From: Jim Morefield
To: Kulpa, Sarah; Crosby, Brandon J
Subject: [EXTERNAL] Fw: Summary of ERTI observations
Date: Tuesday, September 15, 2020 12:45:34 PM
Attachments: ERTI herbivore digging observations 9-8-20.pdf

Hi Sarah and Brandon,

In case you had not already received this through other channels, wanted to make sure you had this report from Jamey McClinton on her initial field observations of the buckwheat damage.

--Jim Morefield

~^
James D. Morefield, Ph.D., Supervisory Botanist
Nevada Department of Conservation & Natural Resources
Division of Natural Heritage
901 South Stewart Street, suite 5002
Carson City NV 89701-5245 U.S.A.
direct tel: (775) 684-2902
general tel: (775) 684-2900
email: jdmore@heritage nv.gov
web: http://heritage.nv.gov
~^

From: Jamey McClinton (b) (6) P.I.I.(b) (6) P.I.I.
Sent: Thursday, September 10, 2020 13:39
To: Elizabeth Leger; Jim Morefield
Subject: Summary of ERTI observations

Hi Beth and Jim,

During my conversation with Jim this morning, he asked me to write up a summary of my observations from the site. I'm attaching that, and all the relevant photos I took from Tuesday are part of the document. Feel free to share with anyone who might like to see it.

Thanks,
Jamey

--
Jamey McClinton
Leger Lab
University of Nevada, Reno
(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.

From: (b) (6) P.I.I.
To: Kulpa, Sarah; Edwards, Fred S; James Morefield
Subject: [EXTERNAL] Fwd: E. tiehmii site conditions
Date: Wednesday, September 9, 2020 8:30:10 AM

Hi you all,

I'm writing to share some news about the E. tiehmii populations, from Jamey. As you remember, she is doing qualitative/quantitative rare plant surveys this summer targeted on rare Eriogonum and Penstemons, describing their habitat characteristics and documenting a number of possible impacts, including roads, herbivory, fire, etc. This is not related to the work with Ioneer, it's rare plant work across Nevada that we are doing in collaboration with UNR, UWFWS and Heritage.

She is almost done with the field surveys, and was just doing E. tiehmii yesterday, when she observed what looks like massive herbivore disturbance to the wild populations; description below, and photos.

Jim, have you ever seen anything like this in your history of work with this plant?

I'm happy to talk on the phone,

-Beth

- -
Elizabeth Leger
Professor, Department of Biology
Director, UNR Museum of Natural History
University of Nevada, Reno
Office: (775) 784-7582
Cell: (775) 315 5741
http://www.naturalhistory.unr.edu/

---------- Forwarded message ---------
From: **Jamey McClinton** <jdwilcher13@gmail.com>
Date: Tue, Sep 8, 2020 at 7:27 PM
Subject: E. tiehmii site conditions
To: Elizabeth Leger <ealeger@gmail.com>

Cc: Cathy Silliman <cathysill96@gmail.com>, Madeline Lowe <madelinelowe@nevada.unr.edu>

Hi Beth,

I wanted to let you know that we found some concerning disturbance from herbivores at the ERTI sites that might benefit from more surveys, maybe by Sarah's people or Cody, since she has such nice transects set up already. Or maybe by the demography folks?

We walked around at ERTI 1, 2, 3, and 6A, and at all of them, somewhere between 20-50% of the mature ERTI plants out there had been dug up and chewed on or gnawed off at the roots the same way our transplants were. We think it happened somewhat recently, because not all of the leaves were dry and crunchy and yet. I'm attaching some photos below...

I'd be interested to see what you think about this when you get a chance. We are planning on another field day tomorrow to check off the last species on my list for the summer, Penstemon tiehmii, but I'll have cell service for parts of the day, or could talk later this week, we'll be in Reno.

Thanks,

Jamey

From: (b) (6) P.I.I.
To: Kulpa, Sarah
Cc: James Morefield; jchrist@forestry.nv.gov; (b) (6) P.I.I. ; Heston, Sophia M; Barrett, Justin S
Subject: [EXTERNAL] Re: eDNA proposal for Tiehms
Date: Monday, September 28, 2020 1:00:20 PM

Hi again!

I think it's a good idea, though I do wonder about spending the time waiting for results. Cameras may be more conclusive, sooner, if they are pointed at the right patch at the right time?

- -
Elizabeth Leger
Professor, Department of Biology
Director, UNR Museum of Natural History
University of Nevada, Reno
Office: (775) 784-7582
Cell: (775) 315 5741
http://www.naturalhistory.unr.edu/

On Mon, Sep 28, 2020 at 10:25 AM Kulpa, Sarah <sarah_kulpa@fws.gov> wrote:

> Hi all!
>
> I received the attached proposal on eDNA sampling from Jackie Grant at SUU. I also just talked with her on the phone, to follow-up on data collection to make sure our situation is a candidate for this type of work. She said she can collect eDNA from exposed roots, and would use a razor blade or scalpel to take a small section. She also recommended taking soil eDNA from the same location a root sample is taken if it's an attached plant to really capture small mammal eDNA. It is in our favor that it is dry out there and it doesn't rain, because that preserves the eDNA longer. Based on past results and other eDNA work, she thinks we can get 50-60% positive 10 weeks or so out; you can get 80-90% positive 2 weeks out. She would be able to come out as soon as this Thursday and Friday.
>
> Since most of you have been to the Tiehm's site already, based on what you saw, do you think this type of eDNA testing is possible? Are there enough plants still available for this type of sampling? What do you think of the proposal? FWS is also going to try to find the funding to pay for this

research.

Thanks!

Sarah

Sarah Kulpa
Restoration Ecologist/Botanist
Reno Fish and Wildlife Office
1340 Financial Blvd. Suite 234
Reno, Nevada 89521
(775) 861-6340

Table 1. Summary of Tiehm's Buckwheat Transect Survey Results

Subpopulation	Transect	Intact Plants[1]	Damaged or Dead Plants[1]	Total Plants (Sep 2020)	Total Plants (June 2020)	Difference Between Counts[3]
1	1	0	1	1	1	0
1	2	18	44	62	49	+13
1	3	4	5	9	39	-30
1	4	15	11	26	36	-10
1	5	21	29	50	46	+4
1	6	17	2	19	13	+6
1	7	10	38	48	51	-3
1: Totals	**All**	**85**	**130**	**215**	**235**	**-20**
2	1	0	0	0	4	-4
2	2	8	23	31	36	-5
2	3[2]					
2	4	10	16	26	46	-20
2	5	2	22	24	15	+9
2	6	0	1	1	1	0
2	7	5	18	23	73	-50
2	8	10	25	35	39	-4
2	9	1	3	4	34	-30
2: Totals	**All**	**62**	**82**	**144**	**248**	**-104**
3	1	0	3	3	4	-1
3	2	2	4	6	7	-1
3	3	11	25	36	17	19
3	4	0	6	6	9	-3
3	5	0	1	1	1	0
3: Totals	**All**	**13**	**39**	**52**	**38**	**14**
4	1	0	4	4	2	+2
4	2	4	36	40	33	+7
4	3	0	8	8	3	+5
4	4	0	76	76	100	-24
4	5	0	0	0	0	0
4: Totals	**All**	**4**	**124**	**128**	**138**	**-10**
6A	1	3	11	14	11	+3
6A	2	1	16	17	8	+9
6A	3	9	2	11	10	-8

Subpopulation	Transect	Intact Plants[1]	Damaged or Dead Plants[1]	Total Plants (Sep 2020)	Total Plants (June 2020)	Difference Between Counts[3]
6A	4	51	28	79	92	-13
6A	5	24	24	48	69	-21
6A	6	88	40	128	128	0
6A	7	39	39	78	154	-76
6A: Totals	**All**	**215**	**160**	**375**	**481**	**-106**
6B	1	7	17	24	22	+2
6B	2	49	68	120	112	+9
6B	3	57	68	125	139	-14
6B	4	0	59	59	30	+29
6B	5	0	0	0	0	0
6B: Totals	**All**	**113**	**215**	**328**	**303**	**25**
All: Totals	**All**	**466**	**762**	**1242**	**1443**	**-201**

[1] Plants counted as either "intact," "damaged," or "dead from herbivory," or "naturally dead" in September 2020 during transect surveys.
[2] Transect 3 in Population 2 was skipped in error during the September 2020 transect count. All counts associated with this transect have been excluded from population totals and calculations.

