NatureServe Explorer

Eriogonum visheri

Dakota Buckwheat

G3
Vulnerable

View on Explorer Pro



Classification

Scientific Name: *Eriogonum visheri* A. Nels.

Other Common Names: Visher's Buckwheat (EN), Visher's buckwheat (EN)

Kingdom: Plantae
Phylum: Anthophyta
Class: Dicotyledoneae
Order: Polygonales
Family: Polygonaceae
Genus: Eriogonum

Scientific Name Reference: Kartesz, J.T. 1994. A synonymized checklist of the vascular flora of the United States, Canada, and Greenland. 2nd edition. 2 vols. Timber Press, Portland, OR.
Concept Reference: Kartesz, J.T. 1994. A synonymized checklist of the vascular flora of the United States, Canada, and Greenland. 2nd edition. 2 vols. Timber Press, Portland, OR.
Name Used in Concept Reference: *Eriogonum visheri*
NatureServe Unique Identifier: ELEMENT_GLOBAL.2.134512
NatureServe Element Code: PDPGN086A0
Related ITIS Names: *Eriogonum visheri* A. Nels. (TSN 21275)

Conservation Status

NatureServe Status

Global Status: G3
Global Status Last Reviewed: 2/24/2020
Rank Method Used: Ranked by calculator
Reasons:

Eriogonum visheri is a regional endemic of the Great Plains known from fewer than 100 element occurrences in South Dakota, North Dakota, and Montana. This endemic buckwheat species is threatened by cattle grazing, and invasive plant species.

National & State/Provincial Statuses

United States: N3

Montana: S2, **North Dakota:** S2, **South Dakota:** S3

Other Statuses

U.S. Endangered Species Act: None
Committee on the Status of Endangered Wildlife in Canada (COSEWIC): None

NatureServe Global Conservation Status Factors

Range Extent: 20,000-200,000 square km (about 8000-80,000 square miles)
Range Extent Comments:

The only known populations of *Eriogonum visheri* are in the western Great Plains of North America, in western South Dakota, western North Dakota, and southeastern Montana. One population has been located in Montana (Carter county), 14 populations have been located in 7 counties in North Dakota (Billings, Golden Valley, Grant, McKenzie,

Mountrail, Sioux, and Slope counties), and at least 79 populations have been located in 8 counties in South Dakota (Corson, Hardin, Jackson, Pennington, Perkins, Meade, Mellette, and Ziebach counties) (Vanderhorst et al. 1998, Lenz 1993, Ode 1987, Schmoller 1993).

Area of Occupancy: 26-125 4-km2 grid cells
Estimated Number of Element Occurrences: 81 - 300
Global Protection: None. No occurrences appropriately protected and managed
Global Protection Comments:

Historical reports for Badlands National Park have not been confirmed, but several occurrences are in National Grasslands of South Dakota and many are in Little Missouri National Grassland in North Dakota where sensitive species policies are in place.

Degree of Threat: Medium
Threat Comments:

Significant threats to populations of *Eriogonum visheri* are cattle grazing and trampling, mining, competition from exotic weeds, global climate change, and problems inherent in regional endemics.

Cattle grazing and trampling are current, human-induced threats. Increased stocking levels have the potential to threaten the species to a greater degree, however due to the paucity of vegetation, cattle grazing is not common among sites with known populations. Furthermore plant does not appear to be selected by cattle for grazing, indeed, cattle do not select *Eriogonums* as a whole (USDA 1988). *Eriogonum visheri* is associated with plants that, on the whole, are not selected by cattle (Johnson and Nichols 1982, USDA 1988). Cattle tend to graze on this species only when little else is available for forage. Grazing can be beneficial when cows, or other small mammals and wildlife, eat species that compete with *Eriogonum visheri,* such as *Salsola iberica*. Trampling is not common at these sites, again, due to the lack of good forage. When trampling has been observed to damage some plants, it appears to be from the travel of cattle from one patch of favored forage to another. And trampling may disturb habitat suitability and create sites suitable for species that compete with *Eriogonum visheri*, such as *Kochia scoparia, Salsola iberica,* and *Melilotus officinalis.* But the presence of the *Eriogonum visheri* within cattle trails suggests that trampling may disperse and implant its seeds. An increase in stocking levels that would result in degradation of the range would likely override any benefits to the species and hasten its decline (Vanderhorst et al. 1998, Ode 1987, Schmoller 1993).

