

Status of
Blowout Penstemon
(*Penstemon haydenii*)
in Wyoming

Prepared for the
Wyoming Cooperative Fish and Wildlife Research Unit,
US Fish and Wildlife Service, and Wyoming Game and Fish Department
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INTRODUCTION

Blowout penstemon (*Penstemon haydenii*) was first recognized as a distinct species by Sereno Watson (1891) based on a flowering specimen collected along the Dismal River in Thomas County, Nebraska in 1891 (Pennell 1920). At that time the species was known from only one other record, a vegetative specimen collected by Ferdinand Hayden in 1857 and originally determined as *Penstemon acuminatus* (a species now known to be endemic to the Columbia River Basin) (Watson 1891; Cronquist et al. 1984). Watson (1891) listed the Hayden collection as being from “the Laramie Mountains of Wyoming”. Pennell (1935) later reported that a duplicate of Hayden’s specimen at the Missouri Botanical Garden was labeled “Loup Fork”, which he attributed to the North Loup River in the Nebraska Sandhills.

Penstemon haydenii was reported as locally abundant in the Nebraska Sandhills in the early 20th Century (Pool 1914), but by the 1940s was thought to be extinct (Fritz et al. 1992). Although the species was rediscovered in 1959, it remained extremely uncommon in west-central Nebraska and was listed as Endangered under the US Endangered Species Act in 1987. The species currently numbers between 3000-5000 plants at 13 sites in Nebraska (Stubbendieck et al. 1997).

Other than Watson’s 1891 report and an unconfirmed record from Kansas (Coulter and Nelson 1909), no other populations of Blowout penstemon were known outside of Nebraska until 1996 when Frank Blomquist, a range technician from the Bureau of Land Management (BLM) Rawlins Field Office, discovered a small colony south of the Ferris Mountains in northwest Carbon County, Wyoming (Fertig 1999). Uncertain about the identity of these plants, Blomquist took Amy Roderick, a Botany graduate student at the University of Wyoming, to the site in June 1998. Roderick and Blomquist collected an immature specimen of the plant which they later sent to Dr. Noel Holmgren of the New York Botanical Garden for verification in 1999. On 2 July 1999, Blomquist, Roderick, and University of Wyoming botanists Walter Fertig, B. Ernie Nelson, and Courtney Ladenburger revisited the site and collected fresh flowering material. Field identification of *Penstemon haydenii* was subsequently confirmed by specimens sent to Dr. James Stubbendieck of the University of Nebraska and Dr. Holmgren.

Blowout penstemon is Wyoming’s only listed Endangered plant* and as of 1999 is still known only from the Ferris dunes area, approximately 300 km (185 miles) west of the nearest known population in Morrill County, Nebraska. In 1999, the US Fish and Wildlife Service (USFWS) contracted with the University of Wyoming and the Wyoming Natural Diversity Database (WYNDD) to summarize existing information on Blowout penstemon in Wyoming. The results of this analysis are included in this report.

* The Ute ladies tresses orchid (*Spiranthes diluvialis*) is listed as Threatened, and the Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*) and Desert yellowhead (*Yermo xanthocephalus*) are candidates for listing as Threatened (no decision on their listing status has been made as of 31 December 1999).

METHODS

Information on the taxonomy, distribution, habitat, population size, and life history of Blowout penstemon was obtained from scientific literature, unpublished reports, specimens from the Rocky Mountain Herbarium (RM), and field surveys conducted by WYNDD and RM staff in 1999.

SPECIES INFORMATION

Classification:

Scientific Name: *Penstemon haydenii* S. Watson (1891). Watson originally spelled the specific epithet “*haydeni*”, but a second “*i*” was later added to make the name etymologically correct (Fritz et al. 1992).

Common Name: Blowout penstemon; Hayden’s penstemon.

Family: Scrophulariaceae (Figwort family).

Synonyms: None.

