

Habitat Restoration and Monitoring of Shaggy Horkelia at Twin Prairie: 2018 Annual Report



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0040

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PREFACE

IAE is a non-profit organization whose mission is conservation of native ecosystems through restoration, research and education. IAE provides services to public and private agencies and individuals through development and communication of information on ecosystems, species, and effective management strategies. Restoration of habitats, with a concentration on rare and invasive species, is a primary focus. IAE conducts its work through partnerships with a diverse group of agencies, organizations and the private sector. IAE aims to link its community with native habitats through education and outreach.



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Cover photographs: Looking west over Twin Prairie. Photo taken on June 19th, 2018 by Andrew Esterson.

SUGGESTED CITATION

Esterson, A. 2018. Habitat restoration and monitoring of shaggy horkelia at Twin Prairie: 2018 Annual Report. Unpublished report prepared for the Bureau of Land Management, Northwest Oregon District. Institute for Applied Ecology, Corvallis, Oregon.

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1. EXECUTIVE SUMMARY

In 2018, the Institute for Applied Ecology (IAE) conducted habitat restoration and monitored the shaggy horkelia (*Horkelia congesta* ssp. *congesta*) population at Twin Prairie. A narrow budget in 2018 limited restoration efforts to one day of scotch broom (*Cytisus scoparius*) removal in the eastern portion of the site. Shaggy horkelia surveys indicate there was a decrease in overall abundance and reproductive individuals by 31% and 50%, respectively, between 2017 and 2018.

2. INTRODUCTION

Twin Prairie is a mid-elevation meadow owned and managed by the Bureau of Land Management, Northwest Oregon District (BLM), and located in southern Lane County, Oregon, south of Cottage Grove. The meadow supports a population of shaggy horkelia (*Horkelia congesta* ssp. *congesta*), a rare species endemic to Oregon. Shaggy horkelia is a BLM Sensitive Species and a State of Oregon Candidate (Oregon Department of Agriculture 2017). The Oregon Biodiversity Information Center (ORBIC) designates shaggy horkelia as a “List 1” species that “contains taxa which are endangered or threatened throughout their range or which are presumed extinct” (ORBIC 2016). Management that bolsters shaggy horkelia populations is necessary to prevent the listing of this species under the Federal Endangered Species Act.

Through a cooperative agreement initiated in 2013, IAE was contracted by the BLM to perform habitat restoration and monitor the shaggy horkelia population at Twin Prairie. 2018 was the final year of the agreement, however, a new agreement between IAE and the BLM was signed in 2018 allowing IAE to continue work at Twin Prairie in 2019.

3. 2018 RESTORATION ACTIONS

In 2018, restoration actions were limited to one day of scotch broom removal on June 19. Over 200 scotch broom individuals (mainly small plants less than a half meter tall) were pulled and removed from the site. In addition, areas that were previously occupied by false brome (*Brachypodium sylvaticum*) were located and no false brome was observed.

4. SHAGGY HORKELIA MONITORING

4.1. Background and methods

Shaggy horkelia monitoring began in 2013. Geographically unique clusters of shaggy horkelia were considered a patch and were mapped with a handheld GPS unit (Appendix A). In 2013, 19 patches were surveyed, however, in subsequent years, three new patches were identified bringing the total number of surveyed patches to 22. In 2015, patches three, four and five were indistinguishable, thus they were considered one patch.

Initially, every reproductive stem in each patch was counted. Since 2014, additional data has been collected, including the total number of individuals, reproductive status (rosette or flowering) and the number of browsed stems. Individual plants were defined as basal rosettes not obviously connected to a single crown, usually a minimum of 1-2 inches apart (Alverson 2013).

In 2015, 220 shaggy horkelia plugs were planted in two locations; these plots are monitored annually but data is kept separate from the naturally occurring shaggy horkelia data.

4.2. Results

IN 2018, 860 SHAGGY HORKELIA WERE OBSERVED; OF THOSE, 49% WERE FLOWERING, 40% WERE VEGETATIVE AND 11% WERE SEEDLINGS. 1,121 11% WERE SEEDLINGS. 1,121 STEMS WERE COUNTED, OF THOSE, 19% WERE BROWSED. BETWEEN 2017 AND 2018 THERE WAS A DECREASE IN THERE WAS A DECREASE IN OVERALL ABUNDANCE, REPRODUCTIVE INDIVIDUALS, AND TOTAL NUMBER OF STEMS BY 31%, 50% AND 47%, 50% AND 47%, RESPECTIVELY (FIGURE 1 AND

Table 1).