Table 1a. Summary of Tiehm's Buckwheat Transect Surveys: Spring 2019 and September 2020

Sub-Population	Transect	Intact Plants[1]	Damaged or Dead Plants[1]	Total Plants (Sep 2020)	Total Plants (Spring 2019)	Difference Between Counts[3]
1	1	0	1	1	1	0
1	2	18	44	62	43	+19
1	3	4	5	9	22	-13
1	4	15	11	26	31	-5
1	5	21	29	50	46	+4
1	6	17	2	19	19	0
1	7	10	38	48	46	+2
1: Totals	**All**	**85**	**130**	**215**	**208**	**+7**
2	1	0	0	0	2	-2
2	2	8	23	31	22	+9
2	3[2]					
2	4	10	16	26	44	-18
2	5	2	22	24	15	+9
2	6	0	1	1	0	+1
2	7	5	18	23	42	-19
2	8	10	25	35	17	+22

Sub-Population	Transect	Intact Plants[1]	Damaged or Dead Plants[1]	Total Plants (Sep 2020)	Total Plants (Spring 2019)	Difference Between Counts[3]
2	9	1	3	4	16	-12
2: Totals	**All**	**62**	**82**	**144**	**158**	**-14**
3	1	0	3	3	6	-3
3	2	2	4	6	10	-4
3	3	11	25	36	11	+25
3	4	0	6	6	11	-5
3	5	0	1	1	1	0
3: Totals	**All**	**13**	**39**	**52**	**39**	**+13**
4	1	0	4	4	3	+1
4	2	4	36	40	57	-17
4	3	0	8	8	5	+3
4	4	0	76	76	153	-76
4	5	0	0	0	4	-4
4: Totals	**All**	**4**	**124**	**128**	**222**	**-94**
6A	1	3	11	14	17	-3
6A	2	1	16	17	14	+3
6A	3	9	2	11	21	-10
6A	4	51	28	79	88	-11
6A	5	24	24	48	68	-20
6A	6	88	40	128	139	-11
6A	7	39	39	78	154	-76
6A: Totals	**All**	**215**	**160**	**375**	**501**	**-126**
6B	1	7	17	24	31	-7
6B	2	49	68	120	189	-69
6B	3	57	68	125	146	-21
6B	4	0	59	59	51	+8
6B	5	0	0	0	1	-1
6B: Totals	**All**	**113**	**215**	**328**	418	**-90**
All: Totals	**All**	**466**	**762**	**1242**	**1546**	**-304**

[1] Plants counted as either "intact," "damaged," or "dead from herbivory," or "naturally dead" in September 2020 during transect surveys.
[2] Transect 3 in Population 2 was skipped in error during the September 2020 transect count. All counts associated with this transect have been excluded from population totals and calculations.

Table 1. Summary of Tiehm's Buckwheat Transect Surveys: Spring 2019 and September 2020

Sub-Population	Transect	Viable Plants[1]	Damaged or Dead Plants[1]	Total Plants (Sep 2020)	Total Plants (Spring 2019)	Difference Between Counts[3]
1	1	1	0	1	1	0
1	2	33	29	62	43	+19
1	3	5	4	9	22	-13
1	4	19	7	26	31	-5
1	5	31	19	50	46	+4
1	6	17	2	19	19	0
1	7	43	5	48	46	+2
1: Totals	**All**	**149**	**66**	**215**	**208**	**+7**
2	1	0	0	0	2	-2
2	2	15	16	31	22	+9
2	3[2]					
2	4	13	13	26	44	-18
2	5	9	15	24	15	+9
2	6	0	1	1	0	+1
2	7	9	14	23	42	-19
2	8	13	22	35	17	+22
2	9	3	1	4	16	-12
2: Totals	**All**	**62**	**82**	**144**	**158**	**-14**
3	1	1	2	3	6	-3
3	2	2	4	6	10	-4
3	3	20	16	36	11	+25
3	4	0	6	6	11	-5
3	5	0	1	1	1	0
3: Totals	**All**	**23**	**29**	**52**	**39**	**+13**
4	1	1	3	4	3	+1
4	2	23	17	40	57	-17
4	3	2	6	8	5	+3
4	4	30	46	76	153	-76
4	5	0	0	0	4	-4
4: Totals	**All**	**56**	**72**	**128**	**222**	**-94**
6A	1	7	7	14	17	-3
6A	2	4	13	17	14	+3
6A	3	10	1	11	21	-10
6A	4	73	6	79	88	-11

Sub-Population	Transect	Viable Plants[1]	Damaged or Dead Plants[1]	Total Plants (Sep 2020)	Total Plants (Spring 2019)	Difference Between Counts[3]
6A	5	33	15	48	68	-20
6A	6	117	11	128	139	-11
6A	7	54	24	78	154	-76
6A: Totals	**All**	**298**	**77**	**375**	**501**	**-126**
6B	1	13	11	24	31	-7
6B	2	82	38	120	189	-69
6B	3	78	47	125	146	-21
6B	4	3	56	59	51	+8
6B	5	0	0	0	1	-1
6B: Totals	**All**	**176**	**152**	**328**	418	**-90**
All: Totals	**All**	**764**	**478**	**1242**	**1546**	**-304**

[1] Plants counted as either "intact," "damaged," or "dead from herbivory," or "naturally dead" in September 2020 during transect surveys.

[2] Transect 3 in Population 2 was skipped in error during the September 2020 transect count. All counts associated with this transect have been excluded from population totals and calculations.

TECHNICAL MEMORANDUM

DATE: September 28, 2020

TO: Mr. Jim Morefield, Supervisory Botanist, Nevada Division of Natural Heritage
Ms. Sarah Kulpa, Restoration Ecologist/Botanist, Reno Fish and Wildlife Office

CC: Rebecca Sawyer, Ioneer Ltd.

FROM: Ms. Vicki Thill, Environmental Specialist
Ms. Kris Kuyper, Biology Program Manager

SUBJECT: Tiehm's Buckwheat; Field Survey Data Analysis

Introduction

The population of Tiehm's buckwheat (*Eriogonum tiehmii*) at Rhyolite Ridge has been monitored by EM Strategies (EM) since 2018. Permanent transects were established in 2019. Demographic data was collected in 2019 and 2020. A subset of plants received unique identifiers and morphometric data was collected, including size.

Damage to tap roots from rodent activity was noted in the Tiehm's buckwheat natural population in early September 2020 by Jamey McClinton. On September 16 and 17, 2020, EMS resurveyed the transects and recorded the number of plants that were intact, damaged by herbivory but still attached to the ground, or dead with broken roots. This technical memorandum presents an analysis of the field survey data based on information needs of the Reno Fish and Wildlife Office and the Nevada Division of Natural Heritage. This analysis is an extension of the summary statistics and photographs presented to the agencies on September 21, 2020.

Analysis

Rodent herbivory was noted at all subpopulations (1-6). There are no transects established in Subpopulation 5; therefore, it was not included in this analysis. Table 1 presents a summary of the plant count by subpopulation and transect. The purpose of this table is to present the difference between total plants counted in September 2020 during transect surveys and total plants counted in June 2020 during transect surveys; a crude measure of "missing" plants. The difference can be due to several factors: 1) the plants were in bloom in June and therefore easier to see than when they were dormant in September; 2) the number of dead plants may be an overestimation, since many plants were laying on the soil and it was impossible to tell whether the parts came from one individual plant or multiple plants; and 3) although the start and end points were the same, the belt transects may not have been completely aligned between surveys.

Positive values are likely due to incorrect transect numbers being recorded during the June 2020 survey (data from UNR which has not been 'cleaned up').

Table 1. Summary of Tiehm's Buckwheat Transect Survey Results

Subpopulation	Transect	Intact Plants[1]	Damaged or Dead Plants[1]	Total Plants (Sep 2020)	Total Plants (June 2020)	Difference Between Counts[3]
1	1	1	0	1	1	0
1	2	33	29	62	49	+13
1	3	5	4	9	39	-30
1	4	19	7	26	36	-10
1	5	31	19	50	46	+4
1	6	17	2	19	13	+6
1	7	43	5	48	51	-3
1: Totals	**All**	**149**	**66**	**215**	**235**	**-20**
2	1	0	0	0	4	-4
2	2	15	16	31	36	-5
2	3[2]					
2	4	13	13	26	46	-20
2	5	9	15	24	15	+9
2	6	0	1	1	1	0
2	7	9	14	23	73	-50
2	8	13	22	35	39	-4
2	9	3	1	4	34	-30
2: Totals	**All**	**62**	**82**	**144**	**248**	**-104**
3	1	1	2	3	4	-1
3	2	2	4	6	7	-1
3	3	20	16	36	17	19
3	4	0	6	6	9	-3
3	5	0	1	1	1	0
3: Totals	**All**	**23**	**29**	**52**	**38**	**14**
4	1	1	3	4	2	+2
4	2	23	17	40	33	+7
4	3	2	6	8	3	+5
4	4	30	46	76	100	-24
4	5	0	0	0	0	0
4: Totals	**All**	**56**	**72**	**128**	**138**	**-10**

Subpopulation	Transect	Intact Plants[1]	Damaged or Dead Plants[1]	Total Plants (Sep 2020)	Total Plants (June 2020)	Difference Between Counts[3]
6A	1	7	7	14	11	+3
6A	2	4	13	17	8	+9
6A	3	10	1	11	10	-8
6A	4	73	6	79	92	-13
6A	5	33	15	48	69	-21
6A	6	117	11	128	128	0
6A	7	54	24	78	154	-76
6A: Totals	**All**	**298**	**77**	**375**	**481**	**-106**
6B	1	13	11	24	22	+2
6B	2	82	38	120	112	+9
6B	3	78	47	125	139	-14
6B	4	3	56	59	30	+29
6B	5	0	0	0	0	0
6B: Totals	**All**	**176**	**152**	**328**	**303**	**25**
All: Totals	**All**	**764**	**478**	**1242**	**1443**	**-201**

[1] Plants counted as either "intact," "damaged," or "dead from herbivory," or "naturally dead" in September 2020 during transect surveys.
[2] Transect 3 in Population 2 was skipped in error during the September 2020 transect count. All counts associated with this transect have been excluded from population totals and calculations.