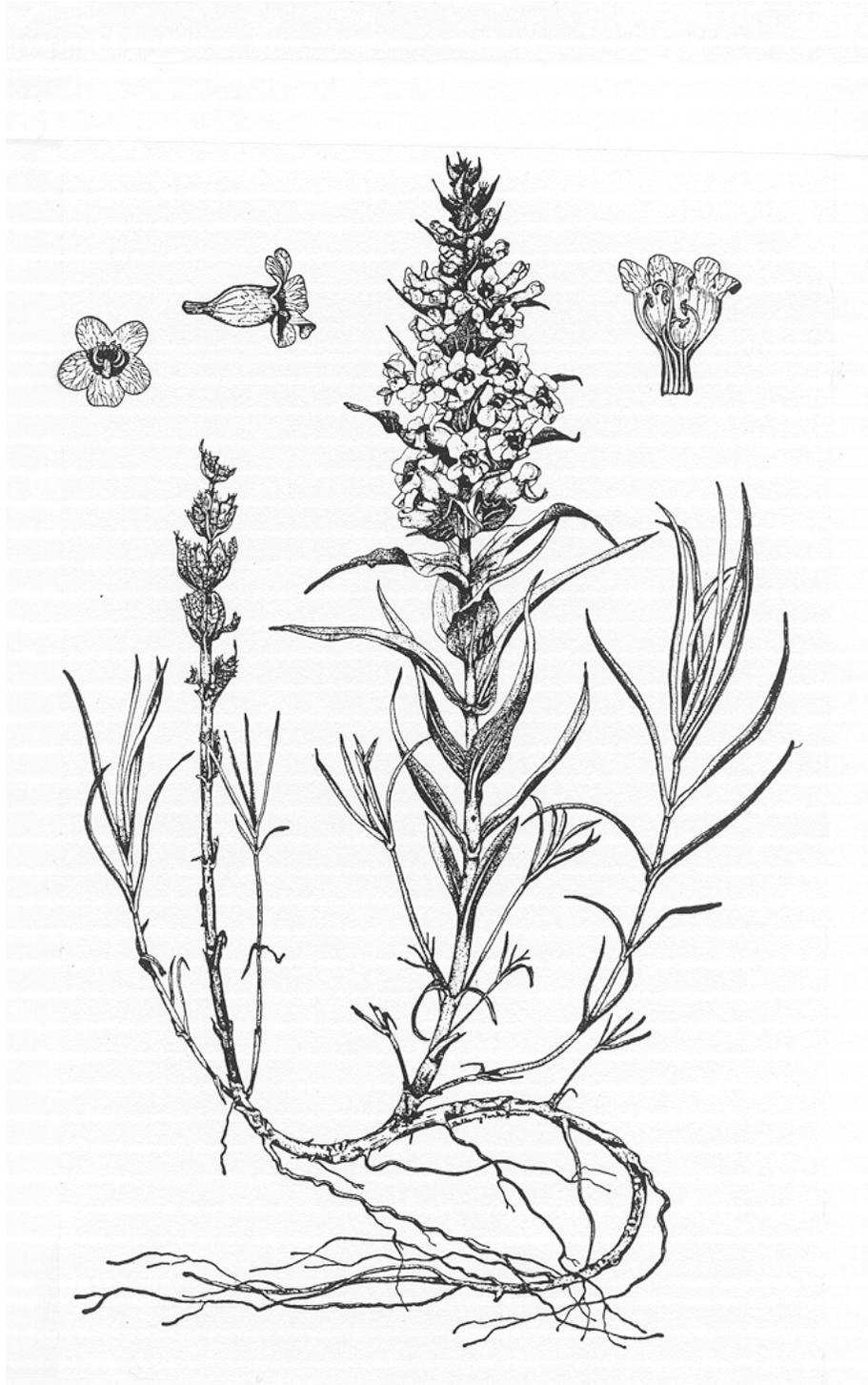
Phylogenetic Relationships: The genus *Penstemon* contains nearly 250 species centered primarily in western North America (Cronquist et al. 1984). Blowout penstemon belongs to section *Coerulei*, a group recognized by succulent and glaucous leaves, anthers that dehisce their entire length, and compact inflorescences of blue, violet, pink, or white flowers (Cronquist et al. 1984). Blowout penstemon is unique within this section in having fragrant flowers (Freeman 1986). *P. haydenii* is thought to be most closely related to *P. grandiflorus* and *P. angustifolius*, and Freeman (1981) has hypothesized that *P. haydenii* may be of hybrid origin between these two taxa.