At present, mining is not a threat to the species, but significant coal deposits occur in the vicinity of several populations in northwestern South Dakota, thus mining has the potential to be a serious human-induced threat. Strip mining of these reserves, which is the method of choice in this region, would result in the destruction or disruption of several populations (Ode 1987). It must be noted that ground-disturbing activities are not necessarily detrimental to the species. It has been observed that the species has colonized areas disturbed by human activity such as ditching for a pasture road (Schmoller 1993, Vanderpool 1993). However, human activity may expose substrate making it open to invasion by nonnative weedy species that may have a competitive advantage over *Eriogonum visheri* (Vanderpool 1993).

Exotic weeds are a current, human induced threat. Exotic weeds have been observed in the same habitats as *Eriogonum visheri*. The two exotic species of particular concern are *Salsola iberica* and *Kochia scoparia.* While these species have been observed growing alongside healthy *Eriogonum visheri* plants, these species produce a tremendous amount of seeds and, in early spring, a dense carpet of seedlings. The competition between *Eriogonum visheri* and these two species for suitable seedbeds, water, and nutrients is likely to be intense. Further, *Eriogonum visheri* appears to be a poor competitor (Crowley 1998, Ode 1987, Vanderpool 1993). Other species that may pose a similar threat are *Bromus*

tectorum, Bromus japonicus, and *Melilotus officinalis*. Degradation of the range, which benefits exotic weeds, would increase the potential threats posed by exotic weeds (Vanderhorst et al. 1998).

Global climate change is a current and potential, human-induced threat. Since this is an annual that has demonstrated strong fluctuations in its population in response to variations in climate, it may be adversely affected by global climate change (Ode 1987, Peabody 1995, Vanderhorst et al. 1998).

Annual changes for this species are compounded by habitat erosion.

One natural, current threat is the set of problems inherent to regionally endemic populations. They face the threat of genetic depression, seed bank decay, and greater vulnerability to rapid habitat changes (Crowley 1998).

Short-term Trend: Unknown

Short-term Trend Comments:

According to regional Natural Heritage Programs, detailed trend data are lacking for several reasons. First, intensive surveys for the species were not initiated until the late 1980's. Second, most populations were not discovered until 1993. Third, only a few surveys have been commissioned, usually without follow-up surveys. Only nine broad surveys that focused on this species have been conducted in Montana, North Dakota, and South Dakota (Ode in 1987, Buffalo Gap National Grassland in 1991 and 1993, Vanderpool in 1993, Lenz in 1993, Peabody in 1995, Heidel and Dueholm in 1995, and surveys in Badlands National Park and Theodore Roosevelt National Park).

The presence of the species in badlands within the short grass province is to its advantage. Development and other anthropogenic factors are at a minimum in these locations, and the primary use of these sites for grazing does not appear to present any imminent threat of extirpation.

Global Abundance: Unknown

Global Abundance Comments:

Local populations vary greatly in size between populations and between years but range up to several thousand individuals.

Fragility: Moderately vulnerable

Fragility Comments:

Harsh setting with unstable conditions. Seed-banking is probably a survival strategy.

Other NatureServe Conservation Status Information

Inventory Needs:

Survey in Badlands National Park, in the course of project work in North and South Dakota, and in southeastern counties of Montana.

Protection Needs:

Pursue establishment of 'Special Interest Area' designation on United States Forest Service lands, and registry for privately owned sites, focusing on large landscape areas with suitable habitat.

Distribution

National and State/Provincial Distribution:

United States : MT , ND , SD

Endemism: endemic to a single nation

Ecology and Life History

Duration: ANNUAL

Reproduction Comments:

Dispersal, germination, and seedling establishment of Eriogonum visheri are dependent upon several factors. As an annual plant, it is dependent upon the size and condition of its seed bank for germination and seedling establishment. Its seed production and viability are not known. The erosional factors that limit the populations of other species appear to create safe-sites for the germination and seedling establishment of Eriogonum visheri. Dispersal of Eriogonum visheri seeds may be accomplished by both wind and water erosion since its seeds, lacking wings or plumes, are very small. The seed rain has been observed to remain largely beneath the parent plant. It has been suggested that Least chipmunks, resident and migratory passerine birds such as Baird's sparrow, Snow buntings, Lapland longspurs, Say's phoebes, and Rock wrens may collect and disperse the seeds. Both seed scarification and stratification may be required prior to germination. The species is proandrous, wind pollinated, and self-fertile (Ode 1987).

