Appendix B.

Species Abstracts for BLM Sensitive and Listed Threatened and Endangered Vascular Plant Species in Wyoming

The following section contains 2-page species abstracts for each of the Wyoming plant species listed as Sensitive by the BLM Wyoming State Office or as Threatened or Endangered under the US Endangered Species Act in 2001. Each abstract includes a brief species description, illustration, and summary of known distribution, habitat, population size and trend, management status, bibliography, and modeled potential range map.

Antennaria arcuata — *Meadow Pussytoes*

Legal Status*:*
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: USFS Region 4 Sensitive; WY BLM Sensitive.
Heritage Rank: G2/S2

Description: Meadow pussytoes is a white-woolly perennial herb that spreads by conspicuously arching woolly stolons up to 10 cm long. Flowering stems are 30-40 cm tall with relatively few oblanceolate leaves that are equally grayish-white hairy above and below. Flower heads are numerous, clustered at the tip of the stem, and have membranous, white-tipped bracts and white disk flowers (ray flowers are absent). Individual plants are unisexual. Pistillate plants have involucres 4-6 mm long, and staminate plants have involucres 5-7 mm long.

Similar Species: *Antennaria microphylla*, *A. parvifolia*, and *A. rosea* have short, non-woolly stolons and densely crowded basal rosettes. *A. flagellaris* has slender, glabrous stolons and inflorescences composed of a single flower head. Other *Antennaria* species in Wyoming lack stolons, have glabrous upper leaf surfaces, or dark-tipped involucre bracts. *Gnaphalium chilense* is an annual or biennial herb with bisexual flower heads and yellowish, membranous involucre bracts.

Flowering/Fruiting Period: July-September.

Range: Regional endemic found in three disjunct areas in south-central and northeastern Idaho and central Wyoming. In Wyoming, it is known from the Sweetwater River Valley and South Pass area of the southern Wind River Range (Fremont County) and the northern Green River Basin (Sublette County).

Habitat: Found primarily in subirrigated meadows within broad stream channels

Above: Antennaria arcuata *by Walter Fertig (from Fertig et al. 1994).*

dominated by *Deschampsia cespitosa*, *Juncus balticus*, *Poa pratensis*, *P. nevadensis*, *Koeleria macrantha*, and *Carex praegracilis* at 4950-7900 feet. These communities are often found within a matrix of *Artemisia cana* and *Pentaphylloides floribunda*. *A. arcuata* may be found on hummocks, level ground, or shallow depressions on alkaline, clayey soils high in organic matter. It is notably absent from riparian sites with tall, dense graminoid or shrub cover and where soils are saturated.

Abundance and Trends: *A. arcuata* is known from 23 occurrences in Wyoming, 18 of which have been discovered or relocated since 1995 (most recently in 2000). Surveys in 1995 found an estimated 99000-130,000 individuals in 15

populations covering ca 500 total acres. Several new populations numbering in the thousands have been discovered since 1997, including the first occurrence in the northern Green River Basin. Trend data from 12 Wyoming occurrences show slight downward to slight upward increases between 1986-1995.

Management Status: Populations occur on lands managed by the BLM Lander, Pinedale, and Rock Springs Field Offices. One population is protected on the Nature Conservancy's Sweetwater River Preserve. Part of another occurrence is within the Sweetwater Canyon Wilderness Study Area and at least one population is found within the BLM South Pass Historic Site ACEC.

Selected References:

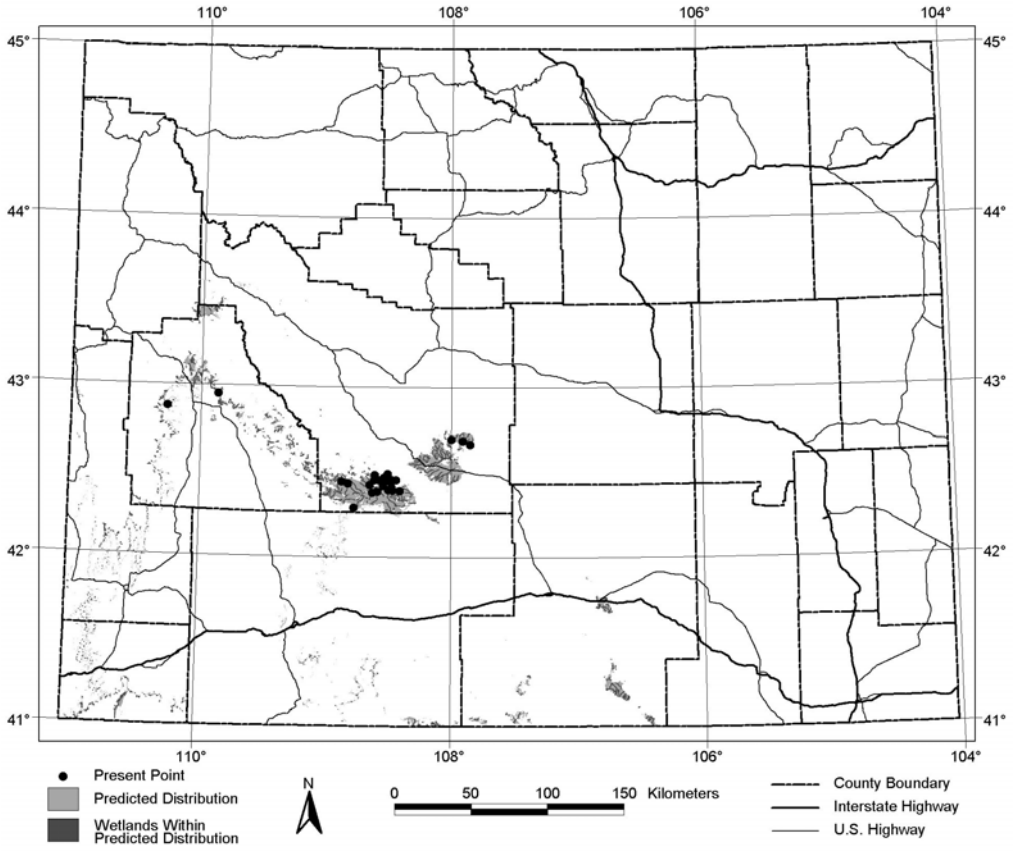
Bayer, R. J. 1992. Allozyme variation, genecology, and phytogeography of *Antennaria arcuata* (Asteraceae), a rare species from the Great Basin and Red Desert with small disjunct populations. American Journal of Botany 79 (8): 872-881.

Cronquist, A. 1950. Notes on the Compositae of the northwestern United States. Leaflets of Western Botany 6:41-50.

Fertig, W. 1996. Status report on *Antennaria arcuata* in central Wyoming. Unpublished report prepared for the Bureau of Land Management Wyoming State Office, Rawlins District, and Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Marriott, H.J. 1986. A report on the status of *Antennaria arcuata*, a Candidate Threatened species. Prepared for the US Fish and Wildlife Service by the Wyoming Natural Diversity Database, Laramie, WY.



Aquilegia laramiensis — Laramie Columbine

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: USFS Region 2 Sensitive; WY BLM Sensitive.
Heritage Rank: G2/S2

Description: Laramie columbine is a perennial, leafy, many-stemmed herb 10-20 cm tall. Leaves are mostly twice ternately compound with leaflets 0.5-3 cm long. Flowers are nodding and borne among the leaves, with greenish-white to lavender sepals, and cream-colored, short-spurred petals (spurs less than 10 mm). Fruits are hairy follicles 1-1.5 cm long with spreading tips (Fertig et al. 1994).

Similar Species: *Aquilegia coerulea* differs in having petals with spurs over 20 mm long. *A. brevistyla* has dark blue-purple, pubescent sepals. *A. jonesii* has entirely basal leaves with blades less than 15 mm long.

Flowering/Fruiting Period: June-August.

Range: Endemic to the Laramie Range of southeast Wyoming (Albany and Converse Counties).

Habitat: Found in shady crevices of north-facing granite boulders and cliffs with pockets of rich soil at 6250-8000 feet.

Abundance and Trends: *A. laramiensis* is known from 8 extant occurrences and 3 historical records (predating 1926). Five populations have been discovered since 1988 (most recently in 2000). No formal range-wide surveys have been conducted. Known populations range from locally abundant to very sparse. 50-100 plants were observed near the Friend Creek Campground in 2000.

Above: Aquilegia laramiensis *by Isobel Nichols.*

No trend data are available, but populations are likely to be stable due to low degree of threat.

Management Status: Populations occur in Medicine Bow National Forest and potentially in the BLM Rawlins Field Office. One occurrence is located within the proposed Ashenfelder Basin Research Natural Area. All other known populations are on private, state, or public lands managed for multiple use.

Selected References:
Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne WY.

Jones, G.P. 1989. Report on the Ashenfelder Basin Special Interest Area. Report prepared for Medicine Bow National Forest by the Wyoming Natural Diversity Database, Laramie, WY.

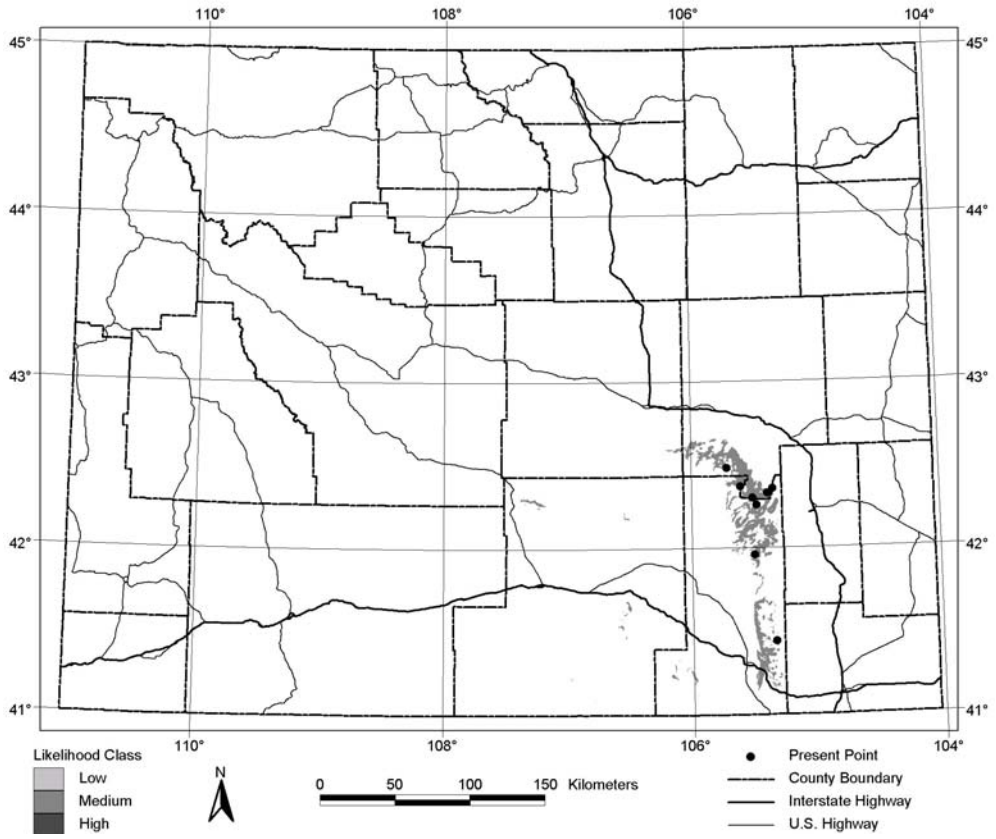
Mills, S. and M. Neighbours. 1995. Intensive data gathering project (fine-filter analysis) for occurrences of rare, threatened, endangered and sensitive species in sections M331H and M331I, north central highlands and northern parks and ranges, in Wyoming. Unpublished report prepared for Medicine Bow National Forest by the Wyoming Natural Diversity Database, Laramie, WY.

Munz, P.A. 1946. *Aquilegia*, The cultivated and wild columbine. Gentes Herb. 7:1-150.

Payson, E.B. 1918. The North American species of *Aquilegia*. Contributions U. S. National Herbarium 20: 133-158.

Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Report prepared for the US Forest Service Region 2 by the Wyoming Natural Diversity Database, Laramie, WY.

Whittemore, A.T. 1997. *Aquilegia*. In: Flora of North America Committee. Flora of North America North of Mexico. Volume 3 Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, NY.



Artemisia biennis var. *diffusa* — Mystery Wormwood

Status:
US Fish and Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G5T1Q/S1

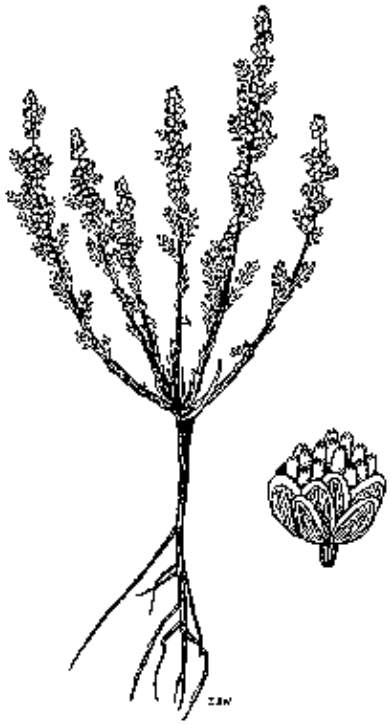
Description: Mystery wormwood is a glabrous to slightly hairy, non-odorous, annual or biennial herb with multiple stems, each up to 30 cm high, originating from the base of the main stem. The stem leaves are mostly 8-17 (26) mm long and once or twice pinnately divided into sharp-toothed segments. The dense, leafy, spike-like inflorescence is glabrous to moderately hairy and consists of numerous small greenish to yellowish flower heads. The receptacle and fruits are glabrous. Seedling or first year plants consist of a stemless basal rosette of once or twice pinnatifid leaves.

Similar Species: *Artemisia biennis* var. *biennis* differs from var. *diffusa* in having longer leaves and a single main stem that usually exceeds 30 cm in height. *A. annua* is an introduced annual with a more open inflorescence of stalked heads. *A. campestris* has linear, pubescent leaves and a longer, more open inflorescence.

Flowering/Fruiting Period: Late August-late September.

Range: Restricted to the Rock Springs Uplift of southwestern Wyoming (Sweetwater County) and the Awapa Plateau in Garfield County, Utah.

Habitat: In Wyoming, Mystery wormwood occurs on clay flats and playas dominated by *Hordeum jubatum, Chenopodium glaucum, Rorippa sinuata,* and *Kochia scoparia* surrounded by thickets of *Sarcobatus vermiculatus* and *Artemisia tridentata* at elevations of 6500 feet.



Above: Artemisia biennis *var.* diffusa *by Isobel Nichols (from Fertig et al. 1994).*

Abundance and Trends: Var. *diffusa* is known from a single occurrence in Wyoming which has not been relocated (despite numerous attempts) since 1980. This population consisted of "hundreds of plants" when discovered by Robert Dorn (Fertig et al. 1999). Mystery wormwood may be extirpated in Wyoming, but was discovered in southern Utah by Kim Anderson of Dixie National Forest in 1999.

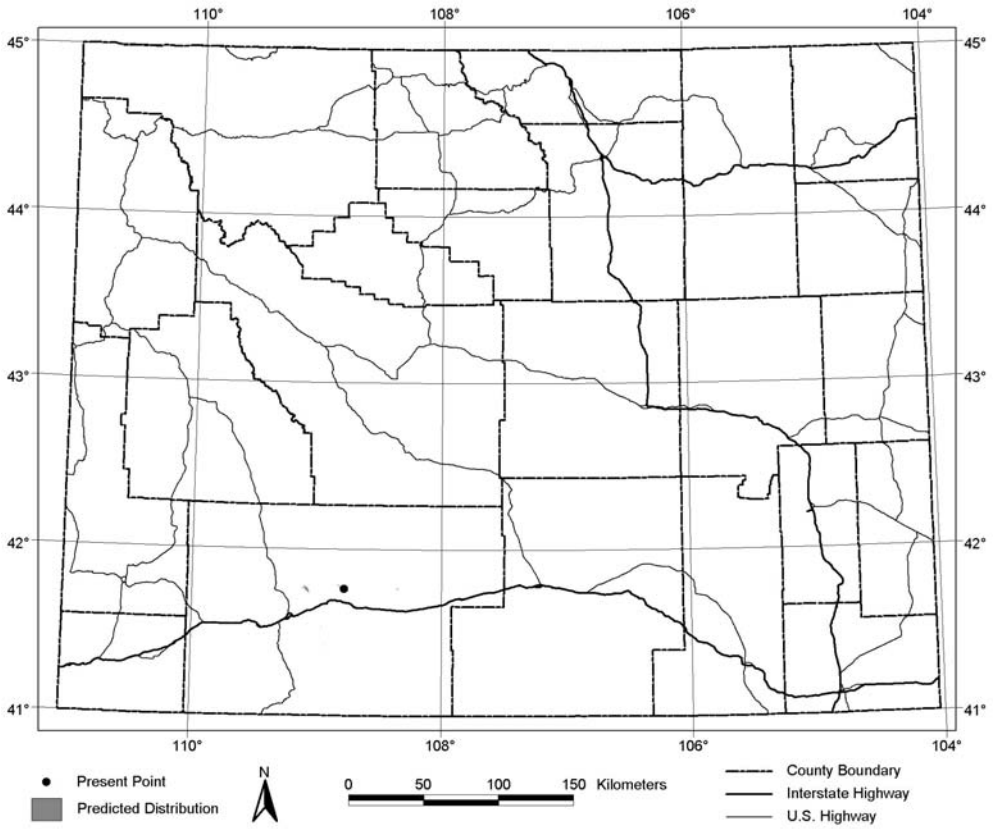
Management Status: The single Wyoming population occurs in a private inholding within the BLM checkerboard in the Rock Springs Field Office. The lands occupied by this species currently have no special management status.