Legal Status: Blowout penstemon was listed as Endangered under the US Endangered Species Act on 1 October 1987 (Fritz et al. 1992). The plant is protected under state law in Nebraska, but receives no comparable protection in Wyoming.

Natural Heritage Rank: The Nature Conservancy’s network of natural heritage programs gives *Penstemon haydenii* a rank of G1, indicating that the species is “critically imperiled because of extreme rarity” throughout its range. At the state level, it is ranked S1 in Wyoming and Nebraska (Nebraska Natural Heritage Program 1996; WYNDD Web Site, August 1999).

Description: Blowout penstemon is a perennial herb with 1 to many glabrous stems arising from a branched caudex or rooting from buried nodes (Fig. 1). Vegetative stems are usually less than 30 cm tall and have greenish-blue, waxy, linear leaves 2.5-12 cm long and 0.3-1 cm wide. Flowering stems have narrow leaves at the base and broad-based, clasping, waxy leaves 0.7-3 cm wide that taper abruptly to a narrow tip higher on the stem. The inflorescence is 6-16 cm long with 6-10 compact, leafy whorls of milky-blue to pale lavender flowers (rarely with pink or white flowers). Bracts of the inflorescence are broad and heart-shaped at the base and narrow to an elongate tip. Individual flowers are 23-25 mm long with tubular, bi-lobed and faintly vanilla-scented corollas and glabrous, linear

Figure 1. Line drawing of *Penstemon haydenii* by Bellamy Parks Jansen.



sepals. Anther sacs are 1.8-2 mm long and glabrous. Fruits are 13-16 mm long capsules with light-brown, disc-shaped seeds with winged margins (Stubbendieck et al. 1982, 1997; Freeman 1986).

Similar Species: *Penstemon grandiflorus* has ovate to spoon-shaped leaves (widest above the middle), non-aromatic corollas over 35 mm long, and fruits over 16 mm long. *P. angustifolius* var. *angustifolius* has corollas less than 25 mm long and narrowly lance-shaped stem leaves over 7 times as long as wide (rarely over 1 cm wide). *P. angustifolius* var. *caudatus* has corollas under 25 mm long and lance-shaped to ovate flowering bracts (Freeman 1986; Dorn 1992).