Ecology Comments:

Eriogonum visheri is a summer annual and primary successional species (Ode 1987). It inhabits harsh and erosive environments where competition and succession are limited. The high erosion and deposition rates at the sites uproot or bury plants. The soils have a high shrink-swell potential that damages plant roots. The high sodium, high pH, and low nutrition associated with these sites also serves to limit competition and succession. Wind erosion may also be an ecological factor in that strong may aid in the exposure of soil, creating blowouts, thus limiting competition and succession. Wind and water erosion may also disperse seeds and create suitable microhabitats, or safe-sites, for this species. Small mammals and resident and passerine birds may collect and disperse the seeds (Vanderhorst et al. 1998, Ode 1987, Schmoller 1993).

No mycorrhizal, symbiotic, or parasitic relationships are known for this species.

Habitat

Terrestrial Habitats: Savanna, Grassland/herbaceous

Habitat Comments:

Barren shale & clay outcrops of badland formations. Sparsely vegetated grassland; saline, saline-sodic substrate.

Community: Eriogonum visheri is found within the Shortgrass Prairie Province, Wheatgrass-Needlegrass section and the Wheatgrass-Grama-Buffalograss section in the west central Great Plains of North America (Ode 1987). The Hardin County, South Dakota site is located in the Agropyron smithii/Carex filifolia Steppe Habitat Type (Hansen and Hoffman 1985).

Geology: Its entire range is found within the unglaciated Missouri Plateau within the Great Plains physiographic province. Within South Dakota it is found on the Cretaceous and Tertiary Table Lands, but never within the Pierre Hills that overlay the Cretaceous and Tertiary Table Lands. It is consistently associated with at least three geologic formations: the White River formation, Hell Creek formation, and rarely, the Pierre formation. It shows a distinct preference for these geologic formations, shying away from other formations that are adjacent and at similar topographic position. In South Dakota the plants were found on the Chadron and Brule phases of the White River formation and at one site the plants were found on the Yellow Mound Member and Interior phase of the Pierre formation. All three formations are composed of claystones, siltstones, sandstones, and shales with infrequent porcelainite and lignite beds. Within these formations, Eriogonum visheri will be found on barren, sedimentary rock outcrops, the alluvium of such outcrops, and small exposures of soil substrates within badlands topography. The geologic structures include buttes, tables, canyons, arroyos, shallow dry washes, blowouts, terraces, and slumps. Amidst these structures, the plant is most often found on the unvegetated clay outwash at the base of slopes, on the unvegetated eroding edge of tables, benches, terraces, and buttes, and on somewhat level patches of soil exposed by wind or water erosion (Ode 1987, Schmoller 1993, Schmoller 1995). At some North Dakota sites it has been found within or adjacent to porcelainite within badlands topography (Lenz 1993).

Soil: The soils associated with Eriogonum visheri are less often considered soils and more often considered rock outcrops with minimal podzolization. Where soil has been formed it is considered to be of the Entisol soil order. In South Dakota, these were Badlands, Interior, Cedar Pass or Cabbart soil types (Schmoller 1993, Schmoller 1995). In Montana, the soils were derived from eroding bentonite and were vesicular silt (Vanderhorst et al. 1998). Typically, the soil is low in organic matter, has high pH, fine texture, high shrink-swell capacity, low infiltration rates, low soil moisture, and low fertility. Often these soils are strongly calcareous and high in sodium. At the sites where there were soils had better horizonation, lower pH, and higher organic matter the plants displayed a more vigorous, robust appearance (Vanderhorst et al. 1998, Ode 1987, Schmoller 1993, Schmoller 1995).

Vegetation: While vegetation is commonly sparse at the Eriogonum visheri sites, associated species do occur. In North Dakota these include Agropyron dasystachyum, Agropyron smithii, Artemisia tridentata, Astragalus racemosus, Atriplex argentea, Atriplex nuttallii, Distichlis spicata, Eriogonum pauciflorum, Grindelia squarrosa, Gutierrezia sarothrae, Machaeranthera canescens, Melilotus officinalis, Oenethera cespitosa, Salsola iberica, and Sarcobatus vermiculatus (Lenz 1993, Peabody 1995, Vanderpool 1993). In South Dakota these include Agropyron trachycaulum, Astragalus racemosus, Artemisia cana, Atriplex argentea, Atriplex canescens, Chrysothamnus nauseosus, Distichlis spicata, Dyssodia papposa, Eriogonum pauciflorum, Gutierrezia sarothrae, Kochia scoparia, Machaeranthera canescens, Oryzopsis hymenoides, Polygonum ramosissimum, Salsola iberica, Solanum rostratum, Sphaeralcea coccinea, and Helianthus annus (Ode 1987, Schmoller 1993). In Montana these include Allium textile, Atriplex confertifolia, Atriplex gardneri, Artemisia tridentata spp. wyomigensis, Elymus lanceolatus, Kraschnekovia lanata, Musineon divaricatum, Oenethera cespitosa, and Sitanion hystrix (Vanderhorst et al. 1998).