The number of damaged and dead plants for each subpopulation was estimated (Table 2). The estimates are based on the percentage of damaged and dead plants in the areas within the transects, extrapolated over the entire area of the subpopulation. Potentially important factors such as the patchiness of Tiehm's buckwheat or counts missed due to the late season were not included; therefore, this prediction should be interpreted as a raw estimation.

A population estimate has not been calculated from the June 2020 survey. Using the 2019 population estimate for subpopulations 1, 2,3, 4, 6a and 6b, 19 percent of the population has been damaged from herbivory, and 43 percent is dead from herbivory.

During September 2020 transect counts, surveyors noticed that smaller plants appeared to be less heavily impacted by rodent herbivory. Using morphometric data from June 2020, a simple analysis was used to determine whether there might be a relationship between plant size and chance of herbivory (R Core v. 4.0.2). Plants that are smaller in size appear to be less likely to experience damage or destruction due to rodent herbivory ($\chi 2 = 45.35$, $p < 0.01$) (Table 3, Figure 1).

Table 2. Estimation of Damaged and Dead Plants for Subpopulations

Subpopulation	Area of Subpop. Surveyed (%)	Damaged Plants	Percent Damaged	Dead Plants[1]	Percent Dead	Estimated Damaged	Estimated Dead[1]	Estimated Dead from Herbivory[2]
1	2.25	64	29.77	52	25.87	2156	3030	2978
2	2.95	26	18.06	80	56.94	883	2757	2710
3	2.25	10	19.23	29	55.77	368	1280	1258
4	3.22	52	40.63	66	56.25	1412	3445	3386
6A	3.73	83	22.13	77	20.53	2024	2903	2854
6B	19.30	63	19.21	152	46.34	1068	5682	5585
Total	**-**	**298**	**23.99**	**456**	**37.79**	**8451**	**19097**	**18771**

[1] Includes all dead plants, even those that appear dead "naturally" and not from rodent herbivory. The number of naturally dead plants accounts for approximately 1.7 percent of all dead plants counted during September 2020 surveys.
[2] Estimated dead multiplied by 0.987

Table 1. Frequency of Rodent Herbivory by Plant Sizes

Plant Size Category	1 (0 – 5 cm^2)	2 (5 – 80 cm^2)	3 (80 – 325 cm^2)	4 (325 – 725 cm^2)	5 (>725 cm^2)
Intact Plants	21	93	61	8	1
Damaged Plants	2	29	36	18	6
Dead Plants	15	53	36	5	1
Totals	**37**	**175**	**133**	**31**	**8**

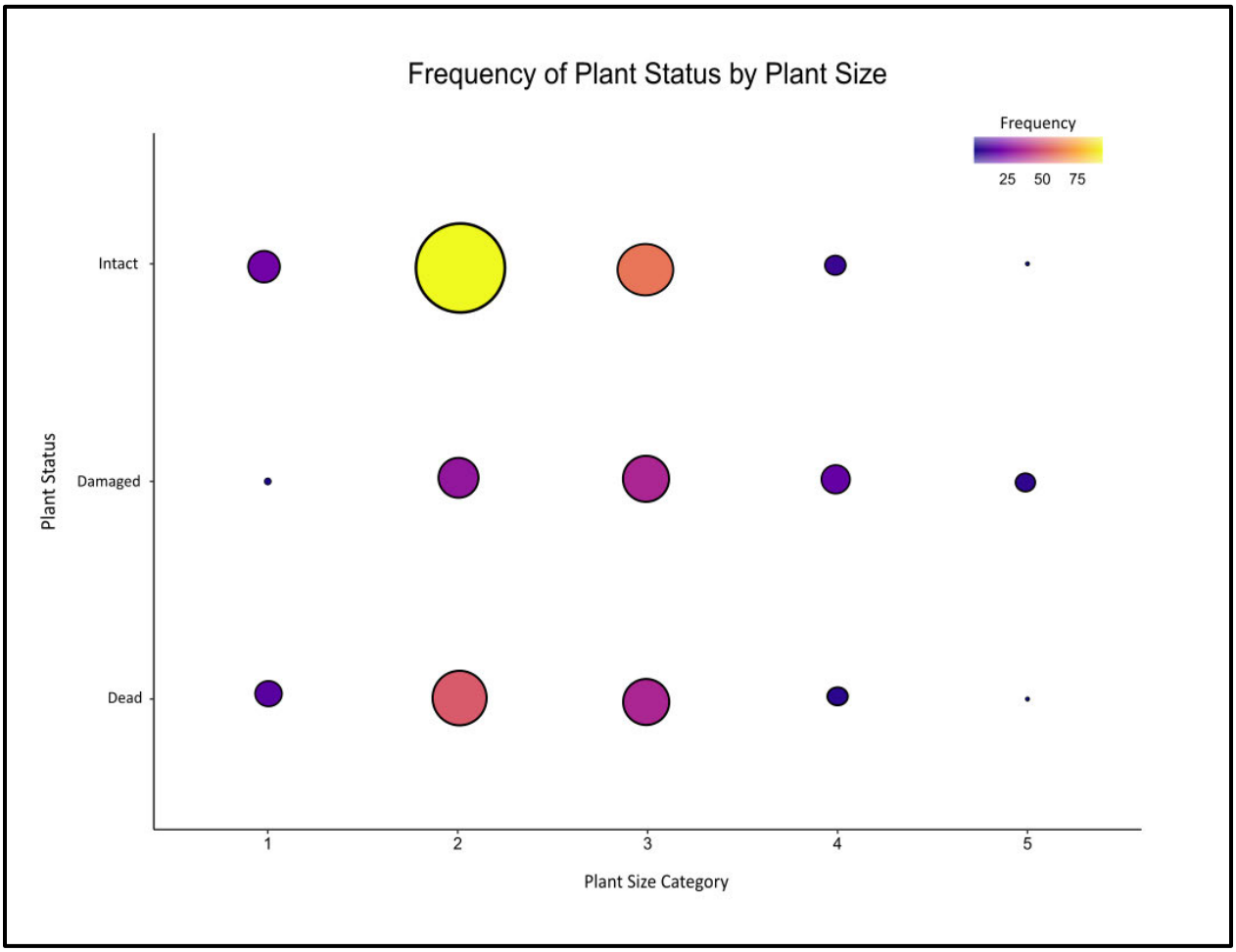

Figure 1. Frequency of plant status (intact, damaged, or dead) by plant size category (smallest [1] to largest [5]). Based off of plant status data collected in September 2020 and plant morphometric data collected in June of 2020.

From: Barrett, Justin S
To: Sharkey, Anne-Marie
Subject: Fw: [EXTERNAL] Tiehm"s eDNA study
Date: Thursday, November 12, 2020 5:18:02 PM
Attachments: FWS_Tiehms_eDNA_report_20201111.pdf
Outlook-23hvklmh.png

Here's the report. It will be my leisure reading tonight!

Justin Barrett
Assistant Field Supervisor
U.S. Fish and Wildlife Service
Reno Field Office
Phone: 775-861-6338

https://www.fws.gov/reno/

From: Kulpa, Sarah <sarah_kulpa@fws.gov>
Sent: Thursday, November 12, 2020 3:26 PM
To: Heston, Sophia M <sophia_heston@fws.gov>; Barrett, Justin S <justin_barrett@fws.gov>; Jackson, Marc A <marc_jackson@fws.gov>; Crosby, Brandon J <bcrosby@blm.gov>; Wickham, Perry B <pwickham@blm.gov>; Distel, Scott J <sdistel@blm.gov>; kaceykc <kaceykc@forestry.nv.gov>; jchrist@forestry.nv.gov <jchrist@forestry.nv.gov>; James Morefield <jdmore@heritage.nv.gov>; Rebecca Sawyer <rsawyer@ioneer.com>; Kris Kuyper <kris@emstrats.com>; Elizabeth A Leger <lelizabeth@unr.edu>; (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.
Cc: Gilkeson, Joanna C <joanna_gilkeson@fws.gov>
Subject: Fw: [EXTERNAL] Tiehm's eDNA study

Hi all,

The much anticipated eDNA result report is in, see attached :)

Cheers,

Sarah

Sarah Kulpa
Restoration Ecologist/Botanist
Reno Fish and Wildlife Office
1340 Financial Blvd. Suite 234

Reno, Nevada 89521
(775) 861-6340

From: Jacqualine Grant <jacqualinegrant@suu.edu>
Sent: Thursday, November 12, 2020 3:11 PM
To: Kulpa, Sarah <sarah_kulpa@fws.gov>
Subject: [EXTERNAL] Tiehm's eDNA study

Hi Sarah,

Attached please find the Tiehm's buckwheat eDNA report based on soil, root, and pellet samples that were collected onsite on 10/2/20.