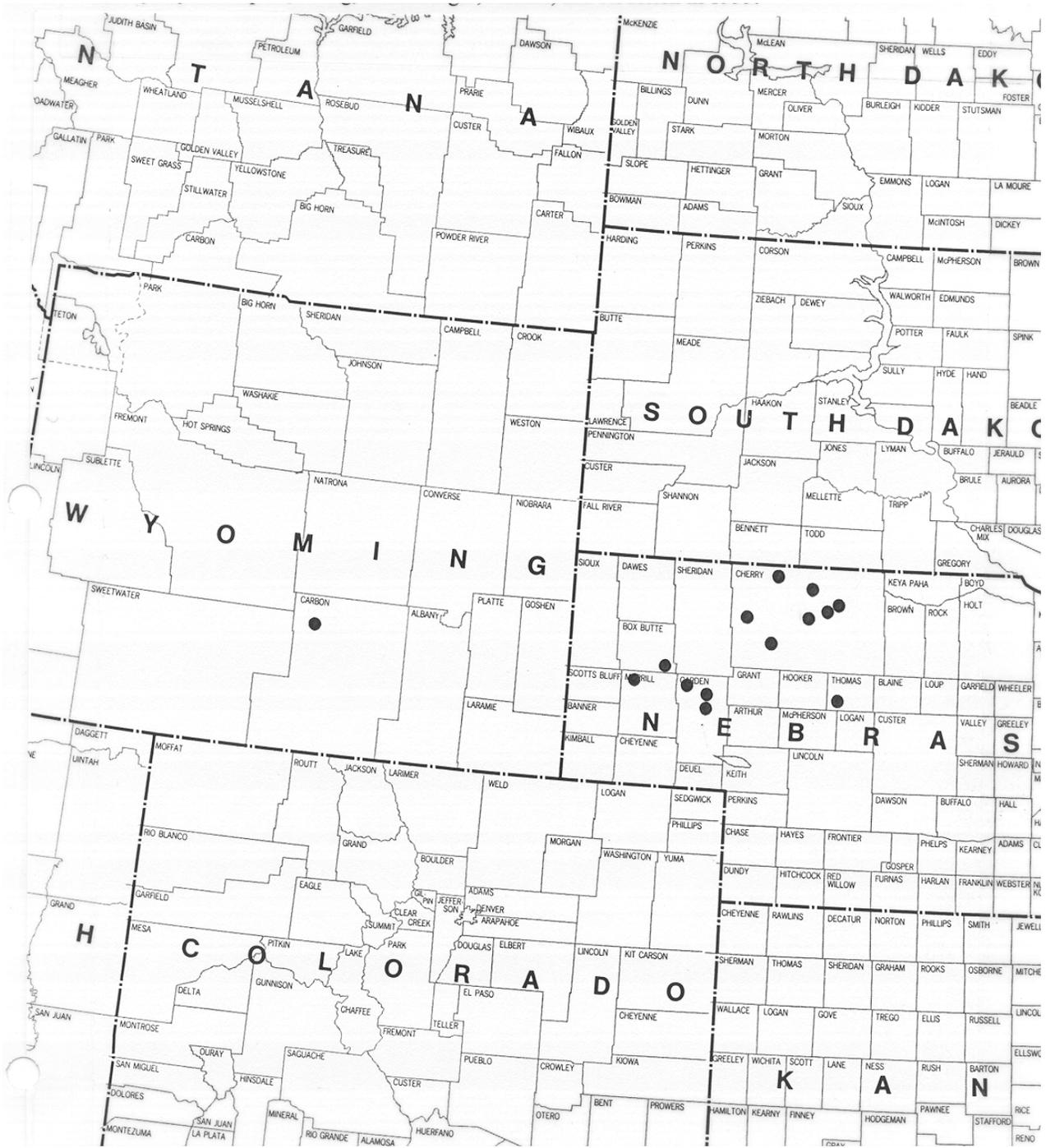
Geographic Range: Regional endemic of the Sand Hills of west-central Nebraska (Box Butte, Cherry, Garden, Morrill, and Thomas counties) and the northeastern Great Divide Basin in Carbon County, Wyoming (Fig. 2) (Stubbendieck et al. 1997; Fertig 1999). The Wyoming population is located at the eastern end of the Ferris sand dune system at the head of Schoolhouse Creek and the west side of Bradley Peak, about 30 km (18.5 miles) east of US Highway 287.

James Stubbendieck (pers. comm.) has suggested that the Wyoming population could have arisen from seed he supplied a Wyoming gardener in the early 1980s (the origin and ultimate destination of these seeds is unknown). Genetic tests currently being conducted on samples from Wyoming should help determine their possible origin. If unique genetic markers are found in the Wyoming plants (as would be expected due to their disjunct range), these plants should be considered native.

Extent of Surveys in Wyoming: No species-specific surveys have been conducted for this species in Wyoming since its confirmation in the state in July 1999. General floristic inventories of sand dune habitats in southeast Wyoming (Goshen and Laramie counties), the Killpecker Dunes in Sweetwater County, Seminoe dunes (Carbon County) and elsewhere in the Ferris dunes by RM students and staff, WYNDD employees, private consultants, and government biologists from 1993-1999 have failed to locate additional populations. Surveys for this species are planned for BLM lands in southwest and central Wyoming in the summer of 2000.

Habitat: In Nebraska, Blowout penstemon occurs in "blowouts", sparsely vegetated depressions in active sand dunes created by wind erosion (Fritz et al. 1992). Blowouts form on windward sandy slopes where the vegetative cover has been removed or disturbed (historically by fire or the activities of bison or cattle). Strong winds blow sand from the exposed windward side and deposit it on the more protected leeward slopes. Eventually a crater may form 4-10 meters (13-33 ft) deep over an area of 0.1-0.3 hectares (0.25-0.75 acres), with leeward slopes up to 60° (although even larger craters have been reported). Blowouts may expand for decades until continued growth of the leeward slope is inhibited by topography. Without continued deposition on the lee side, winds eventually eliminate the steep front

Figure 2. Rangewide Distribution of *Penstemon haydenii*. Based on Stubbendieck et al. (1997) and surveys by Blomquist, Fertig, Ladenburger, Nelson, and Roderick in 1999.



slope of the dune and the community becomes stable enough to support more densely-vegetated prairie grasslands (Fritz et al. 1992).