Selected References:

Dorn, R.D. 1988. Vascular Plants of Wyoming. Mountain West Environmental Publ., Cheyenne, WY.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne WY.

Fertig, W., L. Welp, and S. Markow. 1999. Status report on Mystery wormwood (*Artemisia biennis* var. *diffusa*) in southwest Wyoming. Report prepared for the BLM Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.



Artemisia porteri — Porter's Sagebrush

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G2/S2

Description: Porter's sagebrush is a mat-forming perennial subshrub with numerous slender annual stems less than 15 cm tall. The leaves are silvery-pubescent and 2-5 cm long. Stem leaves are mostly entire, while the basal leaves may be entire or 3-lobed. Flower heads are arranged in a long, narrow, leafy spike-like inflorescence. Each head consists of 30-40 disk flowers (ray flowers are lacking) within a pubescent involucre 4.5-7 mm long. Flowers at the center of the head are staminate, while those on the margins produce fruit.

Similar Species: *Artemisia pedatifida* has shorter (6-20 mm long), mostly 3-parted leaves and shorter involucres. *A. longifolia* usually has longer leaves (often over 6 cm) and a more elongate inflorescence (Fertig et al. 1994).

Flowering/Fruiting Period: Flowers from June-July, mature fruits present into August.

Range: State endemic restricted to the Wind River Basin and Powder River Basin in Fremont, Johnson, and Natrona counties.

Habitat: Occurs in sparsely vegetated badlands of ashy or tufaceous mudstones and clay slopes at 5300-6500 feet. In the northern Wind River Basin, this species is found in semi-barren, low desert shrub communities dominated by *Artemisia pedatifida, A. porteri*, or *A. longifolia* on dry, whitish, ashy-clay hills, gravelly-clay flats, and shaley erosional gullies of the Wagon Box Formation.

Abundance and Trends: Porter's sagebrush is known from 8 occurrences, many of which consist of numerous subpopulations. All have been documented since 1979, and six have been relocated or discovered since 1995. Individual colonies often number in the low hundreds to low thousands and typically occupy patches 0.5-10 acres in size. Short-term trend data (1979-96) suggest that populations are stable. E. Collins has noted that this species can recolonize disturbed areas (Environmental Research & Technology 1979).

Above: Artemisia porteri *by Isobel Nichols from Fertig et al. (1994).*

Management Status: All known occurrences are on lands managed by the BLM Buffalo, Casper, and Lander Field Offices. Populations in the Lysite Badlands are included under Porters Sagebrush special management restrictions in the Lysite Badlands (BLM Lander Field Office). Otherwise, most occurrences are on public lands with no formal management designation.

Selected References:

Cronquist, A. 1951. A new *Artemisia* from Wyoming. Madrono 11:145-146.

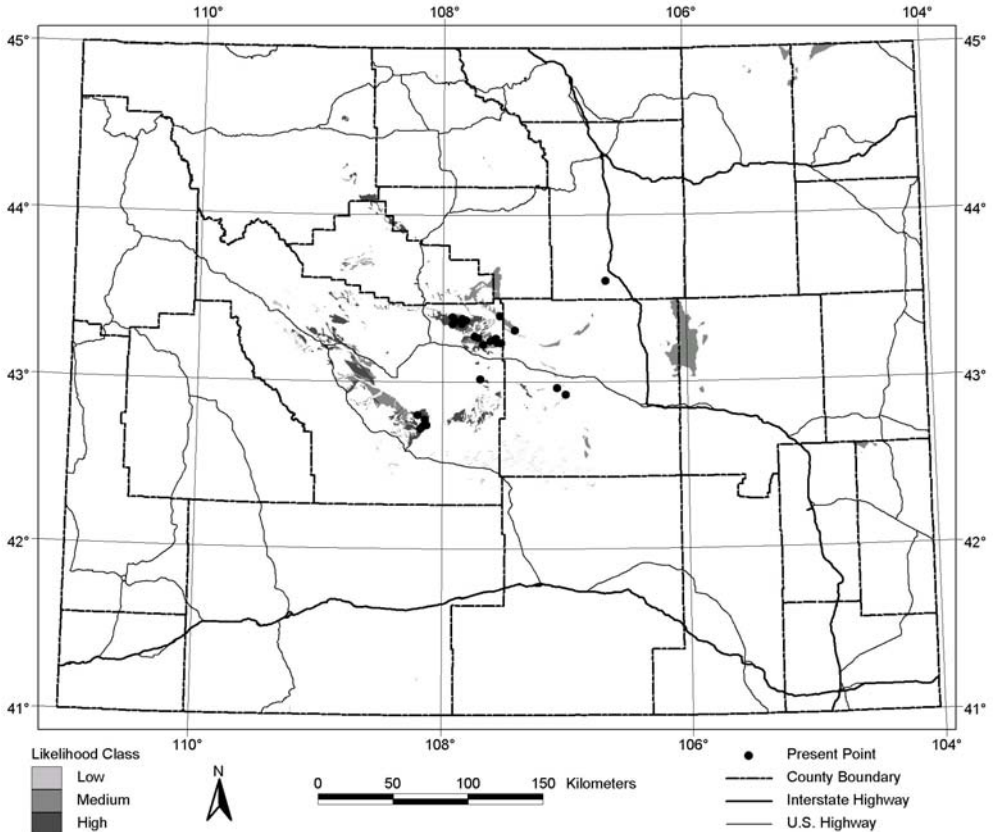
Environmental Research & Technology, Inc. 1979. Studies on distribution of Porter sagewort (*Artemisia porteri*) in the Wind River Basin. Unpublished report prepared for Rocky Mountain Energy Company.

Fertig, W. 2002. Status of Porter's sagebrush (*Artemisia porteri*) in central Wyoming. Report prepared for the BLM Wyoming State Office by Walter Fertig, Botanical Consultant, Kanab, UT.

Fertig, W. and G. Jones. 1997. Plant species of special concern and plant associations of the Copper Mountain ecosystem, Fremont County, Wyoming. Unpublished report prepared for the BLM Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Marriott, H.J. 1986. Evaluation of the Lysite Badlands as a potential Area of Critical Environmental Concern. Prepared for the Bureau of Land Management, Lander Resource Area, by the Wyoming Natural Diversity Database, Laramie, WY.



Astragalus gilviflorus var. *purpureus* — Dubois Milkvetch

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: Wyoming BLM Sensitive
Heritage Rank: G5T2/S2

Description: Dubois milkvetch is a loosely matted perennial herb with a branching caudex. Leaves are silvery pubescent, long-petioled, and divided into three oval leaflets 7-30 mm long. Pea-like flowers are borne in pairs among the densely packed basal rosette of leaves. The banner petal is blue or purple (occasionally pinkish), 12-28 mm long, and has a spoon-shaped blade that tapers evenly to a narrow base. The fruits are upright, elliptical pods that are often hidden among the leaf bases.

Synonyms: *Orophaca triphylla* var. *purpurea; Astragalus shoshonensis* (Roberts 1977) was not validly published.

Similar Species: *Astragalus gilviflorus* var. *gilviflorus* has white or cream colored flowers and a wider geographic distribution. *A. proimanthus* and *A. hyalinus* have fiddle-shaped banner petals. Other milkvetches with three leaflets have smaller flowers.

Flowering/Fruiting Period: Flowering occurs from late May to early July, while fruits are produced from mid June to July.

Range: Local endemic of the Dubois Badlands in the northwestern Wind River Basin and adjacent foothills of the northeastern Wind River and southern Absaroka ranges in Fremont County, Wyoming.

Habitat: Dubois milkvetch occurs primarily in sparsely vegetated cushion plant/bunchgrass communities on sandy-clay soils with abundant surface gravel. These communities may lack a shrub component, or contain widely scattered

Above: *Astragalus gilviflorus* var. *purpureus* by Walter Fertig.

individuals of Wyoming big sagebrush, mountain big sagebrush, or black sagebrush. This species may also be found on semi-disturbed roadbanks with short, sparse vegetation (total cover less than 40%). Populations are typically found on mid to upper slopes near the crest of badland ridges or low knolls at 6400-8800 feet. Soils are mostly derived from the Tertiary Wind River or Indian Meadows formations, although some populations occur on deposits of the Cretaceous Cody Shale, Triassic Chugwater and Dinwoody formations, Paleozoic limestones, or gravelly moraines (Fertig 1998).

Occurrences in Wyoming: Dubois milkvetch is known from 11 extant occurrences, 6 of which have been discovered or relocated since 1990 (most recently in 1997). Several specimens of this taxon (labeled as *A. shoshonensis*) are cited by M.L. Roberts in his 1977 thesis, but have never been relocated. Fertig (1998) conservatively estimated the total population at 100,000-150,000 in 1996. No trend data are available, but there is little

evidence to suggest a large-scale population decline.

Management Status: Known from lands managed by the BLM Lander Field Office, Shoshone National Forest, and the Wind River Indian Reservation. Several occurrences are known from private conservation easements (TNC and Jackson Hole Land Trust). Also found in the Dubois Badlands ACEC and on WY Game and Fish Department wildlife habitat areas.

Selected References:

Dorn, R.D. 1988. Vascular Plants of Wyoming. Mountain West Publ., Cheyenne.

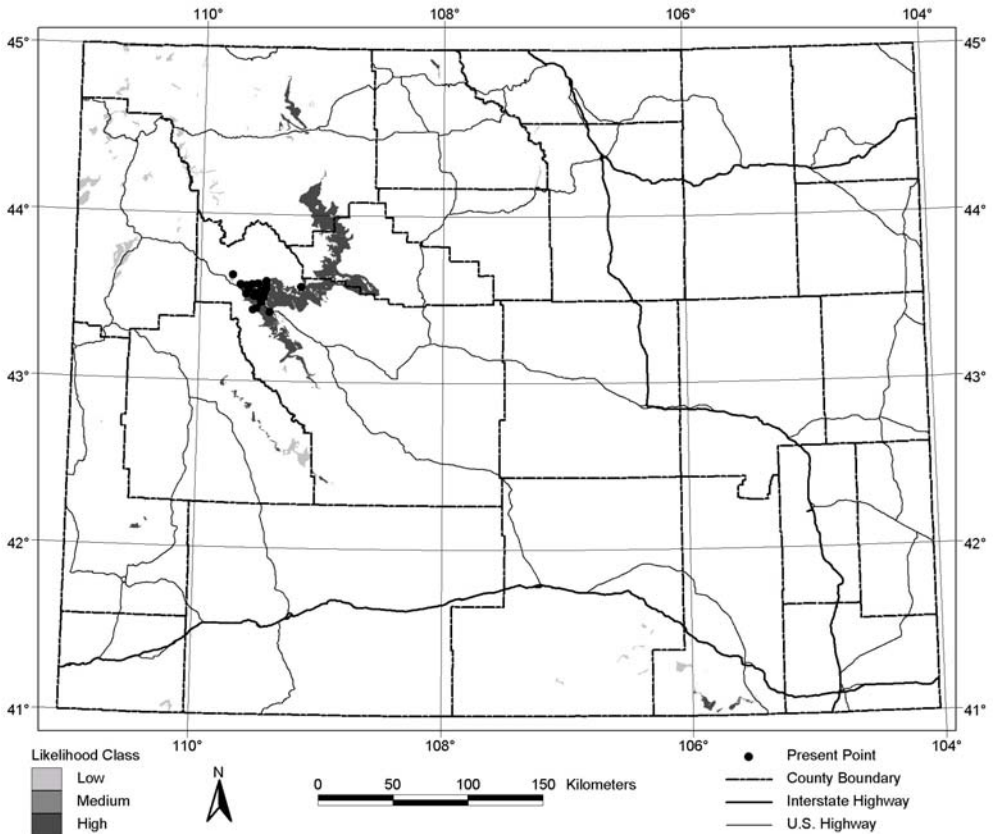
Fertig, W. 1998. Status report on Dubois milkvetch (*Astragalus gilviflorus* var. *purpureus*) in northwestern Wyoming. Unpublished report prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Isely, D. 1998. Native and Naturalized Leguminosae (Fabaceae) of the United States (exclusive of Alaska and Hawaii). Monte L. Bean Life Science Museum, Brigham Young Univ., Provo, UT.

Roberts, M. L. 1977. Systematics of the Orophaca Astragali. Masters Thesis, Department of Botany, University of Wyoming, Laramie, WY.

Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.



Astragalus jejunus var. *articulatus* — Hyattville Milkvetch

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive
Heritage Rank: G3T1/S1

Description: Hyattville milkvetch is a low-growing, multi-stemmed perennial forb. The leaves are pinnately compound, 1-7 cm long, and have 9-21 linear to elliptic leaflets mostly less than 5 mm long and 1.5 mm wide. The terminal leaflet is not continuous with the leafstalk. The inflorescence is a 3-7 flowered raceme. Pea-like flowers are white or tinged with lavender, 5-6.5 mm long, and blunt-keeled. Fruits are stalkless, papery, inflated pods, 12-15 mm long and mottled with red or purple.

Similar Species: *Astragalus jejunus* var. *jejunus* has purplish flowers, shorter stems, and terminal leaflets that are continuous with the leafstalk. *A. ceramicus* has fewer leaflets and larger fruits. *A. kentrophyta* has sharp, spiny-tipped leaflets. *A. miser* var. *decumbens* has greenish-yellow, narrowly elongate, flattened pods and flowers with a sharp-tipped keel

Flowering/Fruiting Period: Late May to early July/early June to mid-July.

Range: Local endemic restricted to the western slopes of the Bighorn Range and eastern rim of the Bighorn Basin (Big Horn County) near Hyattville, Wyoming.

Habitat: Hyattville milkvetch is found primarily in sparsely vegetated cushion plant/ bunchgrass/low shrub communities within a matrix of *Artemisia tridentata/Juniperus osteosperma/Elymus spicatus* or *Chrysothamnus nauseosus/Atriplex canescens* grasslands. Total vegetative cover is typically less than 25-30%. *A. jejunus* var. *articulatus* colonies are found on dry reddish clay soils which are sometimes

Above: Astragalus jejunus *var.* articulatus *by W. Fertig*

mixed with whitish sandstone fragments or inclusions of gypsum. These soils are derived from the Triassic and Permian age Goose Egg and Chugwater formations, but may be intermixed with Permian/Pennsylvanian age Tensleep Sandstone. Populations are found on flats, ridgecrests, and north or west-facing slopes up to 45º. Hyattville milkvetch becomes sparse to absent on lower slopes or adjacent bottoms and swales with loose sand or finer clays and denser shrub cover. Dorn (1989) also notes that this species is sparse to absent on gypsum-rich outcroppings. Populations range in elevation from 4900-5900 feet.

Abundance and Trends: *Astragalus jejunus* var. *articulatus* is currently known from two main occurrences worldwide, consisting of 12 small to medium-sized subpopulations (each ranging in size from 0.2-8 acres). The entire global range is restricted to a narrow belt 5.5 miles x 2.5 miles wide. In 1998-99, Welp and Fertig estimated the population at 5100-6500

plants. These populations are probably stable at present, although they may be subject to annual or short-term fluctuations based on climatic conditions. Laura Welp noted a possible decline during a cursory visit to the two populations in June 2000, probably as a result of drought conditions.

Management Status: The entire range of Hyattville milkvetch falls on lands managed by the BLM Worland Field Office and state of Wyoming. At present, these areas are all managed for multiple use with an emphasis on grazing, mineral development, and recreation.