There is a lot of raw data that is not in the report. Please let me know if you'd like access to the spreadsheets, or if you would like me to add them to the report.

Cheers,
Jackie

--
****
Dr. Jacqualine Grant
Associate Professor of Biology
Museum Curator (SCA 105A)
Garth and Jerri Frehner Museum of Natural History
Southern Utah University
Cedar City, UT 84720
USA
http://suu.edu/cose/museum/
http://suu.edu/faculty/jacqualinegrant/

ph: 435-865-8549
email: jacqualinegrant@suu.edu

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Thanks Just n can you attach the epo t? A so can you e me the takeaway? Thanks!

I am wo k ng on ev s ng he dec a at on w th DOJ but ee f ee to end me a ew entences on th s hat we c n add n d scu s wh the BLM w put someth ng on the eDNA esu s n he dec a at on

Ade e

Adele R Young
U S Depa ment o the Inte io
O ce o he So i ito aci ic Southwest Region
2800 Co tage Way E-1712 Sac amento CA 95825
hone 916 978 4667
ax 916 978 5694
adele young@sol doi gov

---

om Ba ett Jus in S < ust n_ba e t@ ws gov>
Sent day Novembe 13 2020 8 36 AM
To Young Adele R <ade e young@ o doi o >
Subject wd EXTERNA] T ehm s eDNA tudy

Good mo n ng Ade !

In case you haven t a eady seen h s we w p obab y make some m no adjus ments to the dec a at on based on th s epo t

Thank !

Just n

Sent f om my Phone

B g n fo wa ded message

From J m Mo ef e d <jdmo e@he age nv gov>
Date Novembe 12 2020 at 4 38 19 PM PST
To "Ku pa Sa ah" <sa ah_ku pa@ ws gov> "Heston Soph a M" <soph a_hes on@fws gov> "Ba ett u t n S" <just n_ba ett@ ws gov> "J ck on Ma c A" <ma c_jackson@fws gov> "C osby B andon J" <bc osby@b m gov> "W ckham Pe y B" <pw ckham@b m gov> "D ste Sco t J" <sd ste @b m gov> kaceykc <kaceykc@fo est y nv gov> "jch st@ o est y nv gov" < ch t@fo st y nv gov> Rebecca Sawye < sawye @ onee com> K s Kuype <k s@emst ats com> E z be h A Lege < e zabeth@un edu
Cc "G keson Joann [redacted]
Sub ect Re [EXTERNAL] T ehm s eDNA study

H Sa ah

Ve y he pfu hank you o h s! A few quest ons commen s

A hough th s s abe ed "f na epo t " I m wonde ng f a ew tweaks cou d be made?

(1) t wou d be good o nc ude D G nt s comp ete con act nfo mat on unde he name on he f ont page -- cu ent y t s on y n the ema cha n

(2) he e a e eve a te a u e c tat ons n he nt oducto y sect ons but I m not f nd ng a L te a u e C ed sect on de a ng hose sou ces

(3) on pages 5 and 15 whe e t ment ons hat "P ant eDNA f om the o ow ng gene a we e a so ound n the od nt pe ets S ene Sa so a Ha oxy on and At p ex" -- h s wou d be bet e tat d as "P ant eDNA most y c o e y match ng banked sequences of he fo ow ng gene a we e a so found n he odent pe ets "

Ha oxy on and S ene don t occu n the T ehm buckwheat h b tat and we e mo t ke y the c osest ava ab e ma ches o o he membe s of Sa so a (o Ama anthaceae) and Ca yophy a eae espect ve y that do oc u on he s tes

F na y has anyone nqu ed f t wou d be f nanc a y and og st ca y feas b e o get Ammospe moph us eucu us and E ogonum t ehm sequenced and n o GenBank o BOLD so we cou d be ven mo e def n t ve about the matches?

Thanks aga n

--J m Mo ef e d

~^
James D Mo ef e d Ph D Supe v so y Botan t
Nevada Depa tment of Conse vat on & Na u a Re ou ces
D v s on of Natu a He age
901 Sou h Stewa t St e t su e 5002
Ca on C ty NV 89701 5245 U S A
d ect te (775) 684 2902
gene a te 775) 684-2900
ema jdmo e@he tage nv gov
web https gcc02 sa e nks p otect on out ook com ?u =h tp%3A%2F 2Fhe tage nv gov%2F&amp data=04%7C01 7Cjust n_ba ett 40fws gov%7C 3168c8dc0de4cf41c4f08d8876c696b 7C0693b5ba4b184d7b9341f32f400a5494 7C0%7C0%7C637408246986481612%7CUnknown%7CTWFpbGZsb3d8eyJWI o MC4wLjAwMDA LC QI o V2 uMzI LCJBT 6Ik1haWw LCJXVC 6Mn0 3D%7C1000&amp sda a=EXSkN6Ie9EwT u GZFTjVj5 qHPkJ53tCY%2FPxog3EA%3D&amp e e ved=0
~^

F om Ku pa Sa ah <sa ah_ku pa@fws gov>
Sent Thu sday Novembe 12 2020 15 26
To He ton Soph a M u t n_ba ett ackson Ma c A C o by B andon J W ckham Pe y B D ste Scott J Kacey KC John Ch s ophe son J m Mo ef e d Rebecca Sawye K s Kuype E zabe h A Lege Jamey W che
Cc G keson Joanna C
Sub ect Fw [EXTERNAL] T ehm s eDNA study

H a

The much ant c pa ed eDNA esu t epo t s n see at ached)

Chee s

Sa ah

Sa ah Ku pa
Res o at on Eco og st Botan t
Reno F sh and W d fe Off ce
1340 F nanc a B vd Su te 234
Reno Nevada 89521
(775) 861-6340

F om Jacqua ne G ant < acqua neg ant@suu edu>
Sent Thu sday Novembe 12 2020 3 11 PM
To Ku pa Sa ah <sa ah_ku pa@ ws gov>
Sub ect [EXTERNAL] T ehm s eDNA study

Th s ema has been ece ved f om outs de of DOI - Use caut on be o e c ck ng on nks open ng a tachmen s o espond ng

H Sa ah

At ached p ase f nd he T ehm s buckwheat eDNA epo t based on so oot and pe et samp es hat we e co cted ons te on 10 2 20

The e s a ot of aw da a hat s not n the epo t P ease et me know f you d ke acc ss o the sp eadshee s o f you wou d ke me to add them o the epo t

Chee s
Jack e

--
****
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Assoc ate P ofesso of B o ogy
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Sou he n Utah Un ve s ty
Ceda C ty UT 84720
USA
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h tps gcc02 safe nks p otect on out ook com ?
u =ht p%3A%2F%2Fsuu edu%2Ffacu ty%2Fjacqua neg ant%2F&amp d ta=04%7C01%7Cjust n_ba e t%40 ws gov 7Cf3168c8dc0de4cf41c4f08d8876 696b%7C0693b5ba4b184d7b9341 32 400 5494%7C0%7C0 7C637408246986481612%7CUnknown%7CTWFpbGZsb3d8eyJWIjo MC4wL AwMDA LCJQIjo V2 uMzI LC BT I6 k1haWw LC XVCI6Mn0%3D%7C1000&amp sda a=guazOtpkzJThqyqInDXI1LB1VLKDA XGa8qQoyC882M%3D&amp ese ved=0<https gcc02 safe nks p otect on out ook com ?
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ph 435-865-8549
ema jacqua neg ant@suu edu<ma o acqua neg n @suu edu>

From: Barrett, Justin S
To: Young, Adele R
Subject: Fw: [EXTERNAL] Tiehm"s eDNA study
Date: Friday, November 13, 2020 9:10:59 AM
Attachments: FWS_Tiehms_eDNA_report_20201111.pdf
Outlook-lal5r4xk.png

Sorry, I guess that was a failed attempt at using my phone for work. Not the first time!

The report is pretty short, pictures at the end add to the size and length. In a sense, they found DNA from humans, cervids (deer family), and rodents associated with the root material but the conclusion speaks volumes:

These data strongly support the hypothesis that a diurnal rodent in the genus Ammospermophilus was responsible for damage to the Tiehm's buckwheat population at Rhyolite Ridge in the late summer and early fall of 2020.