Blowouts are earlier successional communities inhabited primarily by Prairie sandreed (*Calamovilfa longifolia*), blowout grass (*Redfieldia flexuosa*), Lemon scurfpea (*Psoralidium lanceolatum*), and other species adapted to constant erosion, scouring, and burial by sand (Fritz et al. 1992; Stubbendieck et al. 1997). Common associates in Nebraska include *Cycloloma atriplicifolia* (Ringwing), *Physalis heterophylla* (Clammy groundcherry), *Polanisia trachysperma* (Clammyweed), *Muhlenbergia cuspidata* (Plains muhly), *M. pungens* (Sandhill muhly), and *Eragrostis trichodes* (Sand lovegrass). With stabilization, these sites may become replaced by sandhills prairie vegetation dominated by Sand bluestem (*Andropogon hallii*), Little bluestem (*Schizachyrium scoparium*), Junegrass (*Koeleria macrantha*), Prairie sandreed, and Needle-and-thread (*Stipa comata*) (Fritz et al. 1992; Stubbendieck et al. 1997).

Blowout sites in the Sandhills are characterized by sandy soils (mixed, mesic Typic Ustipsamment) with low organic matter, low water-holding capacity, low fertility, and high susceptibility to erosion (Fritz et al. 1992). Elevation of these sites ranges from 853-1158 m (2800-3800 ft) (Gerry Steinauer, pers. comm.). Annual precipitation is 425-625 mm (16.7-24.6 inches), with 70% coming during the growing season. Average maximum and minimum temperatures for January are 1° and -12° C (33.8° and 10.4° F), with extreme lows of -40° C (-40° F). Mean maximum and minimum temperatures in July are 32 and 15° C (89.6 and 59° F) (Fritz et al. 1992).

In Wyoming, *Penstemon haydenii* is found on steep, northwest-facing slopes of active, blowout-like sand dunes with a sparse cover (less than 5%) of Blowout grass, Thickspike wheatgrass (*Elymus lanceolatus*), Lemon scurfpea, and occasional Rubber rabbitbrush (*Chrysothamnus nauseosus*). These dunes are derived from wind-blown Quaternary alluvium (Love and Christiansen 1985) and consist primarily of fine-textured sands (psamments) and fine clays (Frank Blomquist, pers. comm.). The dunes range in elevation from 2194-2268 m (7200-7440 ft). Average annual precipitation in the Ferris Dunes area is 254 mm (10 inches), with peak precipitation coming in April and May. Mean annual temperature is 6.6° C (44° F). Mean maximum and minimum temperatures in January are -1.1 and -11° C (30 and 12° F) and mean maximum and minimum temperatures in July are 28.6 and 12.1° C (84 and 54° F) (Martner 1986).

The Wyoming site differs from the Nebraska Sandhills in having a higher elevation (2194-2268 m vs 853-1158 m), lower mean annual precipitation (254 mm vs 425-625 mm), and cooler maximum and minimum summer temperatures. The dominant vegetation of the two areas is comparable, but a large number of common associated species in Nebraska are absent from the Wyoming population.

Population Size and Trends: Blowout penstemon is currently known from 13 extant locations in the Nebraska Sandhills, with an estimated total population of 3,000-5,000 plants (Stubbendieck et al. 1997). Population size may fluctuate annually, depending on

recruitment success and environmental stochasticity (Flessner and Stubbendieck 1992; Fritz et al. 1992). Historically, the state's population has experienced a sharp decline. The exact reason for this decline is not known, although wildfire control, severe drought, improvements in range management (leading to reduced blowout production), leveling of sand dunes, and outbreaks of pyralid moths have all been identified as potential causes (Fritz et al. 1992).

The single known *Penstemon haydenii* population in Wyoming contained an estimated 300-500 plants in 1999, distributed across three main subpopulations in an area of approximately 8 hectares (20 acres). No long-term trend data are available as this population has only been known since 1996.

Population Biology and Ecology: Blowout penstemon plants are not evenly distributed across their habitat, but are instead found in sparse, non-random clusters. Density may vary from 1 plant per square meter to 1-2 plants over several hundred meters (Fritz et al. 1992). In unusually favorable microsites in Wyoming, density can be 2-3 plants per square meter. Individual populations may range from 25 to over 2000 plants (Fritz et al. 1992).