Of the 220 shaggy horkelia plugs planted in 2015 zero have survived to 2018.

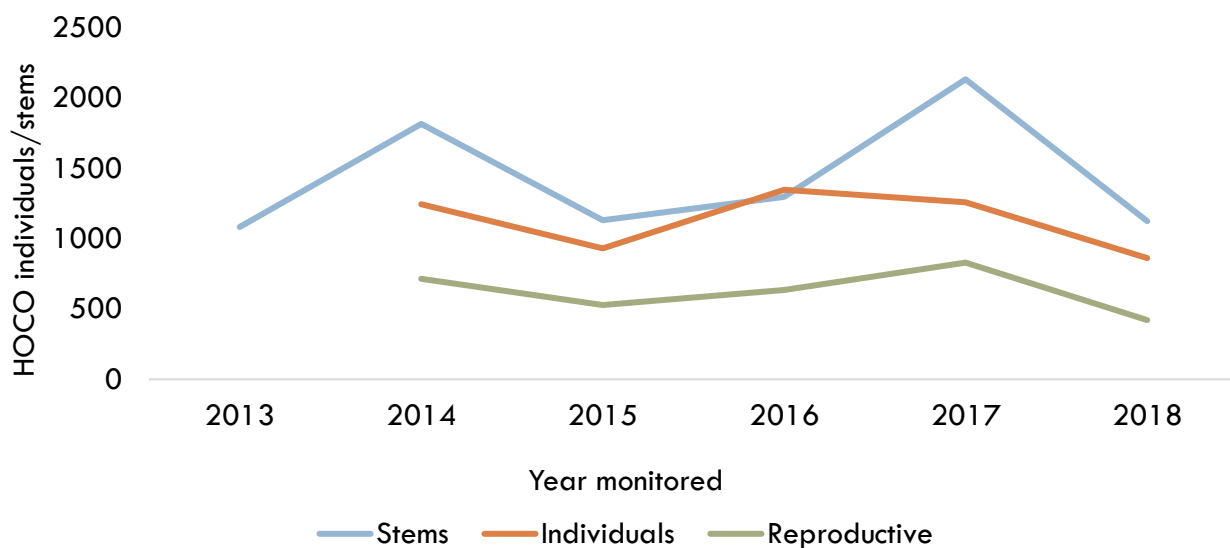


FIGURE 1. SHAGGY HORKELIA POPULATION TRENDS FROM 2013 – 2018. DATA SHOW TOTAL NUMBER OF STEMS (BROWSED AND UNBROWSED), INDIVIDUALS (VEGETATIVE AND REPRODUCTIVE) AND REPRODUCTIVE PLANTS. IN 2013 NUMBER OF STEMS WAS THE ONLY DATA COLLECTED

TABLE 1. 2018 SHAGGY HORKELIA MONITORING RESULTS

Patch	Total individuals	# flowering	# vegetative	# of seedlings	# of stems	# of browsed stems
1	0	0	0	0	0	0
2	8	8	0	0	21	0
3,4,5	484	188	251	45	417	158
6	0	0	0	0	0	0
7	41	19	7	15	39	0
7a	0	0	0	0	0	0
8	68	31	23	14	62	18
8a	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
10a	0	0	0	0	0	0
11	8	6	2	0	17	16
12	27	22	5	0	38	5
12a	1	1	0	0	5	0
12b	3	3	0	0	9	1
13	0	0	0	0	0	0
14	2	1	1	0	11	0
15	48	38	9	1	59	0
16	122	78	32	12	167	9
17	0	0	0	0	0	0
18	31	18	6	7	40	6
19	17	7	9	1	18	5
Total Pop	860	420	345	95	903	218

5. DISCUSSION

5.1. Habitat management

A variety of trees, including Douglas-fir (*Pseudotsuga menziesii*), madrone (*Arbutus menziesii*), bigleaf maple (*Acer macrophyllum*) and ash (*Fraxinus latifolia*), along with manzanita (*Arctostaphylos* sp.) and scotch broom, continue to encroach into the prairie. Limbing and/or removing any of the aforementioned species that encroach into shaggy horkelia habitat is a priority. In 2018, limited funds and a lapse in NEPA permitting restricted limbing/felling actions. Scotch broom was removed from the eastern portion of the site, but many individuals remain and will need to be removed in 2019. With a new agreement in place we anticipate that management actions to reduce prairie encroachment from woody species will resume in 2019.