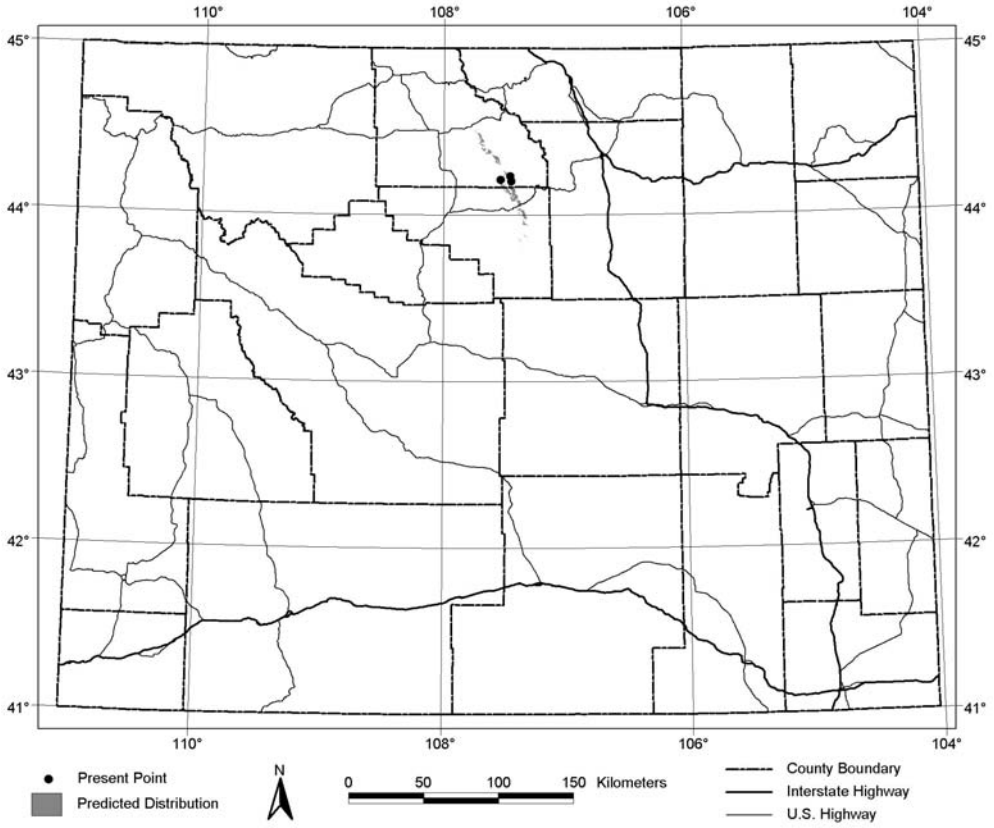
Selected References:

Dorn, R.D. 1988. Vascular Plants of Wyoming. Mountain West Publ., Cheyenne, WY.

Dorn, R.D. 1989. Report on the status of *Astragalus jejunus* var. *articulatus*, a candidate Threatened species. Prepared for the US Fish and Wildlife Service by Mountain West Environmental Services, Cheyenne, WY.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne, WY.

Fertig, W. and L. Welp. 2001. Status of Hyattville milkvetch (*Astragalus jejunus* var. *articulatus*) in Wyoming. Report prepared for the BLM Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.



Astragalus nelsonianus Nelson's Milkvetch

Status:
US Fish & Wildlife Service: None.
Agency Status: WY BLM Sensitive.
Heritage Rank: G2/S2

Description: Nelson's milkvetch is a selenium-scented perennial herb with fleshy-leathery stems 10-30 cm tall. Stems are decumbent at the base and arise from a shallowly buried rootcrown. Lower stipules are papery and fused, while the upper stipules may be free or fused only at the base. Leaves are 4-9 cm long, nearly sessile, and divided into 5-11 linear to oblong leaflets. The leaflets are equally pubescent above and below with short, appressed, basally attached hairs. Individual leaflets are attached directly to the grooved rachis without a distinct joint. The inflorescence is a raceme of 6-20 white flowers with banners over 20 mm long. The calyx tube is 7-9 mm long. Fruits are oblong to elliptical, 15-33 mm long, semi-woody at maturity, and borne on downward-curved stalks.

Synonyms: *Astragalus pectinatus* var. *platyphyllus*.

Similar Species: *Astragalus grayi* has erect to ascending fruits, calyx tubes shorter than 6 mm, and cream-colored flowers. *A. pectinatus* var. *pectinatus* has smaller fruits and extremely narrow leaflets with strongly inrolled margins. *A. bisulcatus* often has purple or bicolored flowers, leaflets jointed to the rachis, and 2-grooved fruit.

Flowering/Fruiting Period: Flowers from mid May-late June. Fruits present from late June-August.

Range: Regional endemic of southwest and central Wyoming, northeast Utah, and northwest Colorado. In Wyoming, it is known from the Wind River, Green River, Washakie, southern Powder River, and Great Divide basins, Owl Creek Mountains, and the Rock Springs Uplift in Fremont, Natrona, and Sweetwater counties.

Above: Astragalus nelsonianus *by W. Fertig.*

Habitat: Occurs on alkaline, often seleniferous, clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders. Known occurrences are found primarily in sparsely vegetated sagebrush, juniper, and cushion plant communities at elevations of 5200-7600 feet.

Abundance and Trends: Nelson's milkvetch is known from 30 extant and 4 historical occurrences in Wyoming (Heidel 2002), over 20 of which have been observed since 1980. Population and trend data are lacking for most sites, but populations are presumed to be stable at present.

Management Status: Found on public lands managed by the BLM Casper, Lander, Rawlins, and Rock Springs Field Offices and Ashley National Forest (Flaming Gorge National Recreation Area). All known populations are on

private or public lands managed for multiple use.

Selected References:

Barneby, R. C. 1964. Atlas of North American *Astragalus*. Memoirs of the New York Botanical Garden 13(II):1-1188.

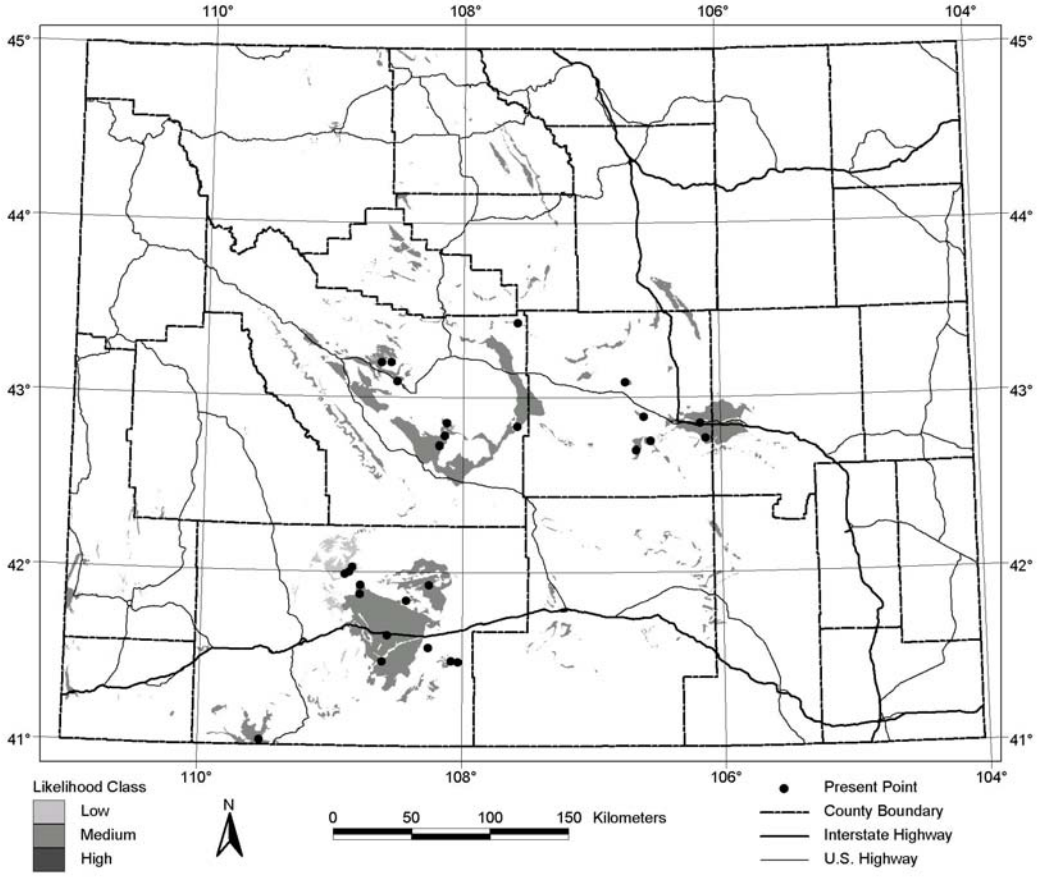
Barneby, R.C. 1989. Fabales, Vol. 3 Part B. IN: A. Cronquist, A. H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. Vascular Plants of the Intermountain West, USA. New York Botanical Garden, Bronx, NY.

Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, Wyoming.

Heidel, B. 2002. Sniffing out endemic *Astragali*. Castilleja 21(3):1.

Jones, G. and W. Fertig. 1996. Plant associations and plant species of special concern in the Jack Morrow Hills Ecosystem. Report prepared for the Bureau of Land Management Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.

Spackman, S., B. Jennings, J. Coles, C. Dawson, M. Minton, A. Kratz, and C. Spurrier. 1997. Colorado Rare Plant Field Guide. Prepared for the Bureau of Land Management, US Forest Service, and US Fish and Wildlife Service by the Colorado Natural Heritage Program, Ft. Collins, CO.



Astragalus proimanthus **Precocious Milkvetch**

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive
Heritage Rank: G1/S1

Description: Precocious milkvetch is a stemless perennial forb forming low cushions 2-3 dm in diameter. The herbage is densely silvery-whitish throughout with ascending, twisted or spreading hairs 1.5-3 mm long. Leaves are densely clustered, 1-3.5 mm long, and have three narrowly oblanceolate to elliptic leaflets 5-9 mm long. Stipules are fused at the back, whitish-membranous, 7-12 mm long, and glabrous except for ciliate margins. The yellow or whitish pea-like flowers (often tinged with lavender or pink) are up to 17 mm long, sessile, erect, and borne in pairs among the basal leaves. The calyx is 8-10.5 mm long with a cylindric tube 6-6.5 mm long. The banner petal is distinctly constricted in the middle (giving the whole banner a fiddle-like shape) and is glabrous on the back. Fruit pods are sessile, 7-10 mm long, narrowly elliptic to ovoid, densely fine-hairy, and have 11-14 ovules.

Synonyms: *Orophaca proimantha*.

Similar Species: *Astragalus gilviflorus* has larger flowers and spoon-shaped banner petals 16-28 mm long. *A. hyalinus* has fiddle-shaped banners that are hairy on the back and smooth pubescence on the stems, calyces, and foliage. An undescribed "orophacoid" *Astragalus* from Park County, Wyoming has predominantly white flowers (often with lavender lines or a lavender tinge) and 6-8 ovules per fruit. Other "*Orophaca*" species of *Astragalus* in Wyoming have smaller flowers (banners are 5-16.5 mm long and calyx tubes under 5.5 mm long) that are borne on short peduncles.

Flowering/Fruiting Period: Late April to mid June/mid May to late July.

Above: Astragalus proimanthus *by Charmaine Refsdal Delmatier (from Fertig et al. 1994).*

Range: *A. proimanthus* is a narrow endemic restricted to the bluffs of the Henry's Fork River and vicinity of McKinnon in the southern Green River Basin in southwestern Sweetwater County, Wyoming.

Habitat: Precocious milkvetch occurs primarily on sparsely vegetated rims and gullied upper slopes of benches, bluffs, and mesa-like ridges at elevations of 6400-7200 feet. It is typically found in cushion plant/bunchgrass communities dominated by *Phlox hoodii*, *Haplopappus nuttallii*, *Cryptantha sericea*, and *Elymus spicatus* in openings within big sagebrush or Utah juniper grasslands. Soils are whitish, fine-textured, dry, shallow, calcareous shale clays covered with a dense layer of coarse cobbles, whitish shaley flakes, and dark volcanic rock derived from the Bridger Formation, or Laney member of the Green River Formation.

Abundance and Trends: Precocious milkvetch is known from 3 extant occurrences (all discovered or relocated in 2000) consisting of 26 subpopulations. Laura Welp documented 2644 plants in 11 colonies in 2000 and estimated the entire state population at 10,500-13,000 (Fertig and Welp 2001). Previously,

Marriott (1989) had estimated the population size at 25,000-40,000 individuals and Robert Lichvar had estimated ca 22,000 individuals in 1981 (Whiskey Basin Consultants 1981). Individual colonies range in size from 0.1-40 acres and may number 10-3200 plants. Trend data from 5 monitoring plots established by Marriott (1989) suggest an overall stable to slightly decreasing population that experiences yearly or short-term fluctuations in size, density, and distribution.

Management Status: Occurs on lands managed by the BLM Rock Springs Field Office and state of Wyoming. One occurrence is found within a Special Status Plant ACEC managed by the BLM .

Selected References:

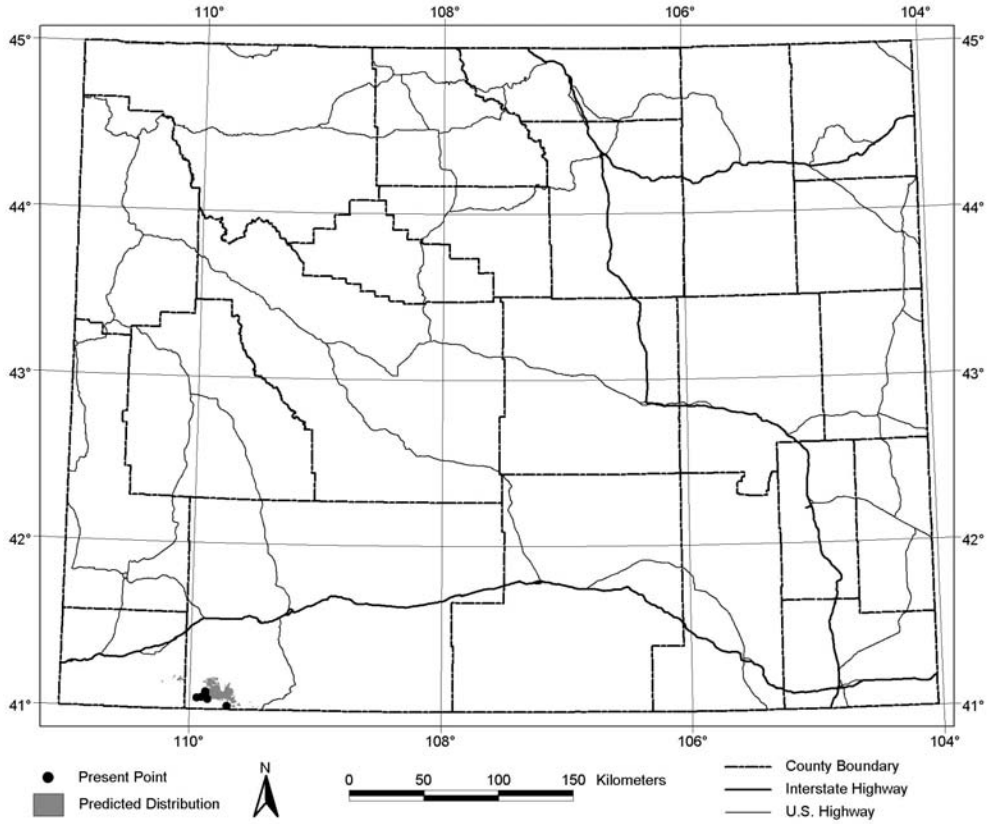
Barneby, R. C. 1964. Atlas of North American *Astragalus*. Memoirs of the New York Botanical Garden 13(II):1-1188.

Fertig, W. and L. Welp. 2001. Status of Precocious milkvetch (*Astragalus proimanthus*) in southwest Wyoming. Prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Marriott, H.J. 1989. Inventory and monitoring of *Astragalus proimanthus* (precocious milkvetch). Prepared for the Bureau of Land Management, Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.

Whiskey Basin Consultants. 1981. Threatened and Endangered Plants Inventory. Unpublished report prepared for the Wyoming Bureau of Land Management.



Astragalus racemosus var. *treleasei* — Trelease's Racemose Milkvetch

Status:
US Fish & Wildlife Service: None
Agency Status: WY BLM Sensitive
Heritage Rank: G5T2/S1

Description: Trelease's racemose milkvetch is a perennial, selenium-scented forb with erect, nearly glabrous green stems 20-55 cm tall. Stipules are 3-12 mm long and fused around the stem opposite of the petiole on the lowermost leaves, but mostly free on the upper leaves. Leaves are 6-15 cm long and pinnately compound with 9-19 lance-elliptic leaflets that are jointed to the rachis. The inflorescence is a raceme of 20-60 nodding flowers. The calyx is 8-11 mm long with a glabrous or sparsely white or black-hairy tube 4-6 mm long. Petals are white to cream-colored with a banner 12.5-16.5 mm long and a spotted keel. Fruiting pods are glabrous, drooping, and have a stipe-like base nearly as long as the calyx tube. At maturity, the pod is compressed trigonously, giving the fruit a 3-sided appearance, with each side flat or slightly concave but not deeply grooved. The body of the mature pod is 1-2 cm long and is less than 4 times as long as wide.