In Nebraska, Blowout penstemon flowers from May to early July and produces fruits from mid-June to mid-July. Occasionally, flowering may also occur from early August to early September (Fritz et al. 1992). Flowering in Wyoming occurs later than in Nebraska (late June to early July), probably in response to drier and cooler climatic conditions. *Penstemon haydenii* is pollinated mostly by four species of megachilid bees (*Hoplitis pilosifrons*, *Osmia distincta*, *O. cyaneonitens*, and *O. integra*), as well as wasps, ants, beetles, butterflies, and flies (Lawson et al. 1989). The plant is primarily an out-crosser, although experimental studies show that it is potentially self-fertile (Flessner and Stubbendieck 1992). Some inbreeding depression (lower mean number of fruit and seed and reduced mean seed weight) is evident in experimentally selfed plants (Flessner and Stubbendieck 1992).

Each fruit contains an average of 25-35 seeds and as many as 1500 seeds may be produced by each plant. Seeds are released from late August to September and either fall near the parent plant or are dispersed by wind or animals (Fritz et al. 1992; Stubbendieck et al. 1997). *Penstemon haydenii* seeds have thick seed coats containing leachable chemical inhibitors. The seeds are often buried in shifting sand and can remain viable in the seedbank for 20 years (Stubbendieck et al. 1997). Prolonged wet conditions and abrasion are required for breaking dormancy and seed germination (Flessner 1988). Additional carryover mechanisms exist to regulate water uptake and germination of seeds, thus preventing the entire seed pool from germinating at once under seemingly favorable conditions (Caha et al. 1998). Despite potential inbreeding due to limited pollen exchange between isolated populations, *P. haydenii* seeds have a 90% germination rate under experimental conditions following seed coat scarification (Flessner 1988). Under natural conditions, seedling production is exceedingly low due to high levels of insect and rodent predation, plant pathogens, and unfavorable climatic conditions (Caha et al. 1998). Good seedling establishment may only occur every 8-10 years (Stubbendieck et al. 1997).

Blowout penstemon is also capable of spreading vegetatively by the production of adventitious roots from buried stems (Stubbendieck et al. 1997). This is an adaptation for surviving constant burial by wind-blown sand, a feature shared by many other plants in its sand dune habitat.

Caha et al. (1998) studied genetic variability in mitochondrial and chloroplast DNA from a subset of Nebraska populations of *Penstemon haydenii*. Although no difference could be detected in chloroplast DNA, at least 8 distinct markers were found in mitochondrial DNA, indicating a greater amount of genetic variability than would be expected in an inbreeding population. This variability could be due to high levels of gene flow between populations in the past. Such gene flow is no longer possible in today's fragmented landscapes. Intrapopulation genetic diversity may also be enhanced by the long-lived seed bank of this species, which allows new cohorts of seedlings to contain a mix of ages and genealogies (Caha et al. 1998). The genetic composition of the Wyoming population is currently being investigated based on tissue samples collected by Frank Blomquist in 1999 (Gerry Steinauer, pers. comm.).

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Current Management: Two populations of Blowout penstemon are protected in the Valentine Lake and Crescent Lake National Wildlife Refuges. Protected populations also occur at Ballard's Marsh Wildlife Management Area (managed by the Nebraska Game and Parks Commission) and The Nature Conservancy's Graves Ranch preserve (Gerry Steinauer, pers. comm.). All other known populations are on private or state lands managed primarily for agriculture (Fritz et al. 1992). In Wyoming, the entire state population is found on public lands managed for multiple use by the Bureau of Land Management's Rawlins Field Office (Fertig 1999).