Himalayan blackberry (*Rubus armeniacus*) continues to invade the southern margins of Twin Prairie. Removal is challenging and somewhat dangerous because of steep slopes. During a 2017 site visit with BLM and IAE staff, it was determined that blackberry removal was not currently a high management priority since shaggy horkelia is not present in the southern portion of the site. However, blackberry should be cut back when possible to reduce encroachment.

In previous years, after non-native species removal, a native seed mix was broadcast in disturbed areas. The mix consisted of Roemer's fescue (*Festuca roemerii*), Oregon sunshine (*Eriophyllum lanatum*) and California oatgrass (*Danthonia californica*). This seed was grown in partnership with the BLM and The Nature Conservancy and was provided for restoration use at no cost to the project; however, only a limited amount of seed remains (<5lbs). In 2019 seed collections from Twin Prairie may be beneficial as mid-elevation seed can be expensive and not readily available.

5.2. Shaggy horkelia

The shaggy horkelia population at Twin Prairie has decreased in population size for two consecutive years. It is unclear what factors are contributing to the decrease, but possibilities include or are a combination of warm and dry springs, herbivory, forest encroachment and competition from non-native species.

Of the listed factors associated with shaggy horkelia population reductions, plant competition and herbivory are two that can be managed, although this may be cost prohibitive. Improving habitat by reducing non-native species (mainly grasses) and limiting tree encroachment may be one approach to slowing shaggy horkelia population reduction. In addition, fencing off some of the populations to reduce browsing may be useful in allowing young plants to mature and older plants to reproduce and set seed.

Increasing the genetic diversity of the shaggy horkelia population may help it persist into the future. Population information collected by Kaye and Gisler in 1993 reported 20 known populations of shaggy horkelia within the Willamette Valley, OR. Permission should be sought to collect seed from public and private mid-elevation sites. Collected seed can be used to establish seed producing beds at IAE's native plant seed production farm.