Similar Species: *Astragalus racemosus* var. *racemosus* and var. *longisetus* are Great Plains forms of this species with 17-31 leaflets per leaf and mature pods that are mostly 2-3 cm long and more than 4 times as long as wide. *A. bisulcatus* has purple or cream-colored flowers and dorsiventrally compressed fruiting pods with a deep grove down the middle of the lower side. *A. nelsonianus* has banners over 22.5 mm long, fruits that are two-sided and sharply angled on the margins, and leaflets confluent with the rachis.

Flowering/Fruiting Period: June-July/July to early August.

Above: Astragalus racemosus *var.* treleasei *by Walter Fertig.*

Range: Regional endemic of southwestern Wyoming and the Uinta Basin of northeastern Utah. In Wyoming, this species is known only from the Green River Basin and eastern foothills of the Wyoming Range in Sublette and Uinta counties.

Habitat: In Wyoming, var. *treleasei* is found on barren hills and washes of clay, shale, limestone, or sandstone at 6500-8200 feet. Rangewide, this species often occurs on selenium-rich soils.

Abundance and Trends: Known from 11 extant and 1 historical occurrences in Wyoming following surveys in 2002 (Heidel 2002). Trends are not currently known.

Management Status: This species occurs on lands managed by the BLM Kemmerer and Pinedale field offices.

Selected References:

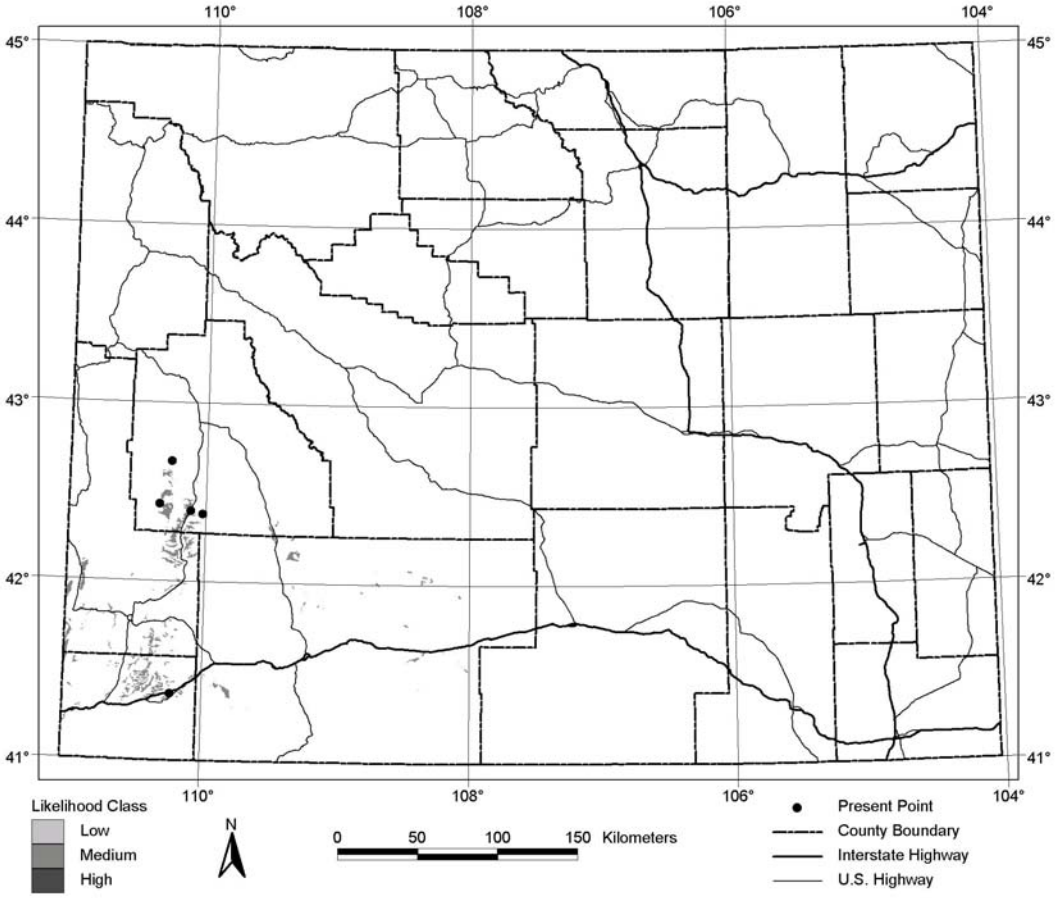
Barneby, R.C. 1964. Atlas of North American *Astragalus*. Memoirs of the New York Botanical Garden 13:1-1188.

Barneby, R.C. 1989. Fabales, Vol. 3 Part B. In: A. Cronquist, A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. Intermountain Flora: Vascular Plants of the Intermountain West, USA. New York Botanical Garden, Bronx, NY.

Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.

Heidel, B. 2002. Sniffing out endemic *Astragali*. Castilleja 21(3):1.

Porter, C.L. 1945. Two tioid *Astragalus* novelties from the Rocky Mountain region. Madrono 8(3): 99-102.



Boechera pusilla — Small Rockcress

Status:
US Fish & Wildlife Service: None (formerly a C1 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G1/S1

Description: Small rock cress is a perennial herb with 2-several decumbent stems up to 17 cm long. The basal leaves are linear and erect with relatively sparse simple, biforked, or triforked spreading hairs. The 3-5 stem leaves are sessile, non-clasping and widely spaced. Flowers are light-lavender, 4-petaled, and 3.5-4.5 mm long. The fruits are glabrous, linear siliques (1-3.8 cm long and 2 mm wide) that spread at right angles from the drooping main stem on pedicels 3 mm or shorter.

Synonym: *Arabis pusilla*

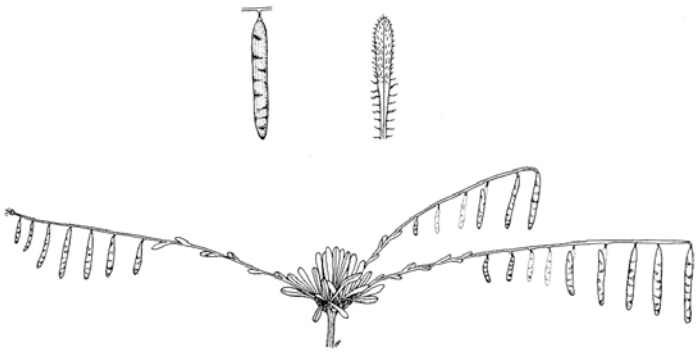
Similar Species: *Boechera* [*Arabis*] *demissa* var. *languida* differs in having narrower (usually 1.5 mm wide) drooping fruit on pedicels 3-6 mm long. *B. pendulina* var. *russeola* has mostly simple, ciliate hairs on the basal leaves and spreading to drooping fruit. Other *Boechera* species differ in having either ascending fruit or densely appressed pubescence.

Flowering/Fruiting Period: May-July/mid-June to July.

Range: State endemic restricted to the southern Wind River Range (South Pass area) in Fremont County, Wyoming

Habitat: Crevices and sparsely vegetated, coarse granite soil in granite-pegmatite outcrops surrounded by sagebrush grassland at 8000-8100 feet.

Abundance and Trends: *B. pusilla* is known from a single population, last surveyed in 1997.



Above: Boechera pusilla *in fruit by Isobel Nichols (from Fertig et al. 1994).*

Recent population estimates place the total population at 600-1000 individuals in less than 60 acres of potential habitat. Long-term trend data are not available.

Management Status: Small rockcress is known only from lands managed by the BLM Rock Springs Field Office. The population near South Pass occurs in a Special Status Plant Area of Critical Environmental Concern created in the 1997 BLM Green River Resource Area Resource Management Plan.

Selected References:
Dorn, R.D. 1990. Report on the status of *Arabis pusilla*, a candidate Threatened species. Prepared for the US Fish and Wildlife Service by Mountain West Environmental Services.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land

Management by the Wyoming Natural Diversity Database, Laramie, WY.

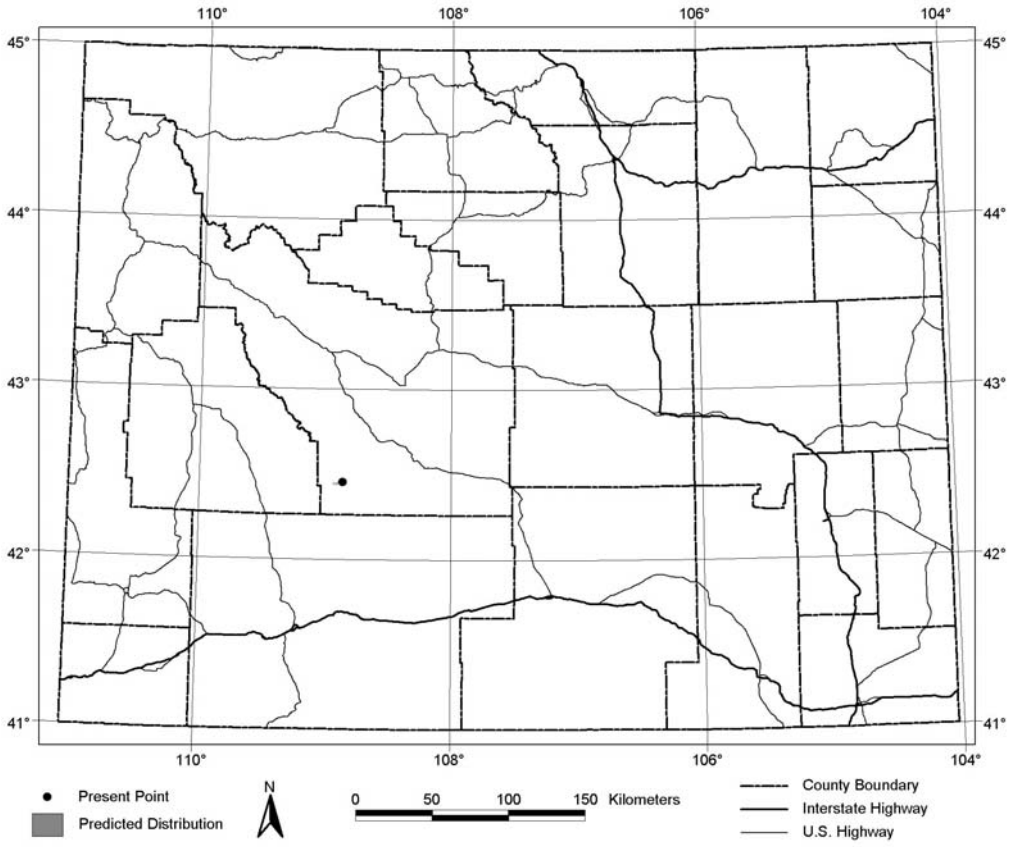
Prepared for the US Fish and Wildlife Service by the Wyoming Natural Diversity Database, Laramie, WY.

Marriott, H.J. 1988. Draft habitat management plan for threatened, endangered and sensitive plant species and their habitats on the Rock Springs District, Bureau of Land Management. Prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.

Marriott, H.J. 1986. A report on the status of *Arabis pusilla*, a Candidate Threatened species.

Rollins, R.C. 1983. Studies in the Cruciferae of western North America. Journal of Arnold Arboretum 64: 491-510.

Rollins, R.C. 1993. The Cruciferae of Continental North America, Systematics of the Mustard Family from the Arctic to Panama. Stanford Univ. Press, Stanford, CA.



Cirsium aridum — Cedar Rim Thistle

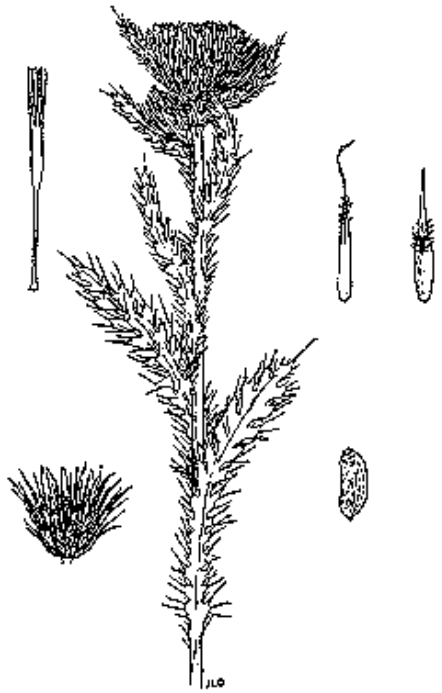
Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act)
Agency Status: WY BLM Sensitive.
Heritage Rank: G2Q/S2

Description: Cedar Rim thistle is a perennial taprooted herb with loosely to densely woolly-hairy stems up to 30 cm tall. Stem leaves are alternate, shallowly to deeply pinnately lobed, and decurrent. Spines on the leaf margins are 2-8 mm long. The leaf surface is loosely white to gray hairy above and densely white-woolly below. One to four heads of lavender flowers are crowded at the tip of the stem. The involucre is sparsely hairy to nearly glabrous and consists of long, spine-tipped outer bracts and spineless inner bracts. Ripe achenes are cream-colored with fine brown streaks and lack a yellow collar at the tip.

Similar Species: *Cirsium pulcherrimum* is usually taller, with greenish, glabrous upper leaf surfaces and fruit with a distinctive yellow apical collar. Pubescent forms of *C. pulcherrimum* can be further distinguished by having a more elongate inflorescence of more than 4 flower heads and unclustered stems that are thickened at the base. *C. hookerianum* has densely pubescent involucre bracts and dark fruit. *C. subniveum* typically has a more open inflorescence with heads on woolly, spineless stalks, short-clasping upper stem leaves and involucres with stringy hairs connecting adjacent bracts.

Flowering/Fruiting Period: June-July.

Range: *C. aridum* is endemic to central Wyoming, where it is found in the Green River Basin in Sublette County, Beaver Rim area of Fremont County, Sweetwater River Valley in Carbon County, and the east side of Flaming Gorge in Sweetwater County. Reports from the Great Divide Basin are apparently based on misidentified specimens of *C. pulcherrimum*.



Above: Cirsium aridum *by Jane Dorn (from Fertig et al. 1994).*

Habitat: Typically occurs on barren slopes, fans, and draws on whitish-gray sandstone, chalk, tufaceous colluvium, or clay substrates derived from the Split Rock, White River, Wagon Bed, Wind River, Green River, and Wasatch formations in bunchgrass or cushion plant communities in openings within Wyoming big sagebrush grasslands.

Abundance and Trends: *C. aridum* is currently known from 12 extant occurrences in Wyoming. Fertig (1995 b) conservatively estimated the state-wide population at 40,000-50,000 plants on 150 acres of habitat in 1994.

Populations are probably stable at present, although long-term trend data are lacking.

Management Status: Occurs on lands managed by the BLM Lander, Pinedale, Rawlins, and Rock Springs field offices. A portion of one population is found in the Beaver Rim ACEC.

Selected References:

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publ., Cheyenne, WY.

Fertig, W. 1995 a. Status report on *Cirsium aridum* in west-central Wyoming. Report prepared for the BLM Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W. 1995 b. Update and corrections to the status report on *Cirsium aridum* in west-central Wyoming. Report prepared for the BLM Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.