Justin Barrett
Assistant Field Supervisor
U.S. Fish and Wildlife Service
Reno Field Office
Phone: 775-861-6338

https://www.fws.gov/reno/

From: Kulpa, Sarah <sarah_kulpa@fws.gov>
Sent: Thursday, November 12, 2020 3:26 PM
To: Heston, Sophia M <sophia_heston@fws.gov>; Barrett, Justin S <justin_barrett@fws.gov>; Jackson, Marc A <marc_jackson@fws.gov>; Crosby, Brandon J <bcrosby@blm.gov>; Wickham, Perry B <pwickham@blm.gov>; Distel, Scott J <sdistel@blm.gov>; kaceykc <kaceykc@forestry.nv.gov>; jchrist@forestry.nv.gov <jchrist@forestry.nv.gov>; James Morefield <jdmore@heritage.nv.gov>; Rebecca Sawyer <rsawyer@ioneer.com>; Kris Kuyper <kris@emstrats.com>; Elizabeth A Leger <lelizabeth@unr.edu>; (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.
Cc: Gilkeson, Joanna C <joanna_gilkeson@fws.gov>
Subject: Fw: [EXTERNAL] Tiehm's eDNA study

Hi all,

The much anticipated eDNA result report is in, see attached :)

Cheers,

Sarah

Sarah Kulpa
Restoration Ecologist/Botanist
Reno Fish and Wildlife Office
1340 Financial Blvd. Suite 234
Reno, Nevada 89521
(775) 861-6340

From: Jacqualine Grant <jacqualinegrant@suu.edu>
Sent: Thursday, November 12, 2020 3:11 PM
To: Kulpa, Sarah <sarah_kulpa@fws.gov>
Subject: [EXTERNAL] Tiehm's eDNA study

Hi Sarah,

Attached please find the Tiehm's buckwheat eDNA report based on soil, root, and pellet samples that were collected onsite on 10/2/20.

There is a lot of raw data that is not in the report. Please let me know if you'd like access to the spreadsheets, or if you would like me to add them to the report.

Cheers,
Jackie

--
****
Dr. Jacqualine Grant
Associate Professor of Biology
Museum Curator (SCA 105A)
Garth and Jerri Frehner Museum of Natural History
Southern Utah University
Cedar City, UT 84720
USA
http://suu.edu/cose/museum/
http://suu.edu/faculty/jacqualinegrant/

ph: 435-865-8549
email: jacqualinegrant@suu.edu

From: Kris Kuyper
To: (b) (6) P.I.I.
Cc: Kulpa, Sarah; "James Morefield"
Subject: [EXTERNAL] RE: EXTERNAL: Rhyolite Ridge
Date: Sunday, November 29, 2020 9:38:55 PM
Attachments: image001.png
NDNH final field inspection report 2020-09-23.pdf
3944V.TiehmsAnalysisMemo.docx

Hi Lynn,

Thank you for sharing your observations. I am glad that you are out there looking after the buckwheat!

I've attached our data analysis on the scope of the herbivore damage, as well as a separate report from the Nevada Division of Natural Heritage. I encourage you to contact Sarah Kulpa at USFWS to see if she can share the results of a DNA study conducted on the damaged roots. I've also attached a photo that Sarah shared showing resprouting from a damaged root (yay!)

There was damage at sites 3 and 5, but there are plants remaining. The plants at Site 3 are confined to a rocky wash at the southernmost end of the subpopulation. They widen out as you move north, but they are very patchy. The plants at Site 5 are VERY hard to find when they are dormant. You have to look very close to the ground. We did not collect quantitative data at Site 5 because we do not have transects set up there.

Please let me know what you see when you go to the site next – especially if there has been any snow or evidence of precipitation. I will let you know the next time that I travel there and I would be happy to show you sites 3 and 5 if it is possible to meet up.

There was a pronghorn that kept me company at 6A when I was collecting data there alone on two separate occasions. It was nice to have him there!

Thanks again,

Kris Kuyper, CPESC, CESSWI
Biology Program Manager
T: 775.826.8822 (Reno) | 775.753.9496 (Elko)
C: 530.448.9098 | F: 775.826.8857

EM STRATEGIES

kris@emstrats.com | www.emstrats.com
1650 Meadow Wood Lane
Reno, Nevada 89502

From: (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.
Sent: Monday, November 23, 2020 5:02 PM
To: Kris Kuyper <kris@emstrats.com>
Subject: EXTERNAL: Rhyolite Ridge

Hi Kris,
I met you out at Rhyolite Ridge when your team was re-surveying the transects on September 16 after the report of 17,000 plants missing from the 6 sites. Janet and I went back out there yesterday and looked at the condition of the plants. Some looked pretty desicated and some looked ok. I didn't see any plants that looked like Tiehm's, desicated or otherwise, at two of the sites--5 and 3. I was wondering if you could tell me what percent of the plants were missing from each population site. Is it possible to share that information with me?

BTW, we saw a lot of fresh ungulate scat and tracks in the population sites. I don't know if they eat the plants or not, but they sure walk through them and leave evidence. Some scat looked like Bighorn sheep, some looked like pronghorn. We saw 2 pronghorn at population site 5. That made my day.

Regards,
Lynn Boulton
Chair Range of Light Group
Sierra Club

From: (b) (6)
To: Barrett, Justin S
Subject: [EXTERNAL] Re: Tiehm"s herbivory report
Date: Friday, December 4, 2020 8:35:24 PM

Thanks Justin,

I'll read this more carefully and work it into my discussions. It is interesting to hear that the antelope squirrels are the primary culprits; that is my feeling for what is chewing on the cactus and Joshua trees.

Cheers, Jim

Sent from my iPhone

> On Dec 4, 2020, at 4:46 PM, Barrett, Justin S <justin_barrett@fws.gov> wrote:
>
> Good afternoon Mr. Boone,
>
> I wanted to bring this report and statement to your attention. These have been posted on our Reno Fish and Wildlife website Home | Reno Fish & Wildlife Office (fws.gov) but there may be some problems with the links so I wanted to make sure the information was appropriately disseminated.
>
> Thank you!
>
> Justin Barrett

Environmental DNA analysis supports conclusion that damage to rare Tiehm's buckwheat plants was caused by herbivory

December 4, 2020 - An environmental DNA (eDNA) analysis conducted on damaged Tiehm's buckwheat roots, nearby soils and rodent scat strongly links small

mammal herbivory to the widespread damage and loss of Tiehm's buckwheat reported in September 2020. Tiehm's buckwheat is a rare plant found only near Rhyolite Ridge in Esmeralda County, Nevada.

To determine the cause of the damage, the U.S. Fish and Wildlife Service and the Bureau of Land Management contracted a researcher affiliated with Southern Utah University to conduct an independent review and analyze materials collected from the area for eDNA. The analysis found squirrel, deer and a small trace of human DNA on root samples and soils near damaged or dead plants.

Buckwheat DNA was detected in the scat, and the genetic signatures were a strong match (96.9-99.8 percent) to ground squirrels. This coupled with known white-tailed antelope ground squirrel populations at Rhyolite Ridge, burrowing at damaged plants, and rodent bite marks on plant roots strongly supports that ground squirrels were responsible for the damage. Current drought conditions likely motivated the rodents to seek moisture by consuming the shallow taproots of mature buckwheat plants. This is the first time herbivory was documented on Tiehm's buckwheat and its significance depends not only on its frequency and intensity, but whether damaged plants can recover and survive.

Justin Barrett
Assistant Field Supervisor
U.S. Fish and Wildlife Service
Reno Field Office
Phone: 775-861-6338

https://www.fws.gov/reno/

<Outlook-c03gmuru.png>

<FINAL_Tiehms_eDNA_report_20201201.pdf>

From: Barrett, Justin S
To: Kulpa, Sarah; Heston, Sophia M
Subject: Fw: [EXTERNAL] Rodent damage
Date: Monday, January 4, 2021 10:53:56 AM
Attachments: Outlook-1iyizyxv.png

If this is helpful, here is a link to pictures that Dr Jim Boone has started pulling together regarding herbivory events I haven't had a chance to look at them yet

Justin Barrett
Assistant Field Supervisor
U.S. Fish and Wildlife Service
Reno Field Office
Phone: 775-861-6338

https://www.fws.gov/reno/

From: Jim Boone (b) (6) P.I.I.
Sent: Monday, January 4, 2021 10:31 AM
To: Barrett, Justin S <justin_barrett@fws.gov>
Subject: Re: [EXTERNAL] Rodent damage

Hi Justin,

Thanks for passing this along Since the Tiehm's buckwheat event, I've been documenting herbivory to all kinds of species all over the Mojave desert, including Northern Arizona (Parashant) Indeed, it will be interesting to see how this affects the survival of these plants

I've uploaded hundreds of observations to the iNaturalist photo database To recover these images in iNat, click Explore, then Filters On the Filters screen, in the "Description/Tags" field, enter "rodent damage" To find only my observation, click the button "More Filters", then in the "Person" field, enter my user name: JLBoone2 Currently, that brings up 329 observation of 20 species I'll add a few more today