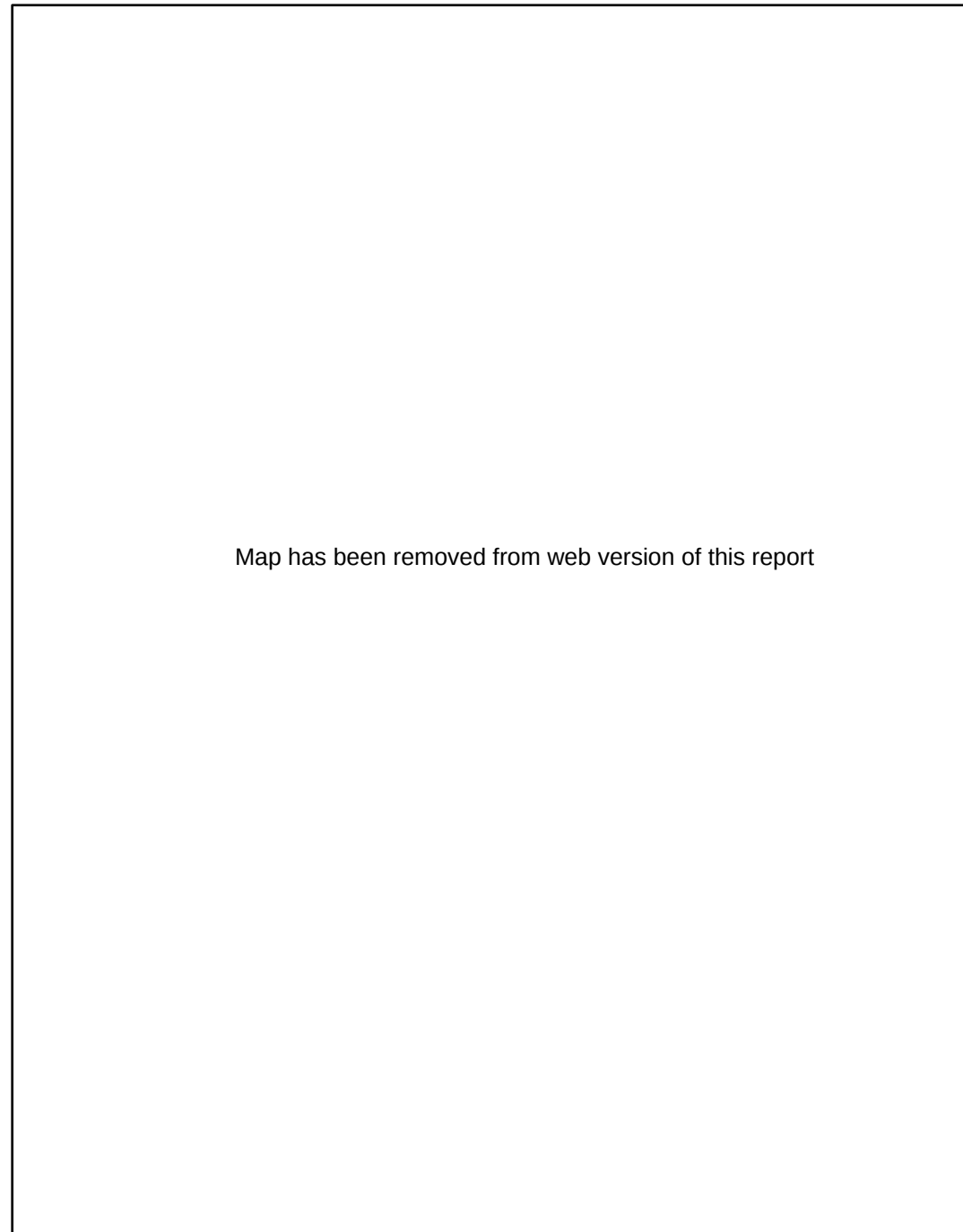
6. 2019 RECOMMENDATIONS

- **Monitor shaggy horkelia:** Monitoring shaggy horkelia should continue in 2018 to determine population trends.
- **Remove encroaching vegetation:** Tree clearing should continue along prairie edges, with emphasis on shaggy horkelia patch locations. Removing conifers will also improve the longevity of surrounding Oregon white oaks (*Quercus garryana*).
- **Manage weedy shrubs:** Continue monitoring and removing scotch broom and blackberry.
- **Locate and remove non-native prairie grass and forb species:** Surveys should be conducted in spring to determine where large patches of non-native prairie species occur. The most aggressive species should be targeted for removal by hand weeding or mowed with a string trimmer to reduce the amount of seed being produced.
- **Collect mid-elevation native seed:** Native plant seed (e.g., California fescue [*Festuca californica*], blue wildrye [*Elymus glaucus*] and Junegrass [*Koeleria macrantha*]), should be collected from Twin Prairie and stored to use for future prairie seeding, especially in areas where woody material has been removed.
- **Collect shaggy horkelia seed:** To increase shaggy horkelia genetic diversity, seed should be collected from other mid-elevation wild populations and used to establish a seed production field at IAE's native seed farm.

7. REFERENCES

- Alverson, Ed. R. 2013. Lomatium Prairie *Horkelia congesta* ssp. *congesta* 2013 Monitoring. Report to Long Tom Watershed Council. 22pp.
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- Oregon Department of Agriculture. 2017. Oregon's threatened, endangered, and candidate plants. <http://www.oregon.gov/ODA/programs/PlantConservation/Pages/AboutPlants.aspx>. Viewed 11/15/2017.

APPENDICES



Map has been removed from web version of this report

Appendix B. Shaggy horkelia flowering stem data from 2013-2018

Patch	2013	2014	2015	2016	2017	2018
1	12	12 (24)	27	6	56	0
2	13	10 (6)	8 (3)	1 (1)	14	21
3-5, summed	489	212 (315)	325 (168)	88 (409)	423(634)	417 (158)
6	27	5 (25)	20	11 (17)	41	0
7	77	51 (63)	51 (11)	30 (38)	84(7)	39
7a	0	2	0	0	0	0
8	61	39 (54)	24	44 (39)	99(23)	62 (18)
8a	0	0	2	0	3	0
9	3	3 (1)	2	2	5	0
10	9	6	0	0	0	0
10a	0	0	1	1	1(1)	0
11	2	8	6 (16)	1 (9)	6(15)	17(16)
12	17	113 (79)	54 (23)	33 (86)	80(23)	38(5)
12a	0	0	5	6 (2)	1	5
12b	0	0	0	0	0	9(1)
13	19	2 (12)	11	2 (9)	1	0
14	6	3 (4)	1 (2)	3	14	11
15	4	43 (56)	43 (27)	42 (38)	83	59
16	229	205 (287)	111 (98)	83 (185)	239(136)	167 (9)
17	4	2	2	0	0	0
18	102	66 (68)	48 (4)	10 (85)	57(35)	40 (6)
19	7	8 (29)	35	3 (17)	15(14)	18 (5)
TOTAL	N/A	790 + (1023)	776 + (352)	359 + (935)	1222 + (907)	903 + 218
Unbrowsed + (browsed)						
TOTAL Combined	1081	1813	1128	1294	2129	1121
Proportion of browsed stems	N/A	56%	31%	72%	42%	19%