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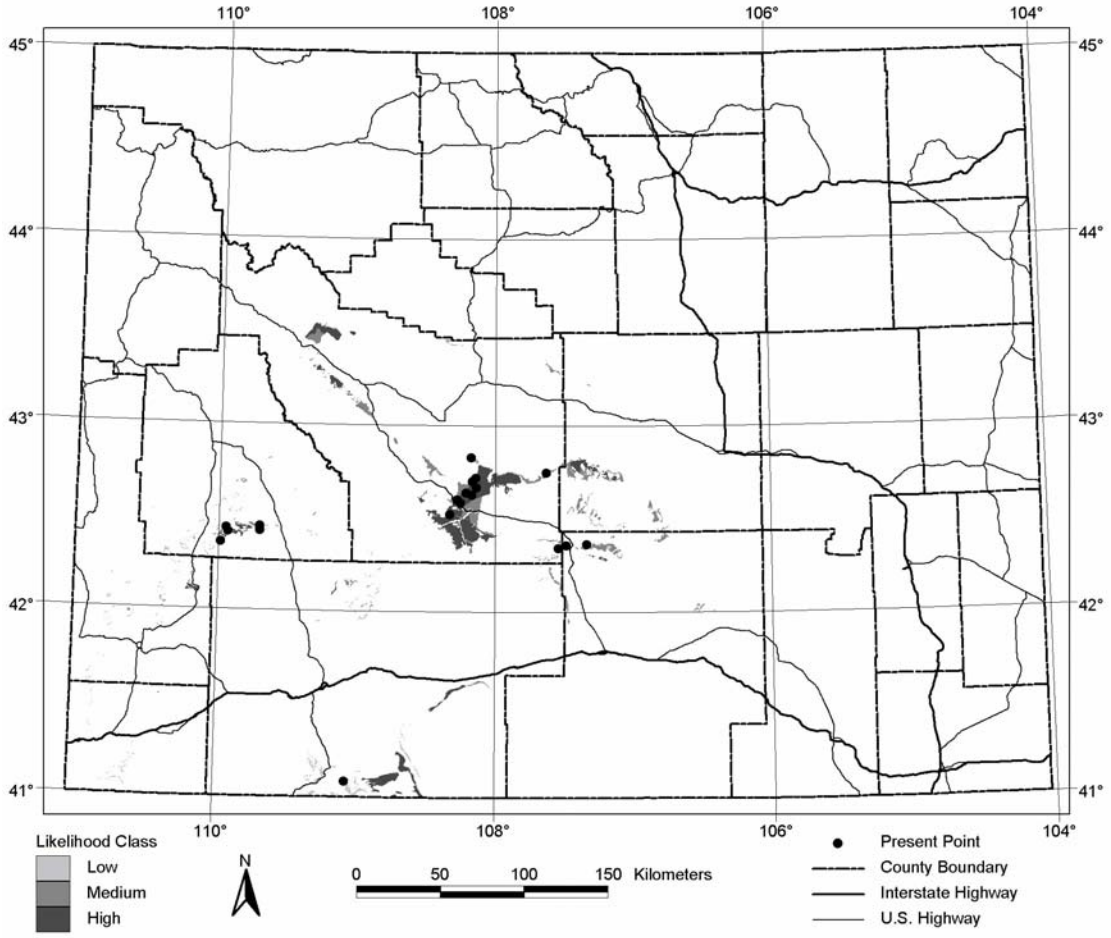
Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.



Cirsium ownbeyi **Ownbey's Thistle**

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G3/S2

Description: Ownbey's thistle is a perennial taprooted herb with stems 50-70 cm high. The stems are lightly pubescent (although often glabrate below the inflorescence) and spiny-winged along the internodes. Leaves are green, glabrous, and thrice pinnately compound with finely divided, spiny lobes. Flower heads are located at the tip of the stem and are not densely clustered. The involucre is 1.8-2.5 cm long and composed of spine-tipped bracts with lightly pubescent margins. Hairs on the bracts often lack cross walls or are very slender. Flowers are white to rose.

Similar Species: *Cirsium eatonii* (including *C. tweedyi*) differs in having densely cobwebby-pubescent involucre bracts, pubescent upper leaves, and woolly upper stems. The hairs of *C. eatonii* and *C. hookerianum* typically have prominent cross-walls and are flatter and broader than those of *C. ownbeyi*.

Flowering/Fruiting Period: Late June to September.

Range: *Cirsium ownbeyi* is a regional endemic of northeast Utah, southwest Wyoming, and northwest Colorado. In Wyoming, it is restricted to the Green River Basin on the east side of Flaming Gorge Reservoir in Sweetwater County.

Habitat: In Wyoming, *C. ownbeyi* is found primarily on semi-barren rims or steep slopes of broken gray slate below shaley cliffs at 6440-8200 feet. Populations are usually found in sparsely vegetated openings within a matrix of

Above: Cirsium ownbeyi *by Walter Fertig.*

Artemisia tridentata, Atriplex confertifolia, Chrysothamnus viscidiflorus, Purshia tridentata, Juniperus osteosperma, Cercocarpus montanus, or *Amelanchier alnifolia* shrublands. Most occurrences are on sandy clay soils covered by bleached and broken whitish, red, or bluish-gray limey-slate fragments derived from the Eocene Green River Formation. In some sites rock chips may form a layer 15-17.5 cm thick and provide nearly 80% of the ground cover. On slate flats and rim tops, *C. ownbeyi* may occur in low forb or cushion plant communities dominated by *Leptodactylon caespitosum* and *Haplopappus armerioides*. Populations may also occur on roadcuts, especially if the surrounding shrub and graminoid cover is low and slate gravel is exposed on the surface.

Abundance and Trends: Ownbey's thistle is currently known from 7 extant occurrences, all of which were discovered or relocated in 1998. Individual populations of Ownbey's thistle range in size from fewer than 10 to nearly 40,000 plants. Fertig (1999) estimated the state population at 56,000-75,000 plants in 1998. Populations are probably stable, although corroborating long term monitoring studies are not available.

Management Status: Occurs on lands managed by the BLM Rock Springs Field Office, Flaming Gorge National Recreation Area (Ashley National Forest), and the state of Wyoming. One occurrence is within the Currant Creek ACEC, and one other is on state lands within the BLM's Sage Creek ACEC.

Selected References:

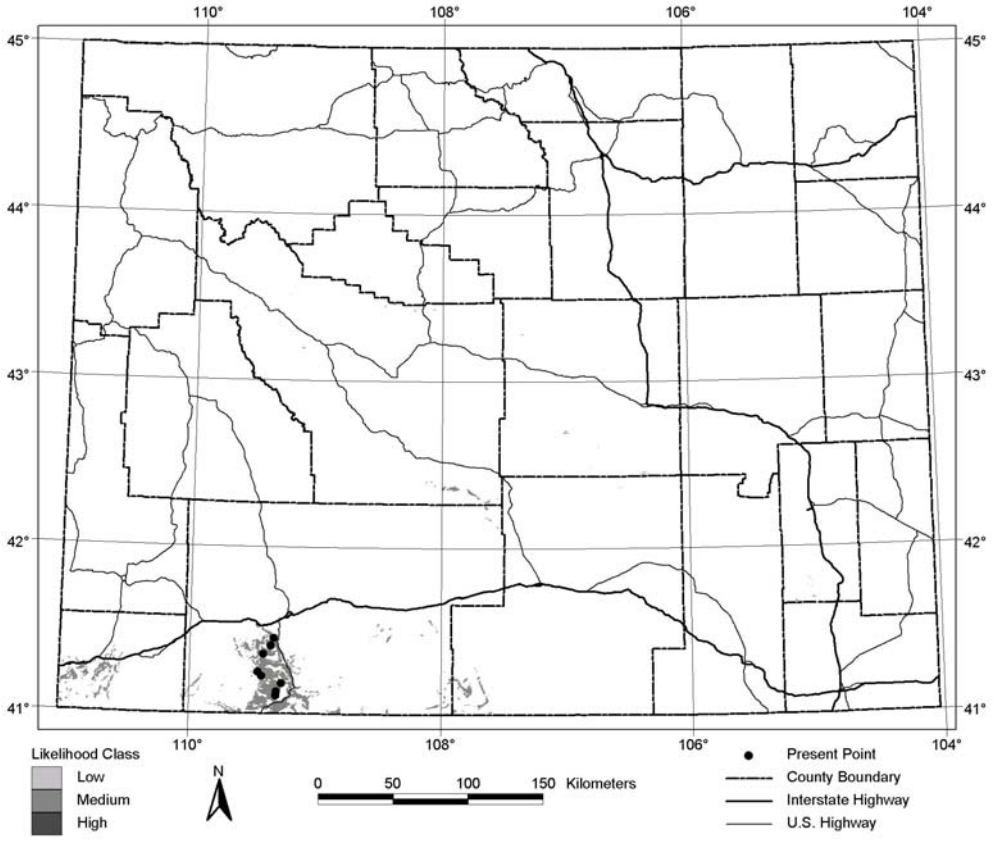
Atwood, D. et al. 1991. Utah Threatened, Endangered, and Sensitive Plant Field Guide. US Forest Service Region 4, National Park Service, Bureau of Land Management, Utah Natural Heritage Program, US Fish & Wildlife Service, EPA Region 8, Navajo Natural Heritage Program, Skull Valley Goshute Tribe.

Fertig, W. 1999. Status report on Ownbey's thistle (*Cirsium ownbeyi*) in southwest Wyoming. Report prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, Wyoming.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Spackman, S., B. Jennings, J. Coles, C. Dawson, M. Minton, A. Kratz, and C. Spurrier. 1997. Colorado Rare Plant Field Guide. Prepared for the Bureau of Land Management, US Forest Service, and US Fish and Wildlife Service by the Colorado Natural Heritage Program, Ft. Collins, CO.

Welsh, S. L. 1982. New taxa of thistles (*Cirsium*; Asteraceae) in Utah. Great Basin Naturalist 42 (2): 199-202.



Cleome multicaulis Many-Stemmed Spider-Flower

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G2G3/S1

Description: Many-stemmed spider-flower is a slender, glabrous annual forb with erect, unbranched or sparingly branched leafy stems 20-70 cm tall. The leaves are sessile (or nearly so) and palmately compound with 3 narrow leaflets 1-2 cm long and less than 1.5 mm wide that may be folded along the midrib. Flowers have 4 pink or pinkish-white petals 4-6 mm long and are borne on thin stalks in the axils of reduced leaves. The 6 stamens are equal in length to the petals. Fruits are narrow, multi-seeded capsules up to 2 cm long with a stalk-like base (gynophore) and droop at maturity. Seeds are light brown, smooth, nearly globose, and less than 2.5 mm.

Similar Species: *Cleome serrulata* is more robust, with broader leaflets, larger fruit, and entire (undivided) flower bracts, and has stamens that are much longer than the petals. *C. lutea* has yellow flowers.

Flowering/Fruiting Period: June-August

Range: Central Mexico (near Mexico City) to southeast Arizona, southwest New Mexico, and southwest Texas, with disjunct populations in south-central Colorado and central Wyoming. In Wyoming, populations are restricted to the Sweetwater River Valley in Natrona County.

Habitat: In Wyoming, *Cleome multicaulis* is found primarily on whitish, alkali-rich, strongly hydrogen-sulfide scented soils bordering shallow, spring-fed playa lakes or dried lakebeds. Populations are most abundant on damp (but not flooded) flats with approximately 90% cover of *Spartina gracilis, Distichlis stricta, Juncus balticus, Puccinellia nuttalliana, Scirpus nevadensis*, and *Triglochin maritimum* bordering playa lakes. This species may also be present in lower numbers on clayey dunes surrounding alkaline lakes with less than 50% cover of *Spartina, Triglochin*, and *Sporobolus airoides* or on low hummocks of *Sarcobatus vermiculatus*. All Wyoming colonies occur at about 5860 feet elevation.

Above: Cleome multicaulis *by Walter Fertig.*

Abundance and Trends: Known from a single extant site in Wyoming, last observed in 2001. A second record from 6 miles east of the known colony has not been relocated in follow-up surveys. The label information from this latter specimen may be erroneous, and the two sites are actually confluent. Surveys in 1999-2000 documented approximately 500,000-1,000,000 individuals in 200 acres. Density ranges from 135-1300 individuals per square meter, depending on habitat quality. Population size

may fluctuate annually, depending on moisture conditions and seed bank size.

Management Status: Occurs on lands managed by the BLM Casper Field Office and Pathfinder National Wildlife Refuge.

Selected References:

Fertig, W. 1993. Field Survey for *Cleome multicaulis*, *Cymopterus williamsii*, and *Sullivantia hapemanii* in north-central Wyoming. Report prepared for the Casper District, BLM, by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W. 2000. Status of Many-stemmed spider-flower (*Cleome multicaulis*) in Wyoming. Report prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.

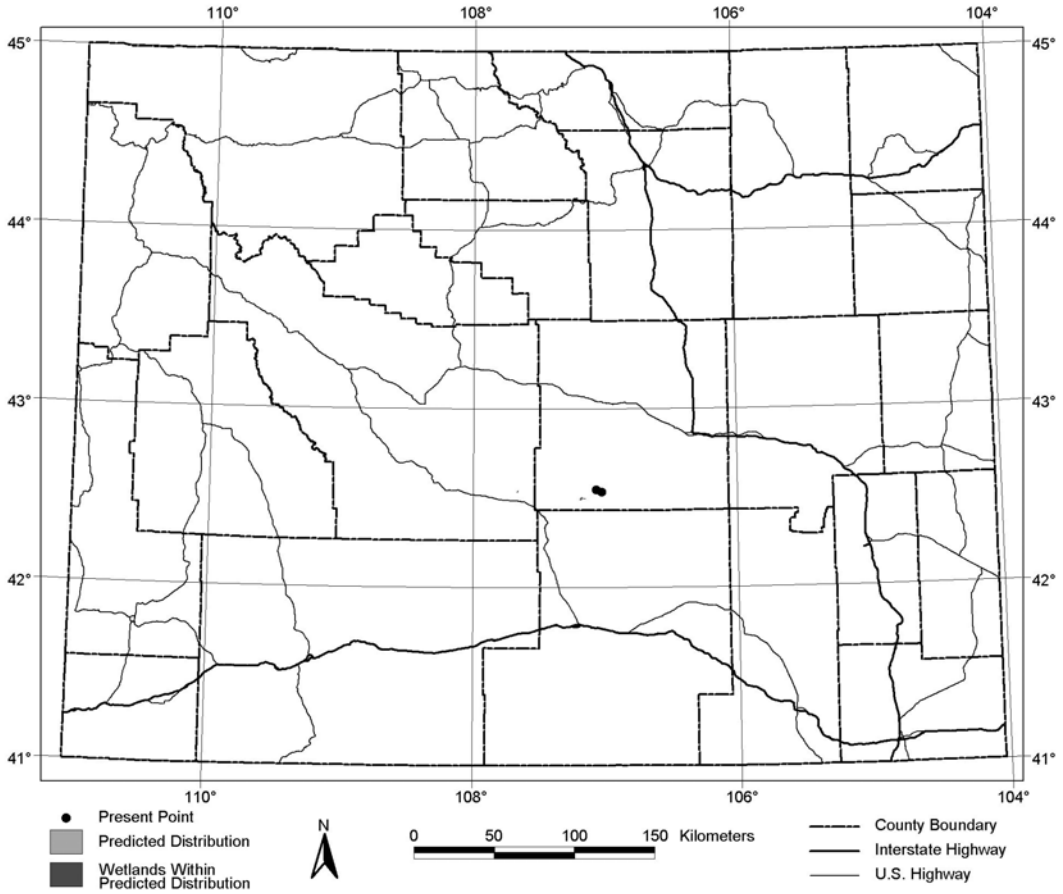
Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Iltis, H. H. 1958. Studies in the Capparidaceae - V. Capparidaceae of New Mexico. The Southwestern Naturalist 3: 133-144.

New Mexico Native Plant Advisory Committee. 1984. A Handbook of Rare and Endemic Plants of New Mexico. University New Mexico Press, Albuquerque, NM.

Riley, C.D. 2001. Population dynamics and habitat characteristics of *Cleome multicaulis*, an annual wetland halophyte of the San Luis Valley. Doctoral dissertation, Colorado State University, Ft. Collins, CO.

Spackman, S., B. Jennings, J. Coles, C. Dawson, M. Minton, A. Kratz, and C. Spurrier. 1997. Colorado Rare Plant Field Guide. Prepared for the Bureau of Land Management, US Forest Service, and US Fish and Wildlife Service by the Colorado Natural Heritage Program, Ft. Collins, CO.



Cryptantha subcapitata — Owl Creek Miner's Candle

Status:
US Fish & Wildlife Service: None (formerly listed as a C2 candidate by the US Fish and Wildlife Service).
Agency Status: WY BLM Sensitive.
Heritage Rank: G1/S1

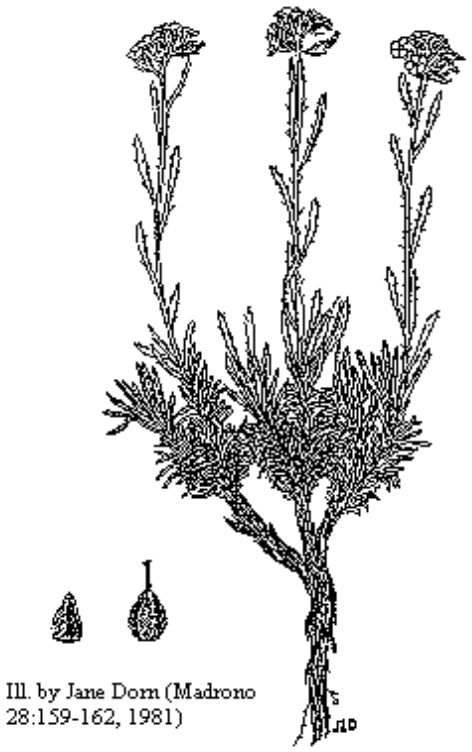
Description: Owl Creek miner's candle is a mat-forming perennial herb averaging less than 15 cm high. The leaves are linear to oblanceolate, 1-3 mm wide, and densely pubescent with both appressed, short hairs and longer, spreading, bulbous-based hairs. The inflorescence is head-like, with white flowers 5-6 mm broad that barely exceed the calyx tube in length. The nutlets are wrinkled and bumpy on the back and are enclosed by the pubescent calyx lobes. The slender style persists in fruit and exceeds the nutlets by 1.5-2 mm.

