Assessing the status of *Abronia turbinata* in southeastern Oregon

2010 Final Report

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PREFACE

This report is the result of a cooperative Challenge Cost Share project between the Institute for Applied Ecology (IAE) and the Bureau of Land Management. IAE is a non-profit organization dedicated to natural resource conservation, research, and education. Our aim is to provide a service to public and private agencies and individuals by developing and communicating information on ecosystems, species, and effective management strategies and by conducting research, monitoring, and experiments. IAE offers educational opportunities through internships. Our current activities are concentrated on rare and endangered plants and invasive species.

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Cover photograph: *Abronia turbinata* habitat (above) and inflorescence (below). Photos by Rachel Newton.

REFERENCE

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INTRODUCTION

Figure 1. *Abronia turbinata* inflorescences. Photo by M. Mancuso.

Abronia turbinata (cover photo, Figure 1), transmontane sand verbena, is native to the Great Basin and Mojave Desert in Oregon, Nevada, and California. In Oregon, its range is limited to Harney and Malheur counties in the southeastern corner of the state. Because of this limited range, Oregon Natural Heritage Information Center (ORNHIC) considers it a List 2 species (taxa which are threatened, endangered or possibly extirpated from Oregon, but are stable or more common elsewhere) with a G5 global ranking (demonstrably widespread, abundant, and secure) and an S1 state ranking (critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences; ORNHIC 2007). This final report documents the methods and results of surveys conducted on BLM lands from 2008 to 2010.

Abronia turbinata is a member of the Nyctaginaceae, the four-o'clock family. The plants are annuals (infrequently perennials) with a decumbent habit, generally crawling across the ground with much branched and elongated stems (Galloway 2004). The stems are reddish, at least basally, and usually glandular-pubescent. Leaf blades are broadly ovate to orbicular with entire to undulate margins. *Abronia turbinata* may flower from spring through fall. The inflorescences are composed of 15-35 flowers with white to pale pink limbs (Figure 1). The fruits are winged and turbinate and are topped by prominent beaks (Galloway 2004).

Abronia turbinata is found on sandy soils in desert scrub plant communities at about 4,000 feet in southeastern Oregon. Range-wide, *A. turbinata* is restricted to sandy soils but may be a component of a broader array of desert scrub plant communities from 2,900 – 8,200 feet. In Oregon, the sand dunes typically have a shrub component composed of *Grayia spinosa, Atriplex canescens, Artemisia tridentata* ssp. *tridentata, Ericameria nauseosus, Chrysothamnus viscidiflorus,* and *Sarcobatus vermiculatus*. The herbaceous layer is typically sparse (<10% cover) and composed of *Tiquilia nuttallii, Oenothera caespitosa, Oryzopsis hymenoides, Malacothrix torreyi, Aliciella leptomeria, Mentzelia albicaulis,* and *Lupinus pusillus*.

As of 2008, eight populations of *A. turbinata* were on record with ORNHIC (Table 1). These populations were spread from between Burns Junction and Basque along Highway 95 west through Coyote Lake to the Alvord Desert, then south through the Pueblo Valley and the Sand Hills to the Nevada state line (Figure 2 & 3). This project was initiated because thorough surveys for *A. turbinata* in Oregon were lacking and the current status of documented populations was unknown. The goal of this project

was to conduct surveys to determine the distribution of *A. turbinata*, estimate the size of populations, and determine potential threats to these populations.

METHODS

Field surveys were conducted June 16 – 19, 2008, June 9 – 11, 2009, and June 8 - 10, 2010. Previously documented *Abronia turbinata* populations were relocated using Element Occurrence Records from ORNHIC and label descriptions from herbarium specimens. We also identified and surveyed potential habitat for the presence of *A. turbinata*. Potential habitat was identified using binoculars, aerial photos, and/or topographic maps. At each site, the Intuitive Controlled survey method (Whiteaker et al. 1998) was employed to determine the extent of the *A. turbinata* population. A complete census of *A. turbinata* was conducted along the survey route; plant density, habitat, threats, and associated species were also documented. Locations were documented using a navigation grade GPS unit. Additional GPS coordinates were periodically taken to document survey routes. These routes were delineated on USGS 7.5' topographic quadrangles whether or not *A. turbinata* was found (Appendix A). Photographs were taken to show the habitat occupied by *A. turbinata* or other points of interest (Appendix B). All survey results will be shared with ORNHIC.

