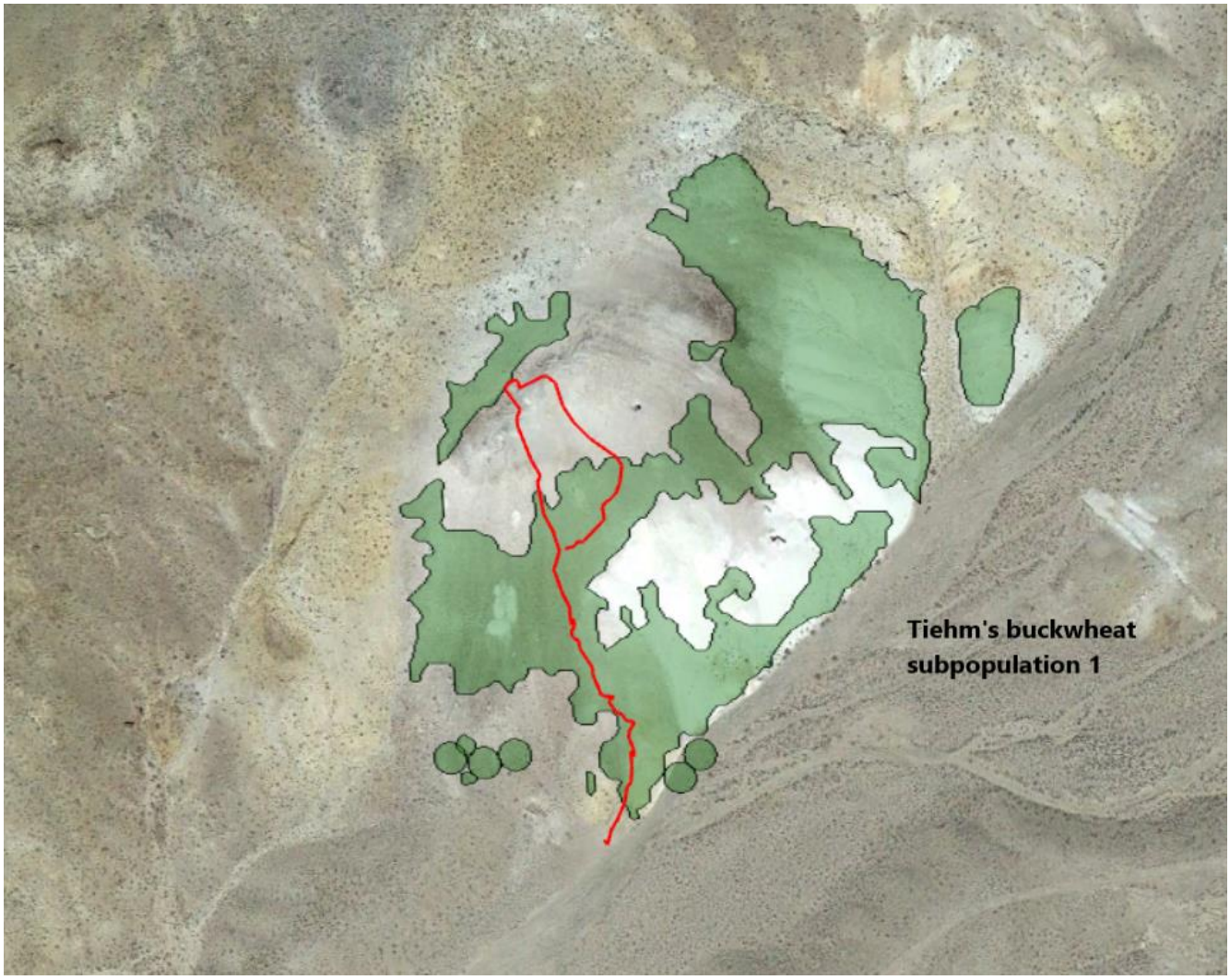


Figure 3: map of new OHV tracks in population 1.

Figures 4-5. Freshly dug holes at *Eriogonum tiehmii* population with plants removed.

Figure 6. A recently damaged plant from subpopulation 1 with freshly cut roots.

Figure 7: Significant new disturbance in subpopulation 6A.

Figure 8: Well defined social trail at subpopulation 6B.

Figure 9: Newly defined social trail (right) near area of significant new disturbance (left) in subpopulation 6A.

From:	Patrick Donnelly
To:	Jackson, Marc A; kaceykc; Furtado, Douglas W
Cc:	Raby, Jon K; Herzik, Kevin; Riddle, Kelly (Rosen); kyle_chapman@cortezmasto.senate.gov; bcrowell@dcnr.nv.gov; James Morefield; Melanie Scheible; Naomi Fraga; Alli Melton; Amy Atwood; Scott Lake
Subject:	[EXTERNAL] letter regarding ongoing damage to Tiehm"s buckwheat
Date:	Monday, November 2, 2020 10:50:22 AM
Attachments:	FragaDonnelly ERTI letter 11.2.2020 final.pdf

Hello,

Attached you will find a letter from Dr. Naomi Fraga and myself regarding our observations at Rhyolite Ridge on October 31, 2020. Continuing and ongoing damage to plants and habitat at Tiehm's buckwheat population at Rhyolite Ridge constitutes an emergency threat to the continued existence of the species.

Best regards,
-Patrick Donnelly

Patrick Donnelly
Nevada State Director
Center for Biological Diversity
702.483.0449
pdonnelly@biologicaldiversity.org
Twitter: @bitterwaterblue