Similar Species: *Cryptantha caespitosa* has an elongate inflorescence and styles exceeding the nutlets by less than 0.5 mm. *C. spiculifera* has a longer inflorescence and closed nutlet scars (nutlet scars are the remnants of the common point of attachment of the 4 nutlets and are open in *C. subcapitata*). Other Wyoming species of *Cryptantha* are either annual, have smooth nutlets, or non-matted stems.

Flowering/Fruiting Period: late May-June/ mid June-mid July.

Range: Narrow endemic of the Owl Creek and Bridger Mountains in the vicinity of Boysen Reservoir and the northern Wind River Basin in Fremont County, Wyoming.

Habitat: Occurs on sandy-gravelly slopes and desert ridges in sparsely vegetated cushion plant communities, often dominated by *Sphaeromeria capitata* or *Artemisia nova*. This species appears to be restricted to sandstones and conglomerates derived from the Eocene Wind River Formation, although it has been reported from limestones (Dorn 1989).



Above: Cryptantha subcapitata *by Jane Dorn (from Fertig et al. 1994).*

Abundance and Trends: Known from 3 extant populations (last surveyed in 1996). One additional occurrence has not been relocated since 1958 and may represent a different taxon according to Dorn (1989). Dorn (1989) estimated the total population to be ca 38,000 plants in an area of 1460 acres. Trends are not known, but assumed to be stable.

Management Status: Occurs on lands managed by the BLM Lander Field Office, Boysen State Park, and the Wind River Indian Reservation. All known populations are on lands managed for multiple use.

Selected References:

Dorn, R.D. 1989. Report on the status of *Cryptantha subcapitata*, a Candidate Threatened species. Prepared for the US Fish and Wildlife Service by Mountain West Environmental Services, Cheyenne, WY.

Dorn, R.D. and R.W. Lichvar. 1981. A new species of *Cryptantha* (Boraginaceae) from Wyoming. Madrono 28 (3): 159-162.

Fertig, W. 1993. Field survey for *Cryptantha subcapitata*, *Physaria eburniflora*, and *Sphaeromeria simplex* on Bureau of Land Management lands in Central Wyoming. Prepared for the Casper District, Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W. and G. Jones. 1997. Plant species of special concern and plant associations of the Copper Mountain ecosystem, Fremont County, Wyoming. Unpublished report prepared for the BLM Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.

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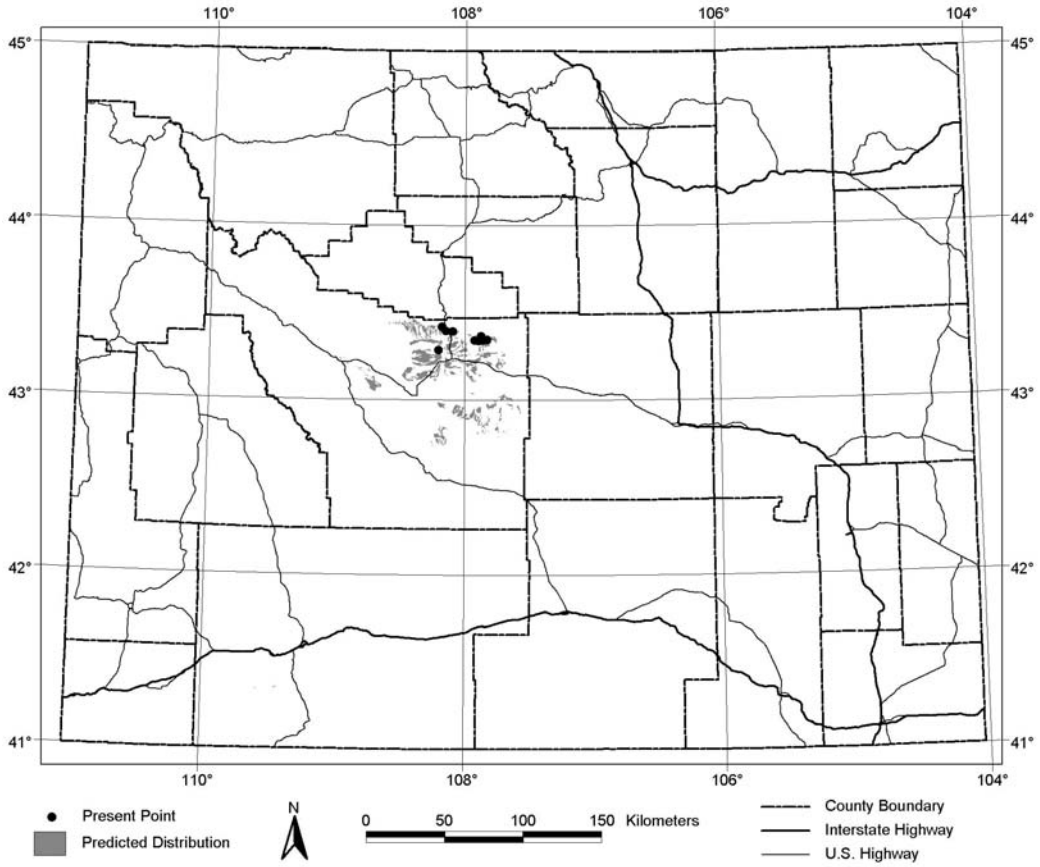

Cymopterus evertii — Evert's Spring-Parsley

Status:
US Fish & Wildlife Service: None.
Agency Status: WY BLM Sensitive.
Heritage Rank: G2G3/S2S3

Description: Evert's spring-parsley is a tufted perennial herb with stems 1-19 cm tall from a multi-branched root crown covered by persistent leaf bases. The rough-pubescent, lance-shaped leaf blades are 1.5-6 cm long and 0.5-1.6 cm wide, and once or twice pinnately compound with 5-8 pairs of pinnae. Crushed foliage is strongly aromatic, with the odor of orange peels. The inflorescence is a compact umbel of white flowers borne on a leafless stalk that exceeds the leaves at maturity. Fruits are flattened on their dorsal side, reddish-brown to purplish with thick white ribs, and covered with short, rough hairs.

Similar Species: *Cymopterus longilobus* has glabrous foliage, leaf blades over 5 cm long with sharp-tipped leaflets, yellow flowers and *C. nivalis* has glabrous ovaries and fruits with thin wing margins.

Flowering/Fruiting Period: April-July/June-August.

Range: Regional endemic of NE Utah and NW Wyoming. In Wyoming, known only from the Absaroka Range and Bighorn Basin in Hot Springs and Park counties.

Habitat: Occurs on coarse volcanic soils or occasionally on sandstone with cushion-forming forbs, and on open or partially shaded rock outcrops and ridges adjacent to juniper or limber pine stands at 5900-10900 feet.

Abundance and Trends: *C. evertii* is known from 24 extant occurrences in Wyoming (most recently surveyed in 1998). Populations number in tens of thousands of individuals (Marriott 1988). Trends appear to be stable, although data are lacking for nearly all populations.

Above: Cymopterus evertii *by Walter Fertig.*

Management Status: Found on lands managed by Shoshone National Forest and the BLM Cody and Worland Field Offices. At least 6 occurrences are in the Washakie Wilderness Area and 2 are within the BLM Carter Mountain ACEC. Populations may also occur on a TNC easement near Meeteetse.

Selected References:
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Fertig, W., L. Welp, and S. Markow. 1999. Status report on Evert's waferparsnip (*Cymopterus evertii*) in northwestern Wyoming. Report prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, Wyoming.

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Marriott, H.J. 1988. Survey of sensitive plant species on Shoshone National Forest. Unpublished report prepared for Shoshone National Forest by the Wyoming Natural Diversity Database, Laramie, WY.

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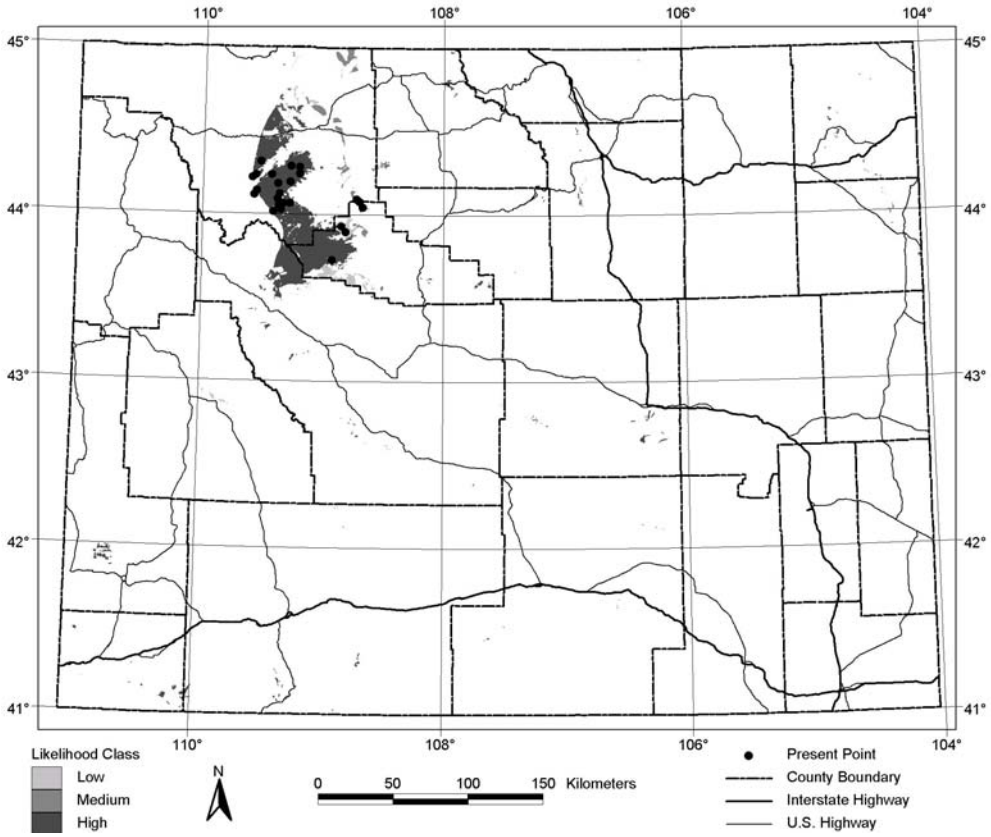
Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.



Cymopterus williamsii — Williams' Spring-Parsley

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G3/S3

Description: Williams' spring parsley is a tufted, perennial herb with basal, once-pinnately compound leaves and a flowering stalk 5-10 cm tall. Leaves are usually glabrous, somewhat leathery, and distinctly bluish or grayish green. The inflorescence is a ball-like, compound umbel of small yellow flowers. Fruits are glabrous, broadly elliptic to oval, and slightly rounded with prominent ribs on the surface (although these are not thin and wing-like as in many other species of *Cymopterus*).

Similar Species: Other species of *Cymopterus* differ in having erect stems, flattened fruit, or leaves that are twice or more compound. *Shoshonea pulvinata* is distinguished by its scabrous fruit. Vegetative specimens of *Astragalus miser* var. *decumbens* differ in having pubescent leaves.

Flowering/Fruiting Period: May-mid-June/ June-July.

Range Endemic to the Bighorn Mountains of north-central Wyoming in Bighorn, Johnson, Natrona, and Washakie Counties.

Habitat: *Cymopterus williamsii* occurs primarily on open, south or east-facing ridgetops and upper slopes with exposed limestone outcrops or talus at 6000-8300 feet. Soils tend to be thin, sandy, and often restricted to small cracks or pockets in limestone bedrock. Barren rock can provide up to 50% of total cover. This species is usually absent or very uncommon where grass cover is high or where *Cercocarpus ledifolius* and *Pinus ponderosa* are dominant. It also tends to be absent from lower slopes or valley bottoms with deeper or better developed soils. Common associates include *Astragalus miser* var. *decumbens*, *A. spatulatus*, *Lesquerella alpina*, *Paronychia depressa*, and *Hymenoxys acaulis*.

Above: Cymopterus williamsii *by Walter Fertig*

Abundance and Trends: Known from 23 extant occurrences in Wyoming (last observed in 1999). Populations are often quite large and the species may be one of the dominant plants in specific microsites. Approximately 72,000 plants were located during 1992 surveys on BLM lands in the southern Bighorn Range (Fertig 1993). Populations are probably stable.

Management Status: Occurs on lands managed by Bighorn National Forest and the BLM Buffalo, Casper and Worland Field Offices. All known occurrences are found on public lands managed for multiple use. One or

two populations are found within the BLM's North Fork Wilderness Study Area and one population may occur within the Bud Love Wildlife Habitat Management Area.

Selected References:

Fertig, W. 1993. Field Survey for *Cleome multicaulis*, *Cymopterus williamsii*, and *Sullivantia hapemanii* in north-central Wyoming. Report prepared for the Casper District, BLM, by the Wyoming Natural Diversity Database, Laramie, WY.

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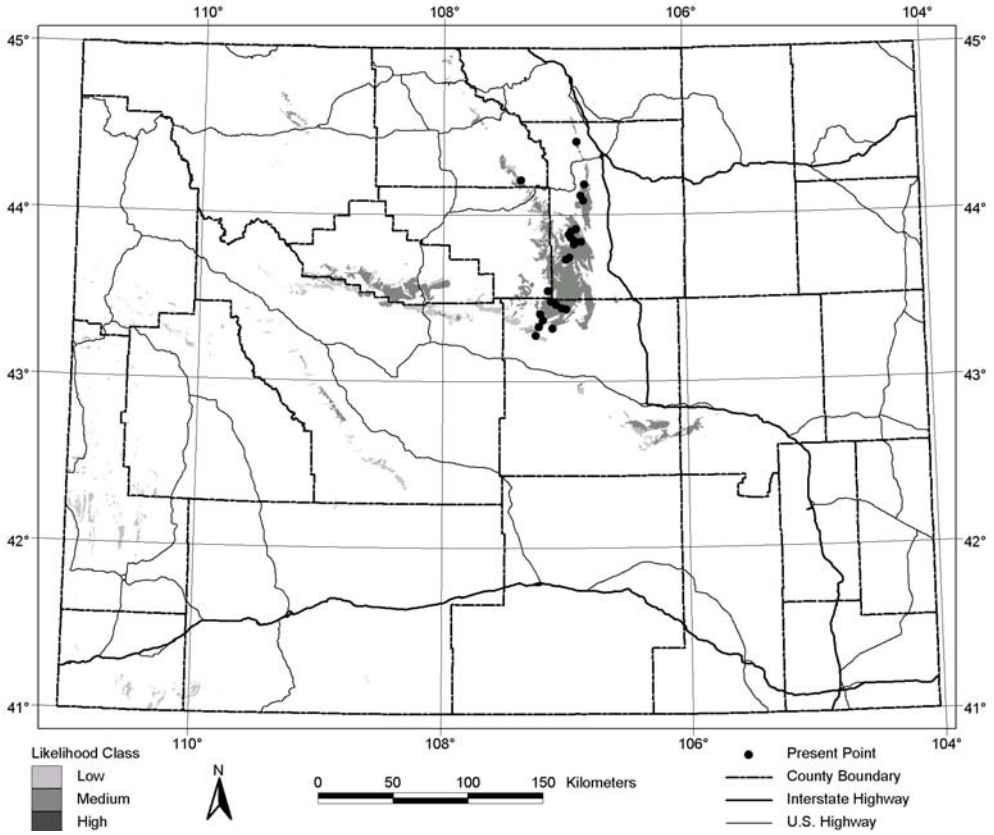

Descurainia torulosa — Wyoming Tansymustard

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: USFS Region 2 Sensitive; USFS Region 4 Sensitive; WY BLM Sensitive.
Heritage Rank: G1/S1

Description: Wyoming tansymustard is a multiple-stemmed biennial or short lived perennial herb growing to 15 cm tall. Finely divided, star-shaped (stellate) hairs give the stem, leaves, and fruit a gray-green appearance. The leaves are pinnately divided, 2-3 cm long, and located mainly at the base of the plant. Flowers are yellow, four-petaled, and 1.5 mm long. The fruits are 8-15 mm long, strongly constricted between the seeds (torulose), long-tapering to the tip, and borne on stalks less than 3 mm long and closely appressed to the inflorescence axis.