Site Conditions: Eriogonum visheri inhabits sites at elevations between 1900 and 3000 feet. It occurs amidst relatively harsh growing conditions. Ground cover is lean, with a minimum of 50% bare ground, and more often an excess of 90% bare ground. Light is open, with minimal shading from surrounding geology. Erosion and deposition rates are high. Where the species occupies the badlands outwash, the slopes are low, where the species occupies the edges of alluvium the slopes are steep (Vanderhorst et al. 1998, Ode 1987, Schmoller 1993). The climate is severe, influenced by the Rocky Mountains to the west. In South Dakota the climate is classified as Type BSk, middle latitude, semi-arid steppe. Seasonal precipitation and temperatures vary widely. Lemmon, South Dakota, in the midst of the range of Eriogonum visheri, has recorded a record high of 115° F and a record low of -45° F (Ode 1987). Others have observed high temperatures of 121°F at Kadoka, South Dakota, and a low of -46°F in Philip, South Dakota (Schmoller, pers. obs.). Rainfall is spare. In

western South Dakota it averages about 15 or 16 inches a year, most of it coming in the form of spring and early summer showers and thunderstorms. Precipitation in the rest of the range of Eriogonum visheri is similar (Ode 1987).

Economic Attributes

Economically Important Genus: No

Economic Comments:

There are no known economic uses of this plant.

Management Summary

Stewardship Overview:

Eriogonum visheri is a regional, edaphic endemic, restricted to dry, open outcrops and outwashes within badlands topography. It may be threatened by cattle grazing and trampling, mining, global climate change, and competition from exotic weeds (Ode 1987, Peabody 1995, Schmoller 1993). Although several surveys have been conducted over the years, little is known about population trends and the current impacts of such things as cattle grazing, exotic weeds, and climate change upon this plant. An increase in cattle stocking levels could possibly result in degradation of the habitat and lead to species decline (Vanderhorst et al. 1998, Ode 1987, Schmoller 1993). Further monitoring and study are needed (Ode 1987, Peabody 1995, Schmoller 1993, Vanderpool 1993).

Restoration Potential:

Due to minimal trend and historical data, it is difficult to determine restoration potential. Many seemingly suitable sites do exist for this plant throughout the badlands region. For example, the Brule and Chadron formations that contain many of the South Dakota populations extend from the North Platte River in Wyoming and Nebraska to the White River in South Dakota. However only one population has been found south of the White River. It seems possible to propagate species in these sites (Schmoller 1993) and seeds have been sent to the Center for Plant Conservation at the Nebraska Statewide Arboretum in Lincoln, Nebraska (Ode 1987, Center for Plant Conservation Web Site 2000).

Preserve Selection & Design Considerations:

At present, no preserve designs have been proposed. In order to design a preserve, some basic questions need to be answered.

First, what is the goal of the preserve? It is recommended that the goal be at a minimum to preserve the populations, habitat, and ecosystem of Eriogonum visheri. The introduction of the species into new sites might be a desired goal.

Second, what information is required? Data on this species is lean. It is recommended that research be directed toward an understanding of the populations, habitat, and ecosystem of the species, especially toward population trends, population history, threshold levels, competitors, seed dispersion methods, specific substrate requirements, affect of climate variations, and threats. This implies the establishment of permanent monitoring sites and the continued analysis of the species' habitat and behavior.

Third, what sort of preserve must be selected? It is recommended that one be selected which accommodates all processes required for the maintenance of a viable population. This means selecting a location that has high erosion and deposition rates within a dense clay substrate. And it is recommended that preserves be established within each of the geological formations that it prefers. And it is recommended that preserves be established with the ability to limit or mitigate threats. Specifically, it is necessary that the preserve contain moderate to low levels of livestock grazing, a minimum or absence of exotics, little or no ground disturbing activities such as road building, mining, or farming.