I'll follow up with Dr Grant

Stay well, Jim

Jim Boone
Las Vegas, NV
birdandhike com

> On Jan 4, 2021, at 9:26 AM, Barrett, Justin S <justin_barrett@fws gov> wrote:
>
> Hello again Dr Boone,
>
> I'm passing this along because you had expressed a continued interest in documenting the herbivory events that occurred to Tiehm's buckwheat and apparently other species this last year If you have any interest in finding out more about the Arizona creosote case shown here, feel free to reach out to Dr Grant She was the researcher who conducted eDNA analysis on Tiehms
>
> A couple weeks ago, my family and I camped in Beatty We drove down there in the dark but coming back I noticed the impacts to Joshua trees that you'd mentioned in your blog post It was 27 degrees out, snowing and blowing so I didn't stop but the impacts are quite apparent It will be interesting to see how this affects the survival of these plants
>
> Happy New Year!
>
> Justin
>
> Justin Barrett
> Assistant Field Supervisor
> U S. Fish and Wildlife Service
> Reno Field Office
> Phone: 775-861-6338
>
> https://www.fws.gov/reno/
>
> <Outlook-2skrgekq.png>
>
> ---
>
> **From:** Jackie Grant <jacqualinegrant@suu.edu>
> **Sent:** Monday, December 21, 2020 11:33 AM
> **To:** Kulpa, Sarah <sarah_kulpa@fws gov>
> **Subject:** [EXTERNAL] Rodent damage
>
>

Hi Sarah,

Attached is a photo of some rodent damage to creosote from the Arizona Strip. I'm sending it because I keep getting asked if I've ever seen anything like the Tiehm's buckwheat incident. Now I can say yes. This was right next to a packrat shelter.

Anyway, if you could ask biologists in your network to keep an eye out for any similar damage, that would be great. I'd like to document as much regional rodent damage as I can.

Thanks, and have a good winter break!

<IMG_8222.jpg>

From: Russell, Daniel
To: Giglio, Deborah; Kulpa, Sarah
Subject: Fw: [EXTERNAL] review
Date: Monday, February 22, 2021 6:57:29 AM
Attachments: REVIEWER.xlsx

****
Daniel Russell - Regional Classification Program Coordinator
California - Great Basin / Legacy Region 8
U.S. Fish and Wildlife Service
2800 Cottage Way, Room W-2606
Sacramento, CA 95825
Office (916) 978-6191
Cell (916) 335-9060
****

From: Arnold Tiehm (b) (6) P.I.I.(b) (6) P.I.I.
Sent: Sunday, February 21, 2021 12:11 PM
To: Russell, Daniel <daniel_russell@fws.gov>
Subject: [EXTERNAL] review

Hi Dan.

Attached are my comments on the Species Status Assessment Report for Eriogonum tiehmii. I found the report to be most thorough and I thought it covered all aspects. My comments are totally editorial.

I cannot get my computer to allow me to do an e-signature so I will have to snail mail you the Conflict of Interest Disclosure.

Thanks for letting me see it.

Arnold Tiehm

From: Kulpa, Sarah
To: James Morefield; jchrist@forestry.nv.gov; (b) (6) P.I.I.(b) (6) P.I.I.
Cc: Heston, Sophia M; Barrett, Justin S
Subject: eDNA proposal for Tiehms
Date: Monday, September 28, 2020 10:25:22 AM
Attachments: Tiehms_buckwheat_NGS_description_GrantJB20200925.pdf

---

Hi all!

I received the attached proposal on eDNA sampling from Jackie Grant at SUU. I also just talked with her on the phone, to follow-up on data collection to make sure our situation is a candidate for this type of work. She said she can collect eDNA from exposed roots, and would use a razor blade or scalpel to take a small section. She also recommended taking soil eDNA from the same location a root sample is taken if it's an attached plant to really capture small mammal eDNA. It is in our favor that it is dry out there and it doesn't rain, because that preserves the eDNA longer. Based on past results and other eDNA work, she thinks we can get 50-60% positive 10 weeks or so out; you can get 80-90% positive 2 weeks out. She would be able to come out as soon as this Thursday and Friday.

Since most of you have been to the Tiehm's site already, based on what you saw, do you think this type of eDNA testing is possible? Are there enough plants still available for this type of sampling? What do you think of the proposal? FWS is also going to try to find the funding to pay for this research.

Thanks!

Sarah

Sarah Kulpa
Restoration Ecologist/Botanist
Reno Fish and Wildlife Office
1340 Financial Blvd. Suite 234
Reno, Nevada 89521
(775) 861-6340

From: Kulpa, Sarah
To: Barrett, Justin S; Heston, Sophia M
Subject: Fw: [EXTERNAL] Fwd: E. tiehmii site conditions
Date: Wednesday, September 9, 2020 8:40:48 AM

See Beth's message below related to Tiehm's buckwheat. Looks like we have some information for Factor C...I had to address a similar issue in the SSA for Eriogonum diatomaceum.

Sarah Kulpa
Restoration Ecologist/Botanist
Reno Fish and Wildlife Office
1340 Financial Blvd. Suite 234
Reno, Nevada 89521
(775) 861-6340

From: (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.
Sent: Wednesday, September 9, 2020 8:16 AM
To: Kulpa, Sarah <sarah_kulpa@fws.gov>; Edwards, Fred S <fsedwards@blm.gov>; James Morefield <jdmore@heritage.nv.gov>
Subject: [EXTERNAL] Fwd: E. tiehmii site conditions

Hi you all,

I'm writing to share some news about the E. tiehmii populations, from Jamey. As you remember, she is doing qualitative/quantitative rare plant surveys this summer targeted on rare Eriogonum and Penstemons, describing their habitat characteristics and documenting a number of possible impacts, including roads, herbivory, fire, etc. This is not related to the work with Ioneer, it's rare plant work across Nevada that we are doing in collaboration with UNR, UWFWS and Heritage.

She is almost done with the field surveys, and was just doing E. tiehmii yesterday, when she observed what looks like massive herbivore disturbance to the wild populations; description below, and photos.

Jim, have you ever seen anything like this in your history of work with this plant?

I'm happy to talk on the phone,

-Beth

- -
Elizabeth Leger
Professor, Department of Biology

Director, UNR Museum of Natural History
University of Nevada, Reno
Office: (775) 784-7582
Cell: (775) 315 5741
http://www.naturalhistory.unr.edu/

---------- Forwarded message ---------
From: [redacted]
Date: Tue, Sep 8, 2020 at 7:27 PM
Subject: E. tiehmii site conditions
To: [redacted]
Cc: [redacted], Madeline Lowe <madelinelowe@nevada.unr.edu>

Hi Beth,

I wanted to let you know that we found some concerning disturbance from herbivores at the ERTI sites that might benefit from more surveys, maybe by Sarah's people or Cody, since she has such nice transects set up already. Or maybe by the demography folks?

We walked around at ERTI 1, 2, 3, and 6A, and at all of them, somewhere between 20-50% of the mature ERTI plants out there had been dug up and chewed on or gnawed off at the roots the same way our transplants were. We think it happened somewhat recently, because not all of the leaves were dry and crunchy and yet. I'm attaching some photos below...

I'd be interested to see what you think about this when you get a chance. We are planning on another field day tomorrow to check off the last species on my list for the summer, Penstemon tiehmii, but I'll have cell service for parts of the day, or could talk later this week, we'll be in Reno.

Thanks,

Jamey

From: Barrett, Justin S
To: Jackson, Marc A
Cc: Kulpa, Sarah; Heston, Sophia M
Subject: Fw: [EXTERNAL] Gophers
Date: Tuesday, September 22, 2020 5:30:11 PM
Attachments: image006.png
Outlook-ggafvttv.png

It's becoming even more like Caddy Shack; I'm concerned that they report continued impacts.

I wonder if Dr. Grant would be able to confirm the gopher hypothesis by looking at damaged and destroyed plant material.

I'm also confused about the gopher hypothesis because, as I understand it, they rarely come above ground and, when they do they will subsequently plug that hole creating "gopher mounds." Their presence is most notable by these mounds. The pictures I've seen have been holes that were excavated from the side to access the root and I haven't notice mounds typical of gophers. Then again, I haven't been on site.

Interesting also that Dr. Bill Longland, in looking at pictures, suggested that it was a human-caused event, rather than herbivory. This adds to the mystery but glad to have other opinions.

According to our 90-day, Tiehm's buckwheat occupies up to 10 acres across 3 square miles. Going back to the gopher hypothesis, it would be good to know if the impacts are occurring in many different areas at the same time or if this is a roving small band of thugs that have a particular preference for buckwheat. Managing gophers across a wide area may be problematic but if the activity is localized, then maybe.