Existing and Potential Threats: The following threats have been identified for this species in the literature (Fritz et al. 1992):

1. Changes in Habitat Quality: Historically, fire and grazing by bison and livestock helped maintain the blowout habitat of *Penstemon haydenii* by removing sand-stabilizing vegetation. The implementation of fire-control policies in the 1870s following white settlement, elimination of bison, initiation of soil conservation programs, and increased usage of rotational grazing systems have reduced the incidence of wind erosion, resulting in the loss of Blowout penstemon habitat and a reduction in its population size in Nebraska (Fritz et al. 1992). Threats from habitat change appear low in Wyoming due to the remoteness of the Ferris Dunes population and compatible current grazing practices in the area.
2. Livestock Trampling and Grazing: Blowout penstemon is edible to cattle and horses, but is not preferred forage if other vegetation is available. During non-drought conditions, grazing on *P. haydenii* is minor and confined mostly to occasional shoots. Such grazing

can be stimulatory in breaking apical dominance (Fritz et al. 1992). When other forage is severely limited, as during drought conditions, severe grazing damage can occur (the entire above-ground portion of the plants may be eaten). Due to the sparse distribution of this plant and loose substrate, trampling damage is rarely significant (Fritz et al. 1992). Some evidence of grazing was observed on flowering and leafy stems at the Wyoming site in 1998 and 1999, but this damage may be attributable to elk or mule deer rather than domestic stock. Cattle use of the adjacent lowlands can be high, but activity on the sand dunes appears minimal under normal conditions due to low forage and lack of water.

3. Over-collection: Many rare penstemon species are vulnerable to over-collection for seed or garden stock. Small populations near state highways are considered especially vulnerable to this threat in Nebraska. Specific site locations have been kept confidential to reduce the threats from overharvest (Fritz et al. 1992). The Wyoming population is probably sufficiently isolated and inaccessible to protect it from over-collection at the present time.
4. Off-road Vehicles: The sand dune habitat of Blowout penstemon is often popular for off-road vehicle (ORV) recreation, especially on state and public lands where access is not as stringently regulated as on private lands. Hill-climbing and other ORV activities can accelerate natural erosion, but driving over the plants would lead to high mortality (Fritz et al. 1992). The Wyoming population is sufficiently remote at present to offer some protection from high ORV use. BLM recreation planners should be made aware of the possible impacts to the population from ORV use.
5. Pesticides: The direct impact of herbicides on Blowout penstemon is not known, although it is probably vulnerable to broadleaf weed killers (Fritz et al. 1992). Due to the sparse cover of its habitat, herbicide application rates are minimal in Nebraska and Wyoming at present. The use of insecticides to combat range pests (such as grasshoppers) is a potential threat to the pollinators of this species.
6. Construction Activities: Construction of permanent roads within the occupied habitat of *Penstemon haydenii* is unlikely to be a threat due to the unsuitability of shifting sand as a road surface. Powerlines and pipeline construction could have short-term impacts if plants are uprooted during the building phase. Home construction is unlikely given the unstable substrate.
7. Natural Threats: Natural succession, in which formerly shifting dunes and blowouts become stabilized with a cover of prairie grasses, is a potential threat to existing populations of Blowout penstemon. Extensive drought, such as the Dust Bowl drought of the 1930s, has been suspected as a cause of the serious decline of this species in the early 20th century. While drought could create new habitat by killing grass cover and making sites more prone to erosion, *Penstemon haydenii* may itself be vulnerable to prolonged water stress. Insect outbreaks may also pose a threat. *P. haydenii* is preyed upon by spider mites, grasshoppers, penstemon aphids, and *Endothenia hebesana* (seed

predator) (Fritz et al. 1992). The most serious pest is probably the larvae of pyralid moths, which bore into the stems and rootcrowns of Blowout penstemon to pupate and can cause 75% mortality (Stubbendieck et al. 1997). Lastly, fungal root rots can cause death through wilting (Fritz et al. 1992).

Management Recommendations: The US Fish and Wildlife Service commissioned a recovery plan for Blowout penstemon in the early 1990s and has been funding basic research into the life history and management needs of this species since the 1980s (Fritz et al. 1992). The primary objectives of the recovery plan are to reach a stable, range-wide population threshold of at least 15,000 individuals in 10 population groups (each with a minimum of 300 plants at the lowest ebb of a population cycle). To reach these objectives, new populations may need to be reintroduced into the historical range of the plant. A minimum level of protection is also needed for each of the target populations (Fritz et al. 1992).