RESULTS

Fieldwork in 2008 – 2010 resulted in the observation of twelve occurrences of *Abronia turbinata* (Table 1). This includes five relocated and seven new populations (three of which may be considered extensions of previously reported populations). Additionally, two historical populations were searched for and not relocated (Table 1, Figures 2 & 3, Appendix A). *Abronia turbinata* was relatively common and frequently located when surveys were conducted in appropriate habitat, although there was suitable habitat that was unoccupied. The density of some populations (i.e. Alvord Desert #1-3) was consistently high and distributed more or less evenly while the density of other populations (i.e. Sand Hills #1-2, North of Black Point) was low with a spotty and uneven distribution (Appendix A). Plants were almost always restricted to sandy openings on dunes harboring a desert shrub plant community. A few *A. turbinata* were found on the flats adjacent to and occasionally some distance away from dunes where propagules had been washed by rain or wind (i.e. Big Sand Gap).

Disturbances were observed at each occurrence and generally included new and/or old cattle feces and prints. Little human disturbance was observed off of the roads used for access. None of the disturbance occurred at a scale that appeared to be a serious threat to *A. turbinata*. As long as destructive activities are not promoted in *A. turbinata* habitat, the long-term viability of these populations is good.

Table 1. *Abronia turbinata* occurrences in southeastern Oregon**.** The two historical collections were searched for in 2008 and not relocated. See Appendix A for specific population information.

Population	ORNHIC Element Occurrence #	Year (re)located
Big Sand Gap	NA	2010
SE of Black Point	NA	2010
Alvord Desert #1	26860	2009
Alvord Desert #2	NA	2009
Alvord Desert #3	27506	2009
Alvord Desert #4	26861	extirpated? (2010)
Mickey Basin	NA	2009
North of Black Point	NA	2009
South of Borax Lake	NA	2009
Coyote Lake	26953	2008
Crooked Creek	27459	2008
Sand Hills #1	26951	2008
Sand Hills #2	NA	2009
Historical collection (near Rome airport)	26954	extirpated? (2008)
Historical collection (S of Fields)	26952	extirpated? (2008)

SUMMARY AND CONCLUSIONS

Surveys for *Abronia turbinata* were conducted during the 2008-2010 field seasons. Eight populations known from herbarium and ORNHIC records were recensused. Five of these populations are extant, while three were unable to be relocated and are considered extirpated. Alvord Desert #4, a presumably extirpated population, may have moved eastward with the prevailing winds, and may now form the Big Sand Gap population. Areas with suitable habitat were also surveyed, resulting in seven new populations. Although our survey work was not exhaustive, these populations suggest the species' range in Oregon is limited to areas in and around the Alvord Desert. Reproductive individuals constituted most of the populations, which ranged in size from 9 to 411 individuals.

Abronia turbinata was most commonly associated with open spaces with low competition in sand dunes stabilized by desert scrub communities. Common native associates included *Sarcobatus vermiculatus*, *Artemisia tridentata* ssp. *tridentata, Chrysothamnus viscidiflorus, Lupinus pusillus, Oenothera caespitosa, Aliciella leptomeria, Camissonia claviformis, Achnatherum hymenoides* and *Hesperostipa comata.* Invasive community members included *Bromus tectorum, Sisymbrium altissimum* and *Salsola tragus. Abronia turbinata* was noticeably absent from areas dominated by *S. vermiculatus* and *Distichlis spicata*, two species with high salt tolerance, suggesting low salt tolerance by *A. turbinata*.

We observed few acute threats to the surveyed populations. The abundance of invasive species was low and lack of suitable forage precludes intensive cattle usage. Long-term threats to *A. turbinata* include the potential for habitat changes associated with climate change, introduction of new invasive species or changes in population dynamics of existing invasive species, and recreational (e.g. OHV) disturbances. Furthermore, little is known about the reproductive dynamics and overall population demographics of *A. turbinata*, making it difficult to predict how habitat and climate changes may affect the species. In the future, work should be undertaken to fill gaps in our knowledge of this charismatic Great Basin species.

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APPENDIX A. POPULATION SUMMARIES FOR *ABRONIA TURBINATA* SURVEYS COMPLETED 2008-2010.