*Numbers represent stems counted in each plot. Numbers in parentheses are browsed stems.

Appendix C. Shaggy horkelia abundance from 2014-2018

Patch	# of total plants + (seedlings)					# of reproductive plants				
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
1	12	11	17	20	0	12	9	5	15	0
2	7	5	1	5 + (4)	8	7	5	1	5	8
3,4,5	407	406	503	576 + (124)	484	235	216	263	408	188
6	20	16	18	23	0	10	9	13	16	0
7	62	35	42	46	41	50	30	30	33	19
7a	1	0	0	0	0	1	0	0		0
8	68	12	58	52	68	35	12	37	41	31
8a	0	1		2	0	0	1	0	2	0
9	3	1	1	2	0	3	1	1	2	0
10	1	0		20	0	1	0	0	0	0
10a	0	1	1	1	0	0	1	1	1	0
11	5	9	11	7	8	4	8	6	6	6
12	104	67	112 + (5)	50	27	64	37	56	39	22
12a	0	2	2	1	1	0	2	2	1	1
12b	0	0	0	0	3					3
13	3	6	7	2	0	3	5	5	1	0
14	1	1	2	8	2	1	1	2	6	1
15	92	80	99	84	48	45	37	43	58	38
16	355	216	222 + (81)	211	122	184	116	125	159	78
17	2	2	0	0	0	2	2	0	0	0
18	76	44	44 + (60)	31	31	46	24	36	27	18
19	15	14	9 + (50)	8	17	10	11	7	8	7
Total	1242	929	1149 + (196)	1129 + (128)	860	713	527	633	828	420

Appendix D. Restoration actions at Twin Prairie (2013-2018)

2013

- Seeds of Success collection (ACHMIL, CLAPUR, DAUPUS, FESROE, KOEMAC, LOMTR, MADELE, MADGRA, MADMAD, AND PLECON)
- Shaggy horkelia, blackberry and scotch broom populations were mapped
- ~1.17 acres of blackberry was removed
- ~0.4 acres of scotch broom was removed
- Shaggy horkelia was monitored (only stems counted)

2014

- Shaggy horkelia, blackberry and scotch broom populations were mapped
- ~1.2 acres of blackberry were removed
- ~0.5 acres of scotch broom was removed
- A native seed mix was broadcast over disturbed areas (PRUVUL, ELYGLA, FESROE and DANCAL)
- Shaggy horkelia was monitored (vegetative and reproductive individuals, browsed and unbrowsed stems)

2015

- Scotch broom was removed
- Shrubs and trees around shaggy horkelia populations were limbed or felled
- Large trees near shaggy horkelia plots were girdled
- Shaggy horkelia was monitored (vegetative and reproductive individuals, browsed and unbrowsed stems)
- 220 shaggy horkelia plugs were planted in two locations (110 plugs in each)

2016

- Shaggy horkelia population was mapped
- Blackberry and scotch broom was removed
- Shrubs and trees around shaggy horkelia populations were limbed or felled
- Large trees near shaggy horkelia plots were girdled
- Shaggy horkelia was monitored (vegetative and reproductive individuals, browsed and unbrowsed stems)
- Augmented shaggy horkelia population was monitored
- A native seed mix was broadcast over disturbed areas (ELYGLA, FESROE, ERILAN and DANCAL)

2017

- Scotch broom was removed

- Shaggy horkelia was monitored (vegetative and reproductive individuals, browsed and unbrowsed stems)
- Shrubs and trees around shaggy horkelia populations were limbed or felled
- Management plan was reviewed by IAE staff

2018

- Scotch broom was removed
- Shaggy horkelia was monitored (vegetative and reproductive individuals, browsed and unbrowsed stems)