Fourth, what would constitute acceptable results? This would be an expression of the original goal. Results must be measurable, so the preserve needs to have permanent monitoring plots and a monitoring program (Ode 1987, Peabody 1995, Schmoller 1993, Vanderpool 1993).

Management Requirements:

In many ways, present management does not appear to spell swift and sudden doom for Eriogonum visheri. For example, one threat, the proliferation of exotic weeds, has been continuing apace since their explosion during the drought of the 1930's. The continued existence of Eriogonum visheri during this period suggests that these exotics do not pose a short-term threat to its existence. Similar remarks might be made for slight or moderate levels of cattle grazing which have continued for decades. Nevertheless, it cannot be stated whether or not the past decades of exotic species, cattle grazing, farming, or global climate change have altered the range of the species. And should current management worsen, adverse effects would be expected. The impacts of overgrazing would be felt, not only in the general degradation of the range, but in the advance of exotics, destruction of safe-sites, and an increase of direct grazing and trampling of the species. Hence, modest stocking levels and sensible grazing rotations should be established or maintained on all federal and state lands and encouraged on private lands. And efforts to eradicate exotic species should continue. Farming is not likely to impact the species directly, due to the unsuitability of the land for raising crops. However, a retreat to the farming practices that played such a major role in the dustbowl of the 1930's would surely spell the decline of this and many other sensitive species (Ode 1987). Global warming has implications far beyond the extinction of one regional endemic. The reduction of the output of greenhouse gasses is essential.

In addition to these management practices, efforts might be made to colonize suitable habitats in the region. And monitoring populations of Eriogonum visheri is an essential part of a good management plan.

Monitoring Requirements:

All comments on monitoring suggest to establish permanent monitoring plots. The plots should be visited on an annual basis, be established at the population and subpopulation level in a variety of habitats (in the very least on each type of geologic substrate on which it is found), and target surveys should be conducted on suitable habitat (Peabody 1995, Ode 1987, Schmoller 1993, Vanderpool 1993).

Monitoring Programs:

There are no known management programs in operation. The National Grasslands that contain Eriogonum visheri are managed by a Forest Plan that mandates the protection of sensitive species habitat and populations.

Management Research Programs:

There are no known management research programs in operation.

Management Research Needs:

Management research needs are primarily to gather baseline data on the species, particularly population numbers, locations, and trends.

The consensus among surveyors is that the species requires further survey and monitoring (Ode 1987, Peabody 1995, Vanderpool 1993, Schmoller 1993). Trend data are lacking and there is a large possibility that additional populations of this species exist. For example, the Brule and Chadron formations that contain many of the South Dakota populations, extend from the North Platte River in Wyoming and Nebraska to the White River in South Dakota. However, to date, only one population, in Mellette county by the Little White River, has been found south of the White River, (Ode 1987, Schmoller 1993).

Vanderpool, in her 1993 survey, suggested the establishment of permanent monitoring plots on the population and subpopulation level with a view to observing the impact of climate, human activity, secondary succession, and exotic weeds on Eriogonum visheri populations and seed banks (Vanderpool 1993). Peabody, in his 1995 survey, suggested that particular attention should be focused on the correlation between precipitation patterns and anthropogenic factors and the Eriogonum visheri populations (Peabody 1995). Schmoller, in his 1993 survey, recommended focusing on locating new populations determining habitat requirements. Additionally, these habitat requirements could be elucidated through a comparison of the habitat of known populations across its range (Schmoller 1993). Ode, in his 1987, recommended that further searches for Eriogonum visheri be conducted, that livestock exclosures be constructed around populations to monitor the long-term effects of grazing on the plant, and that populations should be monitored to determine population patterns and the impact of exotic weeds (Ode 1987).

Biological Research Needs:

Determine length of seed viability. Correlate occurrences geologic members and type of substrate.

Additional Topics:

Little to no information has been found concerning economic or herbal uses, mycorrhizal, allelopathic, symbiotic relationships, pollinators, seed bank viability, or consumers of this species. No information has been found on Native American uses or regard for this species. Individuals with considerable knowledge about this species include:

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Population / Occurrence Delineation

The default minimum separation distance is 1 km; see the Habitat-based Plant Element Occurrence Delimitation Guidance for details.

Population / Occurrence Viability

See the Generic Guidelines for the Application of Occurrence Ranks (2008).

Authors and Contributors

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