Justin Barrett
Assistant Field Supervisor
U.S. Fish and Wildlife Service
Reno Field Office
Phone: 775-861-6338

https://www.fws.gov/reno/

From: Kris Kuyper <kris@emstrats.com>
Sent: Tuesday, September 22, 2020 4:42 PM
To: Kulpa, Sarah <sarah_kulpa@fws.gov>; 'Jim Morefield' <jdmore@heritage.nv.gov>; Barrett, Justin S <justin_barrett@fws.gov>; Heston, Sophia M <sophia_heston@fws.gov>; jchrist@forestry.nv.gov <jchrist@forestry.nv.gov>; 'Kacey KC' <kaceykc@forestry.nv.gov>; Crosby, Brandon J <bcrosby@blm.gov>; Balmer, Daltrey J <dbalmer@blm.gov>; Wickham, Perry B

<pwickham@blm.gov>; Furtado, Douglas W <dfurtado@blm.gov>
Cc: 'Rebecca Sawyer' <rsawyer@ioneer.com>; 'Matt Weaver' <mweaver@ioneer.com>; 'Bernard Rowe' <browe@ioneer.com>; 'Chad Yeftich' <cyeftich@ioneer.com>; 'Elizabeth Leger' <ealeger@gmail.com>; (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I. Richard Delong <rich@emstrats.com>
Subject: [EXTERNAL] Gophers

I had a verbal report from our wildlife subconsultant, Dr. Mike Morrison, after his visit to the site. He identified gophers as being the rodents damaging the Tiehm's buckwheat. Here are a couple of points from our call:

1. The herbivory is continuing. He saw fresh sign and plant material.
2. Gophers move across an area and 'pillage' as they go, which corresponds to the widespread damage on site.
3. Gophers are nocturnal (so he did not see or photograph any).
4. It's been so hot and dry and most vegetation is under great stress. This could cause the gophers to focus on the buckwheat. (There is water in Cave Spring).
5. Foxes prey on gophers and they were seen on the BLM game cameras in the last week (from Brandon Crosby) and by Mike today.
6. He ruled out two other suspects
    a. K-rats do not dig holes like that, do not forage in exposed areas, don't dig in rocky areas, and he did not seen any tail drags in the soil.
    b. Deer mice do not eat roots.

Mike recommended the following actions:

1. Develop a baseline density estimate of the gopher population (2-3 days in the field).
2. Utilize night vision and thermal cameras.
3. Develop a trapping plan.

I asked Mike and his associate, Shawn Smallwood (a small mammal PhD from UC Davis, also living in Bishop) to put together an estimate for a survey effort and developing a trap design. They said that they can have that for me tomorrow. I will coordinate with BLM and NDOW to see what approvals may be required. I suggest we discuss the proposal during our next Teams call to see if there is general agreement on this course of action.

Kris Kuyper, CPESC, CESSWI
Biology Program Manager
T: 775.826.8822 (Reno) | 775.753.9496 (Elko)
C: 530.448.9098 | F: 775.826.8857
kris@emstrats.com | www.emstrats.com
1650 Meadow Wood Lane
Reno, Nevada 89502

From: Edwards, Fred S
To: Wickham, Perry B; Balmer, Daltrey J; Crosby, Brandon J
Cc: Magaletti, Matthew E; Shepherd, Alan B
Subject: Fw: [EXTERNAL] Jamey"s further thoughts after looking at the CBD report
Date: Thursday, September 17, 2020 8:31:11 AM
Attachments: ERTI herbivore digging observations 9-8-20_addendum.docx

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Perry, FYI I received this this AM from UNR.

In my experience both herbivory and vandalism do happen to plant populations. Prior to becoming a National Wildlife Refuge, Ash Meadows experienced vandalism when T&E species were proposed for listing. The residents of Pahrump were not happy and some took it out on the plants and wildlife. While I was a biologist with FWS one listed plant species Ash Meadows milkvetch regularly experienced herbivory by rabbits to such a point where it prevented populations from recruiting new individuals.

Jamey and Beth are careful scientists, without seeing the damage myself, I'm leaning toward supporting their conclusion. I believe FWS is planning on visiting the sites next week. Regardless of the cause - this damage to the population highlights the 5th factor FWS uses for listings: vulnerability to stochastic events. Small populations are simply more vulnerable to extinction due to random events (fire, drought, predation, herbivory etc). This event ***highlights*** the need for the proponent to absolutely minimize their impacts. Clearly Tiehm's buckwheat has a extremely small population and it clearly can not afford many impacts. Call if you want to talk.
Fred

Fred S Edwards
(Detailed) Wildlife, Threatened and Endangered Species Lead
Bureau of Land Management
Nevada State Office
1340 Financial Blvd
Reno, NV 89502-7147
775.861.6491
fsedwards@blm.gov

From: (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.
Sent: Wednesday, September 16, 2020 6:18 PM
To: Kulpa, Sarah <sarah_kulpa@fws.gov>; Edwards, Fred S <fsedwards@blm.gov>; James Morefield <jdmore@heritage.nv.gov>
Cc: (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I. Gilkeson, Joanna C <joanna_gilkeson@fws.gov>
Subject: [EXTERNAL] Jamey's further thoughts after looking at the CBD report

links, opening attachments, or responding.

Attached.

I sent this, and her original report, to multiple reporters this evening.

- -

Elizabeth Leger
Professor, Department of Biology
Director, UNR Museum of Natural History
University of Nevada, Reno
Office: (775) 784-7582
Cell: (775) 315 5741
http://www.naturalhistory.unr.edu/

From:	Edwards, Fred S
To:	Shepherd, Alan B; Magaletti, Matthew E; Barrett, Justin S
Cc:	Ralston, Jill A
Subject:	Fw: [EXTERNAL] letter regarding large-scale destruction incident of Tiehm"s buckwheat
Date:	Tuesday, September 15, 2020 11:35:44 AM
Attachments:	ERTI large-scale destruction incident letter.pdf Outlook-5vurq1h0.png

Alan and Matt - Justin just forwarded this.
Justin- Alan Shepard is currently our DSD. Jill is off the hook.
Fred

Fred S Edwards
(Detailed) Wildlife, Threatened and Endangered Species Lead
Bureau of Land Management
Nevada State Office
1340 Financial Blvd
Reno, NV 89502-7147
775.861.6491
fsedwards@blm.gov

From: Barrett, Justin S <justin_barrett@fws.gov>
Sent: Tuesday, September 15, 2020 11:31 AM
To: Ralston, Jill A <jralston@blm.gov>; Edwards, Fred S <fsedwards@blm.gov>
Subject: Fw: [EXTERNAL] letter regarding large-scale destruction incident of Tiehm's buckwheat

Hello Jill and Fred,

This was sent to Doug Furtado and Perry Wickham but I wanted to make you aware as well.

Sarah Kulpa is in the field today but as soon as she returns, I will ask her to start looking into this a bit further.

Thank you!

Justin

Justin Barrett
Assistant Field Supervisor
U.S. Fish and Wildlife Service
Reno Field Office
Phone: 775-861-6338

https://www.fws.gov/reno/

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>; (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.
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: Jackson, Marc A
To: Barrett, Justin S; Kulpa, Sarah
Subject: Fw: [EXTERNAL] Tiehm"s Buckwheat Field Report
Date: Monday, September 28, 2020 11:47:57 AM
Attachments: Report on Tiehm's Buckwheat Disturbance Event.docx

---

FYI

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: Laura Cunningham <lcunningham@westernwatersheds.org>
Sent: Monday, September 28, 2020 9:54 AM
To: Jackson, Marc A <marc_jackson@fws.gov>
Cc: pdonnelly@biologicaldiversity.org <pdonnelly@biologicaldiversity.org>; Scott Lake <slake@biologicaldiversity.org>; Naomi Fraga <nfraga@calbg.org>; (b) (6) P.I.I. (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.
Subject: [EXTERNAL] Tiehm's Buckwheat Field Report

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

From: Kris Kuyper
To: Kulpa, Sarah; "Jim Morefield"
Cc: Vicki Thill; (b) (6) P.I.I.
Subject: RE: [EXTERNAL] Confidential Data
Date: Tuesday, September 22, 2020 4:48:11 PM
Attachments: image002.png

Hi Sarah,

Yes, we can do this. Vicki was running stats on the size classes today. We will hopefully get everything to you and Jim in the next couple of days.

Kris Kuyper, CPESC, CESSWI
Biology Program Manager
T: 775.826.8822 (Reno) | 775.753.9496 (Elko)
C: 530.448.9098 | F: 775.826.8857
kris@emstrats.com | www.emstrats.com
1650 Meadow Wood Lane
Reno, Nevada 89502

From: Kulpa, Sarah <sarah_kulpa@fws.gov>
Sent: Tuesday, September 22, 2020 4:31 PM
To: Kris Kuyper <kris@emstrats.com>; 'Jim Morefield' <jdmore@heritage.nv.gov>
Cc: Vicki Thill <Vicki@emstrats.com>; (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.
Subject: Re: [EXTERNAL] Confidential Data

Hi Kris,

I was going to follow-up and ask you the same thing about the transects that Jim did. In addition to his question, are you able to quantify the area represented in each transect to the overall total number of plants in each subpopulation? For example, X number of plants were damaged and uprooted in the transect within subpopulation 1. This represents Y percentage of the total subpopulation, therefore we are extrapolating from this information and estimating Z number of plants in subpopulation 1 were damaged and uprooted.

Thanks!