The discovery of a new Blowout penstemon population in Wyoming, well outside its' presumed historic range, is extremely significant for the protection and future de-listing of this species. If genetically unique, the Wyoming population will provide an important source of seed and pollen for gene banking and possible introduction to new sites. The discovery also raises the possibility that the species may be more widespread (and thus less imperiled) than traditionally thought. Surveys in sand dune habitats outside of the Nebraska Sandhills (including eastern, central, and southwest Wyoming, northeast Colorado, and possibly southern South Dakota) may now be warranted. Protection for the Wyoming population will also help achieve the goal of 10 populations with a minimum of 300 individuals needed for *Penstemon haydenii* to be delisted.

The following are specific actions recommended by the recovery plan (Fritz et al. 1992):

1. Protect naturally occurring, reintroduced, and introduced populations and their habitat. Protection may be necessary to prevent additional loss of habitat or to encourage management activities that promote sand erosion and blowout creation. Such activities include fire and grazing by livestock and bison. Other threats, including over-collection, pesticide use, and ORV recreation, need to be controlled at these sites and regulations under federal and state law need to be enforced.
2. Conduct systematic surveys for additional naturally occurring populations and suitable habitat for establishing new populations. Additional populations still need to be located or established through reintroduction to meet the minimum population goals for recovery. Aerial photography, remote sensing, and geographic information systems offer promise for the identification of potential habitat, although none replace the need for on-the-ground surveys.
3. Monitor populations and conduct research to determine species life history, minimum viable population parameters, habitat requirements, and management criteria. Although much information about the life history of *Penstemon haydenii* has already been gathered

through the efforts of scientists from the University of Nebraska, Chadron State College, The Nature Conservancy, and the Nebraska Natural Heritage Program, additional data are needed on monitoring techniques, population biology, and response to management techniques (especially fire and grazing). Additional basic research on genetic variability, greenhouse propagation, and the life history of pollinators will also be beneficial for developing management plans.

4. Reintroduce populations in areas of historic occurrence and introduce new populations in suitable habitat within the species range. Suitable reintroduction sites will be determined by rangewide surveys of potential habitat, with sites on public lands or protected private lands receiving first priority. The native status of the new Wyoming population (which has been questioned by James Stubbendieck) needs to be determined through comparison of its genetic composition with known Nebraska populations. If this population is native, other suitable locations in Wyoming should be considered as potential reintroduction sites.

5. Develop and implement management plans addressing the requirements of each naturally occurring and newly established population. Management plans, utilizing natural and human-induced disturbances to create and maintain shifting dune conditions are needed for each of the 10 *Penstemon haydenii* populations targeted for protection.

6. Maintain seed source and genetic variability in an artificial seedbank. The origin and genetic variability of seeds maintained in seedbanks for future reintroduction needs to be carefully documented. All genetically distinct populations should be maintained in a seedbank.

7. Carry out public education to develop awareness and support for the preservation of *Penstemon haydenii*. The Nebraska Game and Parks Commission has produced an attractive color pamphlet discussing the identification, life history, habitat, and management needs of this species (Stubbendieck et al. 1997). Private landowners who possess occupied or potential Blowout penstemon habitat need to be made aware of the plant and its management needs. Landowners should be rewarded for good stewardship of penstemon habitat with monetary incentives.

SUMMARY: Blowout penstemon, a federally Endangered plant, was first discovered in Wyoming in 1996 (although not confirmed until 1999). This species was previously thought to be endemic to the Nebraska Sandhills, where it was known from 13 extant populations numbering 3000-5000 individuals. The single known Wyoming population is found in northwest Carbon County along the eastern rim of the Great Divide Basin and is nearly 300 km from the next nearest occurrence in western Nebraska. As in Nebraska, the Wyoming population is restricted to shifting sand dunes and wind-carved, crater-like depressions (blowouts) with sparse cover of Blowout grass and Lemon scurfpea. The Wyoming occurrence covers an area of less than 8 hectares and contained an estimated 300-500 flowering and vegetative individuals in 1999. Although legally protected, Blowout penstemon is still highly threatened by habitat loss (stemming from natural succession, fire suppression, or erosion-minimizing grazing rotation practices), impacts from ORV

recreation, pesticides, over-collection, and insect predation. A recovery plan has been created with the goal of protecting at least 15,000 individuals at 10 different sites. The discovery of a new population in Wyoming helps attain these de-listing objectives and could serve as a new source of genetic variability.

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