Similar Species: Varieties of *Descurainia incana* have hairless fruits or glandular-hairy stems and leaves. *D. pinnata* has hairless, club-shaped fruit (Fertig et al. 1994). A 1998 DNA sequencing study by Jerry Bricker and Greg Brown of the University of Wyoming suggests that *D. torulosa* is similar genetically to *D. incana,* and should be recognized as a variety of the latter.

Flowering/Fruiting Period: July-September.

Range: Endemic restricted to the southern Absaroka Range (Fremont, Park, and Teton counties) and Rock Springs Uplift (Sweetwater County) in Wyoming.

Habitat: Grows in sandy soil at the base of cliffs composed of volcanic breccia or sandstone, under slight overhangs, in cavities in the volcanic rock, or on ledges (Marriott 1991). Elevation 7700-10500 ft.

Above: Descurainia torulosa *by Hollis Marriott.*

Abundance and Trends: Known from 8-11 occurrences in Wyoming, several of which are in the same general area and might be better treated as metapopulations rather than individual occurrences. One population at Carter Mountain (Park County) may not represent this species (Dorn 1989). Rollins (1993) recognizes only the type population (Brooks Lake, Fremont County) as authentic. The total population of this species probably numbers less than 1500 (Marriott 1991, 1992, Fertig 1997). Most populations average less than 40 individuals and may be restricted to a single ledge. Numbers may vary from year to year (Dorn 1989).

Management Status: Occurs on lands managed by Bridger-Teton and Shoshone National Forests, and the BLM Rock Springs Field Office. Reports from the BLM Cody Field

Office are based on a questionable specimen. Two occurrences in the BLM Rock Springs Field Office are protected within Special Status Plant ACECs (established under the Green River Resource Area Management Plan in 1997). Two populations in the Absaroka Range are in the North Absaroka and Washakie Wilderness Areas. A taxonomically questionable population is found in the BLM's Carter Mountain ACEC.

References:

Bricker, J.S., G.K. Brown, and T.L. Patts Lewis. 2000. Status of *Descurainia torulosa* (Brassicaceae). Western North American Naturalist 60(4):426-432.

Dorn, R.D. 1989. A report on the status of *Descurainia torulosa*, a Candidate Threatened species. Unpublished report prepared for the US Fish and Wildlife Service by Mountain West Environmental Services, Cheyenne, WY.

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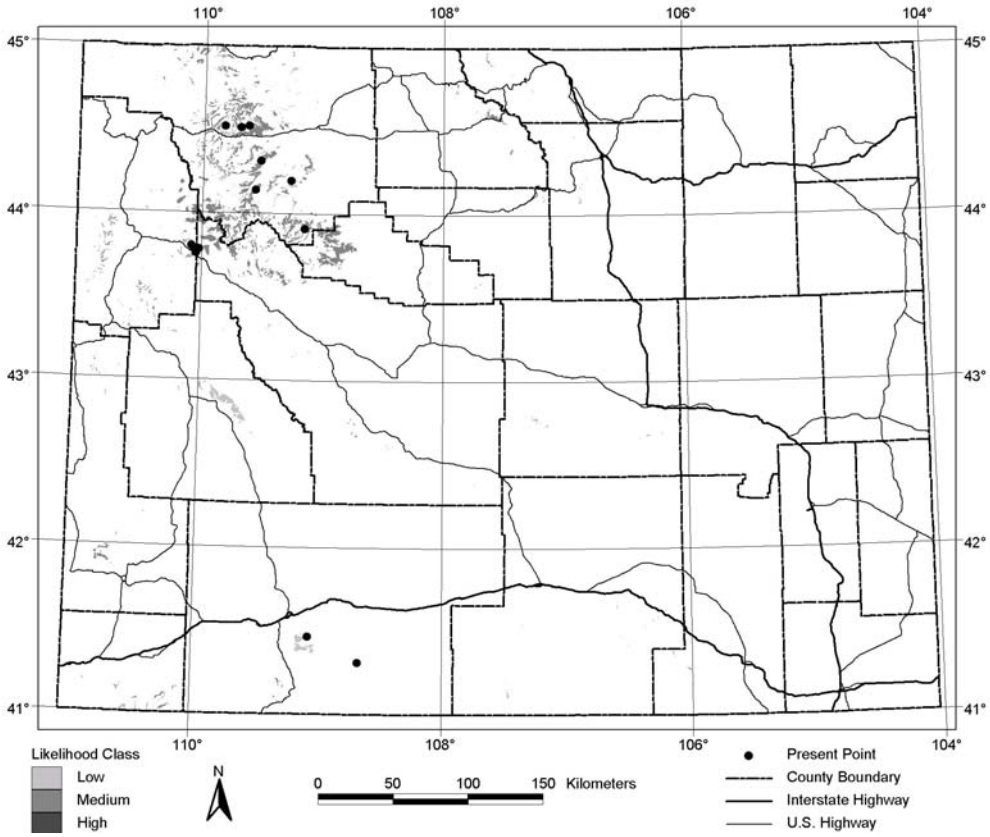
Rollins, R.C. 1993. The Cruciferae of Continental North America, Systematics of the Mustard Family from the Arctic to Panama. Stanford Univ. Press, Stanford, CA.

Rollins, R.C. 1983. Studies in the Cruciferae of western North America. Journal of Arnold Arboretum 64: 491-510.



Gaura neomexicana var. *coloradensis* — Colorado Butterfly Plant

Status:
US Fish & Wildlife Service: Threatened
Agency Status: Threatened
Heritage Rank: G3T2/S2

Description: Colorado butterfly plant is a short-lived perennial herb with 1-few reddish, pubescent stems 50-80 cm tall. Lower leaves are lance-shaped, with smooth or wavy-toothed margins and average 5-10 cm long, while those higher on the stem are smaller and reduced in number. The inflorescence is located above the leaves and is flat-topped when in bud. The multiple branches of the inflorescence elongate as the flowering season progresses. Usually only a few open flowers are present at any time and are located between the floral buds and the mature fruits. Flowers have 4 white petals (turning pink with age) and are 1-1.5 cm wide. The hard, nut-like fruits are 4-angled and sessile.

Similar Species: *Gaura parviflora* is an annual with a narrow, elongate inflorescence and white flowers less than 3 mm long. *G. coccinea* is a low, bushy perennial with leaves less than 3 mm long. Rosettes of *Oenothera* spp. and *Cirsium flodmanii* are similar, but are more pubescent.

Flowering/Fruiting Period: Late June or early July to mid September or early October.

Range: Regional endemic of SW Nebraska, SE Wyoming, and NE Colorado. In Wyoming, known only from the Southeastern Plains in Laramie and Platte counties.

Habitat: Typically occurs on subirrigated soils on level or slightly sloping floodplains and drainage bottoms along bends in wide, meandering streams at elevations of 5000-6400 feet. This species is found on soils derived from conglomerates, sandstones, and tuffaceous mudstones and siltstones of the Tertiary Wind River, Arikaree, and Ogalalla formations (Fertig 2000).

Above: Gaura neomexicana *var.* coloradensis *by W. Fertig.*

Abundance and Trends: Colorado butterfly plant is currently known from 19 extant occurrences in Wyoming, 13 of which have been discovered or resurveyed since 1992. Rangewide, the population of flowering individuals was estimated at 47,300-50,300 in 1998 (with the majority of these occurring in Wyoming). Total population size (including non-flowering rosettes) is estimated at 283,000-300,000. Long term studies at FE Warren Air Force Base suggest that population size can vary from year to year, depending on past recruitment success and moisture conditions. Overall, the trend at the Base has been stable to slightly increasing over the past decade.

Management Status: Two occurrences are found on F.E. Warren Air Force Base within the Colorado butterfly plant Research Natural Area. All other populations in Wyoming are on unprotected state or private lands.

Selected References:
Fertig, W. 1994. Status report on *Gaura neomexicana* ssp. *coloradensis*, a candidate Threatened species. Unpublished report prepared for the US Fish and Wildlife Service

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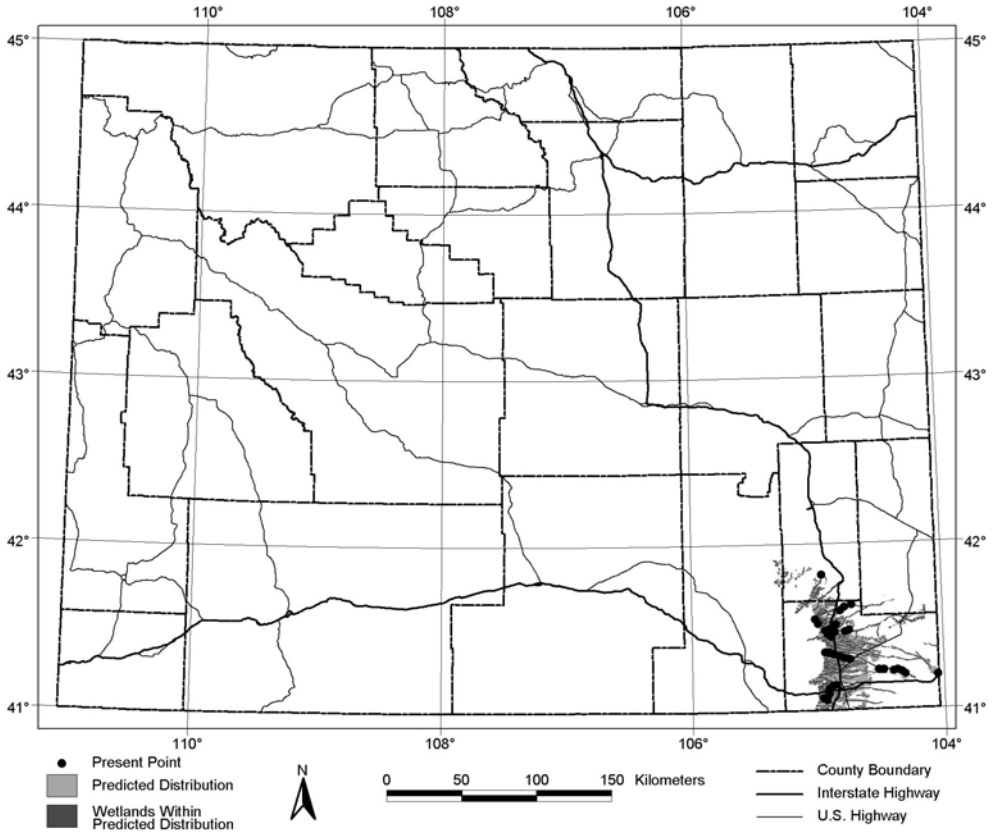
Marriott, H.J. 1987. A report on the status of *Gaura neomexicana* ssp. *coloradensis*, a Candidate Threatened species. Prepared for the US Fish and Wildlife Service by the Wyoming Natural Diversity Database, Laramie, WY.

Munk, L.M. 1999. Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*) regeneration with removal of Canada thistle (*Cirsium arvense*) or native herbs. Masters thesis, Department of Renewable Resources, University of Wyoming, Laramie, WY.



Ipomopsis aggregata ssp. *weberi* — Weber's Scarlet-Gilia

Status:
US Fish & Wildlife Service: None (formerly a C2 Candidate for listing under the Endangered Species Act).
Agency Status: Forest Service Region 2 Sensitive; WY BLM Sensitive.
Heritage Rank: G5T1T2Q/S1

Description: Weber's scarlet gilia is a taprooted biennial herb with stems 15-60 cm tall. The leaves are pinnately divided into numerous, linear segments with loose, white-woolly pubescence. Flowers are typically white (some can be pinkish) with petals fused into a long, slender, trumpet-like corolla tube 10-22 mm long and 1-2 mm wide with five lobes at the tip.

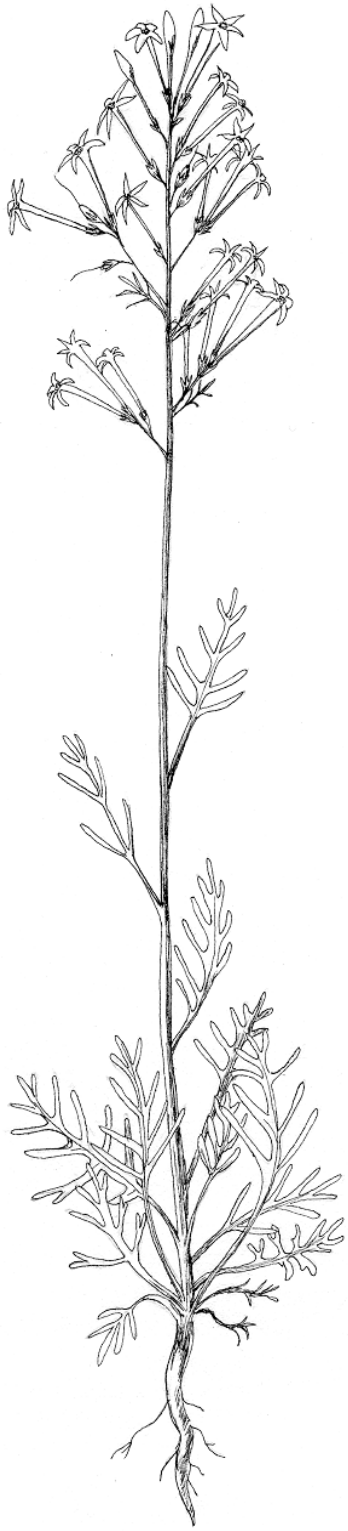
Similar Species: *Ipomopsis aggregata* var. *aggregata* and var. *attenuata* differ in having predominantly red or pink flowers. *I. tenuituba* has a longer, broader corolla tube. Other Wyoming species of *Ipomopsis* have shorter corolla tubes or more densely compacted, head-like inflorescences (Dorn 1990).

Flowering/Fruiting Period: June-August.

Range: Regional endemic of northern Idaho, south-central Wyoming, and north-central Colorado. In Wyoming, known only from the Sierra Madre in Carbon County.

Habitat: Reported from "openings in coniferous forest" by Grant and Wilken (1986). Wyoming populations occur on south-facing slopes and ridges dominated by *Artemisia tridentata* or brushy *Amelanchier/Purshia/ Chrysothamnus/Prunus* stands on gravelly, clay-loam soils at 7200-8300 feet.

Abundance and Trends: Weber's scarlet-gilia is known from 2 populations in Wyoming. The Battle Mountain population was estimated at several thousand by Nancy Kastning in 1989.



Above: Ipomopsis aggregata *ssp.* weberi *by W. Fertig (Fertig et al. 1994).*

Far fewer plants were observed by Wendy Haas in follow-up survey in 1994, possibly as a result of spraying for brush control in 1991.

Management Status: Occurrences in Wyoming are on Medicine Bow National Forest and the BLM Rawlins Field Office. One occurrence is in the Battle Mountain Special Botanical Area.

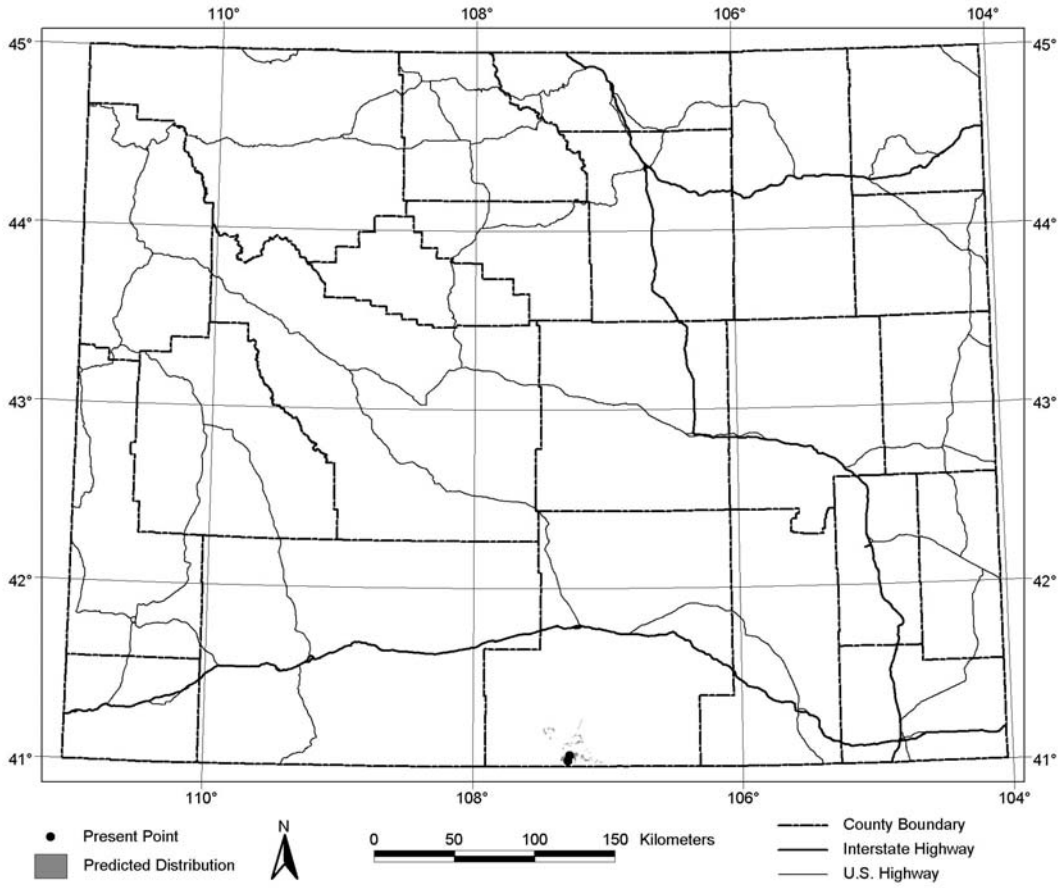
Selected References:

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Mills, S. and M. Neighbours. 1995. Intensive data gathering project (fine-filter analysis) for occurrences of rare, threatened, endangered and sensitive species in sections M331H and M331I, north central highlands and northern parks and ranges, in Wyoming. Unpublished report prepared for Medicine Bow National Forest by the Wyoming Natural Diversity Database, Laramie, WY.