Sarah

Sarah Kulpa
Restoration Ecologist/Botanist
Reno Fish and Wildlife Office
1340 Financial Blvd. Suite 234
Reno, Nevada 89521
(775) 861-6340

From: Kris Kuyper <kris@emstrats.com>
Sent: Tuesday, September 22, 2020 9:36 AM
To: 'Jim Morefield' <jdmore@heritage.nv.gov>; Kulpa, Sarah <sarah_kulpa@fws.gov>
Cc: Vicki Thill <Vicki@emstrats.com>; (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.
Subject: [EXTERNAL] Confidential Data

Hi Jim, we did not compare our total numbers to the baseline numbers or the count from UNR this June just yet, but we will do so. I will add the caveat that since the plants are dormant, they are much harder to see and therefore it may not be apples to apples. I will request the data that UNR collected in June under Dr. Bob Shriver, who is conducting the population modeling research.

Thanks,

Kris Kuyper, CPESC, CESSWI

Biology Program Manager

T: 775.826.8822 (Reno) | 775.753.9496 (Elko)

C: 530.448.9098 | F: 775.826.8857

kris@emstrats.com | www.emstrats.com

1650 Meadow Wood Lane

Reno, Nevada 89502

-----Original Message-----
From: Jim Morefield <jdmore@heritage.nv.gov>
Sent: Tuesday, September 22, 2020 9:11 AM
To: Kris Kuyper <kris@emstrats.com>; sarah_kulpa@fws.gov
Subject: Re: Kris Kuyper shared "Field Survey Results 9.2020" with you.

Hi Kris,

Thanks much for this, very helpful. I have another question for your analysis: how did the total absolute number of plants (intact + damaged + uprooted + dead by other means) compare with the previous totals in your transects? In other words, was there a statistically significant number of plants "missing in action"?

--Jim Morefield

~^

James D. Morefield, Ph.D., Supervisory Botanist Nevada Department of Conservation & Natural Resources Division of Natural Heritage
901 South Stewart Street, suite 5002
Carson City NV 89701-5245 U.S.A.
direct tel: (775) 684-2902
general tel: (775) 684-2900
email: jdmore@heritage.nv.gov
web: http://heritage.nv.gov
~^

_____

From: Jackson, Marc A
To: Barrett, Justin S
Cc: Kulpa, Sarah; Heston, Sophia M
Subject: Re: [EXTERNAL] Gophers
Date: Wednesday, September 23, 2020 10:44:22 AM
Attachments: image006.png
Outlook-ggafvttv.png

Adding to the mystery, Patrick Donnelly was on site Sunday and said that many holes appear to have been filled in. Although that was one of their recommendations initially, he now thinks it suspicious that so many holes are now gone.

Patrick did not think the activity was still occurring so we continue to get mixed reports.

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: Barrett, Justin S <justin_barrett@fws.gov>
Sent: Tuesday, September 22, 2020 5:30 PM
To: Jackson, Marc A <marc_jackson@fws.gov>
Cc: Kulpa, Sarah <sarah_kulpa@fws.gov>; Heston, Sophia M <sophia_heston@fws.gov>
Subject: Fw: [EXTERNAL] Gophers

It's becoming even more like Caddy Shack; I'm concerned that they report continued impacts.

I wonder if Dr. Grant would be able to confirm the gopher hypothesis by looking at damaged and destroyed plant material.

I'm also confused about the gopher hypothesis because, as I understand it, they rarely come above ground and, when they do they will subsequently plug that hole creating "gopher mounds." Their presence is most notable by these mounds. The pictures I've seen have been holes that were excavated from the side to access the root and I haven't notice mounds typical of gophers. Then again, I haven't been on site.

Interesting also that Dr. Bill Longland, in looking at pictures, suggested that it was a human-caused event, rather than herbivory. This adds to the mystery but glad to have other opinions.

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problematic but if the activity is localized, then maybe.

Justin Barrett
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U.S. Fish and Wildlife Service
Reno Field Office
Phone: 775-861-6338

https://www.fws.gov/reno/

From: Kris Kuyper <kris@emstrats.com>
Sent: Tuesday, September 22, 2020 4:42 PM
To: Kulpa, Sarah <sarah_kulpa@fws.gov>; 'Jim Morefield' <jdmore@heritage.nv.gov>; Barrett, Justin S <justin_barrett@fws.gov>; Heston, Sophia M <sophia_heston@fws.gov>; jchrist@forestry.nv.gov <jchrist@forestry.nv.gov>; 'Kacey KC' <kaceykc@forestry.nv.gov>; Crosby, Brandon J <bcrosby@blm.gov>; Balmer, Daltrey J <dbalmer@blm.gov>; Wickham, Perry B <pwickham@blm.gov>; Furtado, Douglas W <dfurtado@blm.gov>
Cc: 'Rebecca Sawyer' <rsawyer@ioneer.com>; 'Matt Weaver' <mweaver@ioneer.com>; 'Bernard Rowe' <browe@ioneer.com>; 'Chad Yeftich' <cyeftich@ioneer.com>; (b) (6) P.I.I. (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I. Richard Delong <rich@emstrats.com>
Subject: [EXTERNAL] Gophers

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3. Develop a trapping plan.

I asked Mike and his associate, Shawn Smallwood (a small mammal PhD from UC Davis, also living in Bishop) to put together an estimate for a survey effort and developing a trap design. They said that they can have that for me tomorrow. I will coordinate with BLM and NDOW to see what approvals may be required. I suggest we discuss the proposal during our next Teams call to see if there is general agreement on this course of action.

Kris Kuyper, CPESC, CESSWI
Biology Program Manager
T: 775.826.8822 (Reno) | 775.753.9496 (Elko)
C: 530.448.9098 | F: 775.826.8857
kris@emstrats.com | www.emstrats.com
1650 Meadow Wood Lane
Reno, Nevada 89502

From: Kulpa, Sarah
To: (b) (6) P.I.I.
Cc: James Morefield; jchrist@forestry.nv.gov; (b) (6) P.I.I. Heston, Sophia M; Barrett, Justin S; Edwards, Fred S
Subject: Re: [EXTERNAL] Re: eDNA proposal for Tiehms
Date: Monday, September 28, 2020 1:26:11 PM

We can get results in 3-6 weeks, or can do a rush to get them sooner for $500 -$1000 extra. I do like this approach in that we will be getting eDNA straight from the plant root. And Jim, is right, we will get human eDNA just simply based on all the researchers out there. And the absence of herbivore eDNA also likely will signify we didn't get out there in time. But Jackie doesn't think that will be the case, based on everything we discussed. She thinks we will be able to pick something up. She does plan on sampling all the different types of roots/shoots and hole types too :)

Sarah Kulpa
Restoration Ecologist/Botanist
Reno Fish and Wildlife Office
1340 Financial Blvd. Suite 234
Reno, Nevada 89521
(775) 861-6340

From: (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I. >
Sent: Monday, September 28, 2020 12:59 PM
To: Kulpa, Sarah <sarah_kulpa@fws.gov>
Cc: James Morefield <jdmore@heritage.nv.gov>; jchrist@forestry.nv.gov <jchrist@forestry.nv.gov>; (b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I.(b) (6) P.I.I. >; Heston, Sophia M <sophia_heston@fws.gov>; Barrett, Justin S <justin_barrett@fws.gov>
Subject: [EXTERNAL] Re: eDNA proposal for Tiehms

Hi again!

I think it's a good idea, though I do wonder about spending the time waiting for results. Cameras may be more conclusive, sooner, if they are pointed at the right patch at the right time?

- -
Elizabeth Leger
Professor, Department of Biology
Director, UNR Museum of Natural History
University of Nevada, Reno

Office: (775) 784-7582
Cell: (775) 315 5741
http://www.naturalhistory.unr.edu/

On Mon, Sep 28, 2020 at 10:25 AM Kulpa, Sarah <sarah_kulpa@fws.gov> wrote:

> Hi all!
>
> I received the attached proposal on eDNA sampling from Jackie Grant at SUU. I also just talked with her on the phone, to follow-up on data collection to make sure our situation is a candidate for this type of work. She said she can collect eDNA from exposed roots, and would use a razor blade or scalpel to take a small section. She also recommended taking soil eDNA from the same location a root sample is taken if it's an attached plant to really capture small mammal eDNA. It is in our favor that it is dry out there and it doesn't rain, because that preserves the eDNA longer. Based on past results and other eDNA work, she thinks we can get 50-60% positive 10 weeks or so out; you can get 80-90% positive 2 weeks out. She would be able to come out as soon as this Thursday and Friday.
>
> Since most of you have been to the Tiehm's site already, based on what you saw, do you think this type of eDNA testing is possible? Are there enough plants still available for this type of sampling? What do you think of the proposal? FWS is also going to try to find the funding to pay for this research.
>
> Thanks!
>
> Sarah
>
> Sarah Kulpa
> Restoration Ecologist/Botanist
> Reno Fish and Wildlife Office
> 1340 Financial Blvd. Suite 234
> Reno, Nevada 89521
> (775) 861-6340