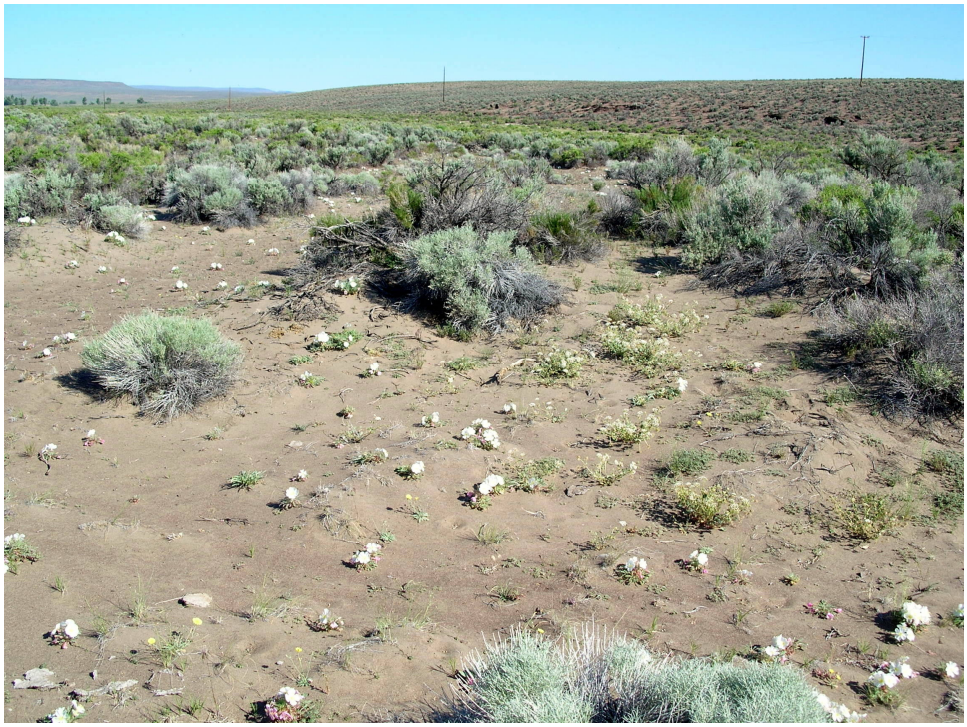
This information has been removed from the public report.

APPENDIX B. *ABRONIA TURBINATA* HABITAT AND FLOWER PHOTOGRAPHS.

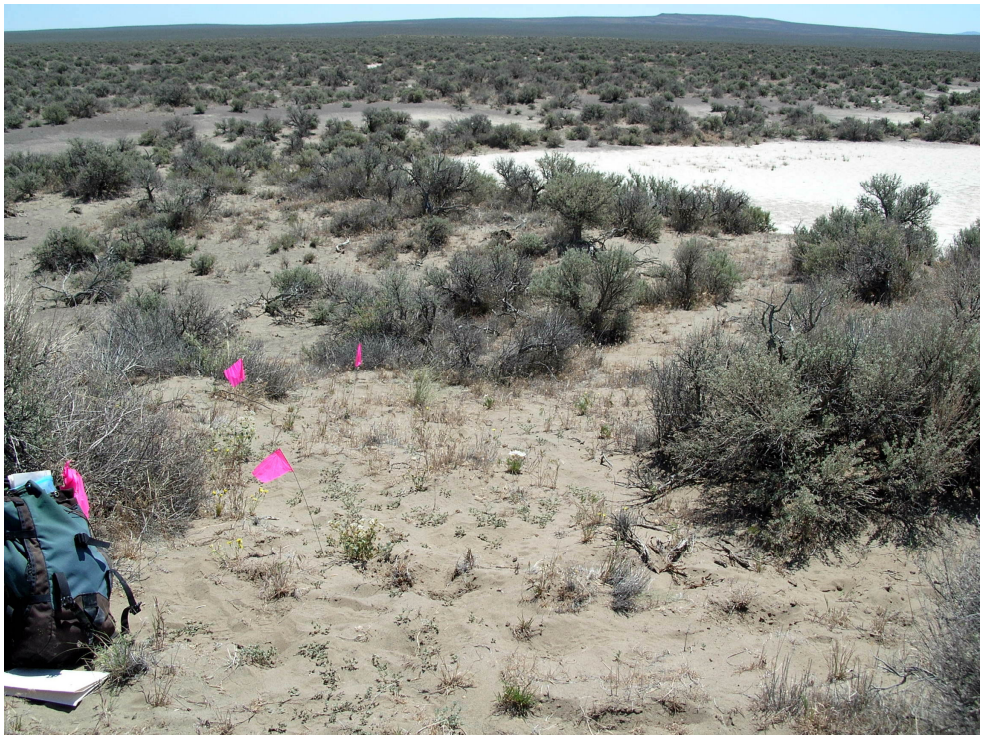
Sand Hills #1 *Abronia turbinata* (pink flagging) and habitat. The large white flowers are *Oenothera caespitosa.*

Sand Hills #1 *Abronia turbinata* (pink flagging) and habitat.

Sand Hills #1 *Abronia turbinata*.



Crooked Creek *Abronia turbinata* and habitat near eastern end of occurrence; view is facing northwest.



Crooked Creek *Abronia turbinata* (pink flagging) and habitat.

Coyote Lake *Abronia turbinata* with flowers near western end of occurrence: view is eastward.