Spackman, S., B. Jennings, J. Coles, C. Dawson, M. Minton, A. Kratz, and C. Spurrier. 1997. Colorado Rare Plant Field Guide. Prepared for the Bureau of Land Management, US Forest Service, and US Fish and Wildlife Service by the Colorado Natural Heritage Program, Ft. Collins, CO.

Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.



Lepidium integrifolium var. *integrifolium* — Entire-Leaved Peppergrass

Status:
US Fish & Wildlife Service: None.
Agency Status: WY BLM Sensitive.
Heritage Rank: G2T1?/S1

Description: Entire-leaved peppergrass is a perennial forb with erect, minutely-pubescent stems 15-25 cm tall from a thick, branched caudex covered with remnant leaf bases. Basal leaves are 3-8.5 cm long x 6-25 mm wide and have elliptic to oblanceolate blades with entire margins and sparse pubescence (especially on the veins and margins). Stem leaves are 1-4 cm long, gradually reduced in size, and glabrate. Flowers have 4 pubescent sepals and 4 white petals less than 3 mm long. Fruits are glabrous, flat, ovate to lance-ovate silicles 3-4.2 mm long with styles 0.4-0.7 mm long.

Synonyms: *Lepidium montanum* var. *integrifolium*.

Similar Species: *Lepidium barnebyanum* has linear leaves and petals over 3 mm long and is a narrow endemic of white shales in Duchesne County, Utah. *L. latifolium* has entire to serrate leaves, fruits 1.5-2 mm long, and typically is over 80 cm tall. *L. montanum* var. *alyssoides* has narrowly linear, mostly entire leaves (some have a few lobes at the base) and is typically over 60 cm tall.

Flowering/Fruiting Period: June-early July/July-August.

Range: Regional endemic of northeastern Utah and southwestern Wyoming. In Wyoming, known only from the southern Overthrust Belt in Lincoln County.

Habitat: Reported from alkaline meadows with *Scirpus* and *Triglochin* and saline meadows by Rollins (1993). Wyoming populations occur in sparsely vegetated and seasonally wet clay flats, *Sarcobatus vermiculatus* communities on clay hummocks, and moist alkaline meadows at 6200-6770 feet.

Above: Lepidium integrifolium *var*. integrifolium *by Walter Fertig.*

Abundance and Trends: *L. integrifolium* is known from two extant occurrences in the state. The Fossil Butte National Monument population was surveyed in 1999 by Fertig and Welp who found 250-500 plants in an area of less than 2 acres. Additional small colonies have been

found on the monument by Clay Kyte. At least one historical population in the state has probably been extirpated due to changes in the natural vegetation of its saline, ephemeral wetland habitat. Stone (1998) suggests that populations from SC Utah may be extinct.

Management Status: In Wyoming, this species occurs only in Fossil Butte National Monument and the BLM Kemmerer Field Office.

Selected References:

Fertig, W. 2000. Vascular plant species checklist and rare plants of Fossil Butte National Monument. Report prepared for the National Park Service Northern Colorado Plateau Network by the Wyoming Natural Diversity Database, Laramie, WY.

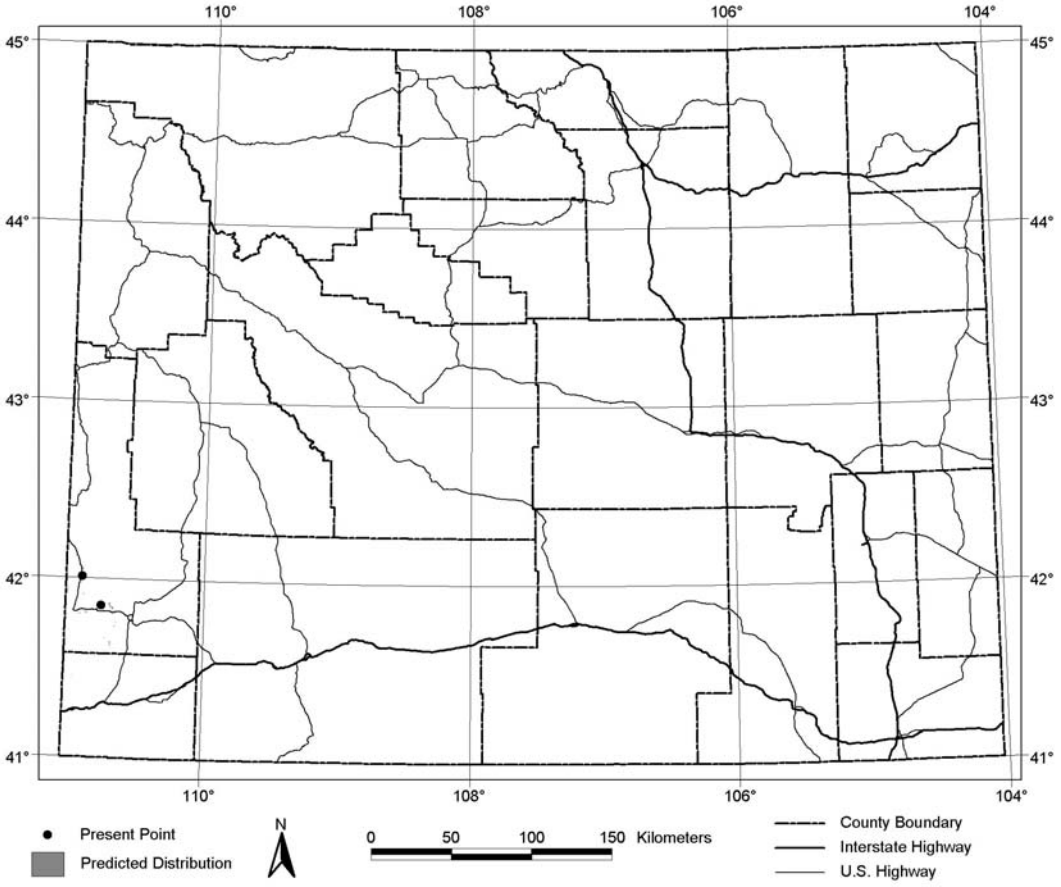
Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, Wyoming.

Hitchcock, C. L. 1936. The genus *Lepidium* in the United States. Madrono 3: 265-320.

Rollins, R.C. 1993. The Cruciferae of Continental North America, Systematics of the Mustard Family from the Arctic to Panama. Stanford Univ. Press, Stanford, CA.

Stone, D. 1998. Endemic and rare plants of Utah: an overview of their distribution and status. Prepared for the Utah Reclamation Mitigation and Conservation Commission and US Department of the Interior by the Utah Division of Wildlife Resources, Salt Lake City, UT. Available on the internet at www.nr.state.ut.us/dwr/plants.htm.

Welsh, S.L., N.D. Atwood, S. Goodrich, and L.C. Higgins, (eds). 1993. A Utah Flora, second edition, revised. Brigham Young University Print Services, Provo, UT.



Lesquerella arenosa var. *argillosa* — Sidesaddle Bladderpod

Status:
US Fish & Wildlife Service: None.
Agency Status: WY BLM Sensitive
Heritage Rank: G5T2/S1

Description: Sidesaddle bladderpod is an annual or short-lived perennial with several semi-prostrate, densely-pubescent stems 10 to 20 cm long. The basal leaves are 2-10 mm wide, oblanceolate, and long-petioled while the stem leaves are elliptic, 1-4 mm wide, and entire. Flowers are 6-8 mm long with four yellow petals that may dry to reddish or lavender. The fruits are borne on recurved pedicels positioned along one side of the flowering stem (secund) and are pubescent with appressed hairs.

Similar Species: *Lesquerella arenosa* var. *arenosa* has hairs of the fruit spreading rather than closely appressed. *L. ludoviciana* has taller stems, narrower leaves, yellow petals, and non-secund fruit. Other species of *Lesquerella* differ in having wider basal leaves or S-shaped pedicels.

Flowering/Fruiting Period: April-June/late May-June.

Range: Regional endemic of eastern Wyoming, southwestern South Dakota, and western Nebraska. In Wyoming, this taxon is known only from the eastern Great Plains in Niobrara County. Additional reports from the Black Hills in Crook County (Dorn 1992) have been determined as var. *arenosa* by Marriott (1992). Other reports from Converse and Natrona counties need confirmation.

Habitat: Dry, open and frequently barren soil, rock outcrops, or road shoulders of gravel, shale, or limestone. May occur on seleniferous soil in Wyoming (Marriott 1992).

Abundance and Trends: Sidesaddle bladderpod is known from 3-4 extant occurrences in Wyoming. Marriott estimated the total state population at 3000-10,000 following surveys in 1991 (Marriott 1992). Long-term trends are not known.

Above: Lesquerella arenosa *var.* argillosa *by W. Fertig (Fertig et al. 1994).*

Management Status: In Wyoming, this species occurs on Thunder Basin National Grassland, the BLM Newcastle Field Office, and private lands. No populations are currently found in special management areas.

Selected References:
Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Marriott, H.J. 1992. Field survey for *Aster mollis*, *Astragalus barrii* and *Lesquerella arenosa* var. *argillosa* in northeast and central Wyoming. Unpublished report prepared for the Casper District, Bureau of Land Management by the Wyoming Natural Diversity Database.

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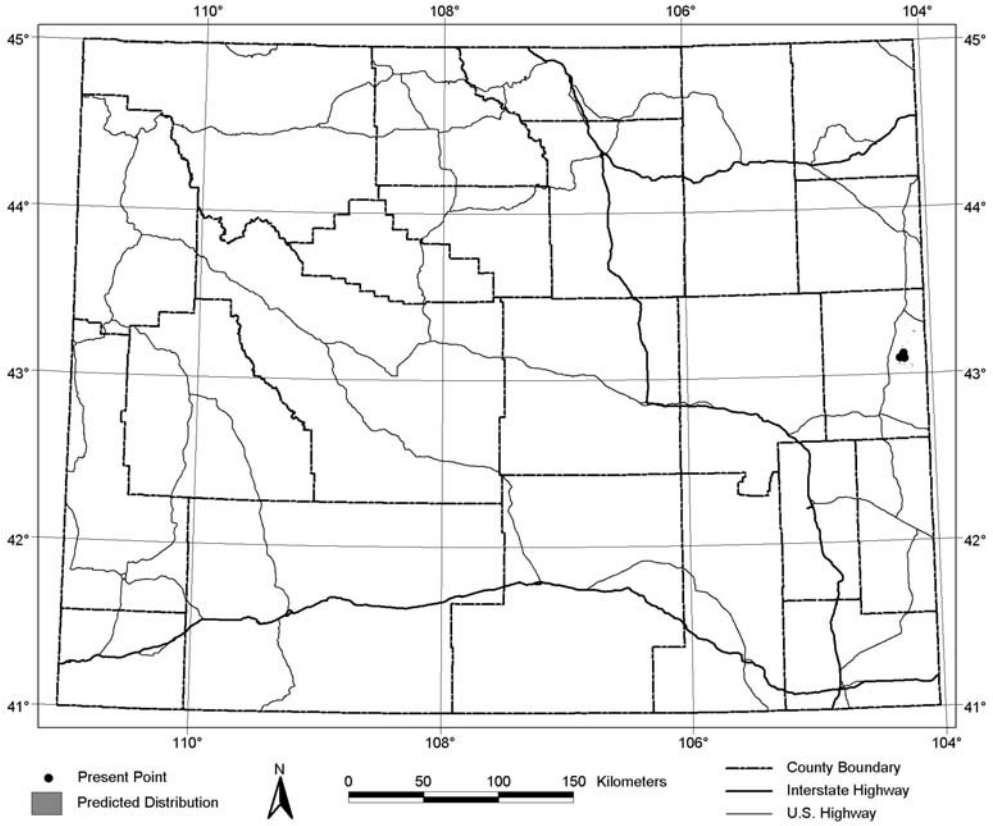
Rollins, R.C., and Shaw, E.A. 1973. The Genus *Lesquerella* (Cruciferae) in North America. Harvard Univ. Press, Cambridge, MA.



Lesquerella fremontii — Fremont Bladderpod

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: USFS Region 2 Sensitive; Wyoming BLM Sensitive
Heritage Rank: G2/S2

Description: Fremont bladderpod is a pubescent, perennial, taprooted herb with decumbent stems 5-15 cm long. Basal leaves are 1.5-4 cm long, elliptic to diamond-shaped and covered by star-like (stellate) hairs, while the stem leaves are generally longer and narrower. Flowers are 6-8 mm long with 4 yellow petals. Fruits are elliptical, 4-7 mm long, and inflated or slightly flattened at a right angle to the partition (the line separating the two halves of the fruit). At maturity, the fruits are borne on recurved stalks. The walls of the fruit are pubescent on both the outer and inner surfaces.

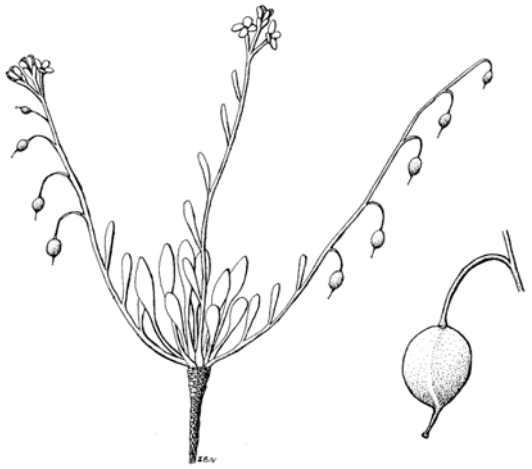
Similar Species: *Lesquerella macrocarpa* has inflated fruits that are sparsely hairy on the outer wall and glabrous on the inner surface. *L. carinata* and *L. paysonii* differ in having more strongly flattened fruits.

Flowering/Fruiting Period: May-July.

Range: Local endemic of the east slope of the Wind River Range and Sweetwater Plateau in Fremont County.

Habitat: Meadows, slopes, ridges, and benches in desert foothill, montane meadow, or alpine cushion plant communities on rocky, mesic, limestone derived soils. Common associates include *Artemisia tripartita*, *Balsamorhiza incana*, *Lomatium cous*, *Phlox hoodii*, *P. multiflora*, and *Townsendia spathulata*.

Abundance and Trends: Fremont bladderpod is known from 9 extant occurrences, 6 of which have been discovered or relocated since 1993



Above: Lesquerella fremontii *by Isobel Nichols from Fertig et al. (1994).*

(most recently in 1999). The total known range of the species is just over 200 acres. Total population size was estimated at 40,000-50,000 individuals by Fertig in 1994. Three additional, medium to large populations have since been discovered, suggesting that the total population size may be closer to 50,000-60,000. Overall trends are probably stable, although some colonies have been lost due to road expansion or limestone quarrying.

Management Status: Occurs on lands managed by the BLM Lander Field Office and Shoshone National Forest. Part of the large Limestone Mountain occurrence is found within The Nature Conservancy's Red Canyon Ranch preserve. One other colony is protected in the Fitzpatrick Wilderness Area (within the potential Arrow Mountain RNA).

Selected References:
Fertig, W. 1995. Status report on *Lesquerella fremontii* in central Wyoming. Unpublished report prepared for the BLM Wyoming State Office and Rawlins District by the Wyoming Natural Diversity Database, Laramie, Wyoming.

Fertig, W. 1998. The status of rare plants on Shoshone National Forest: 1995-97 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

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Lichvar, R.W. and R.D. Dorn. 1980. Noteworthy collections. Madrono 27(3): 140-141.

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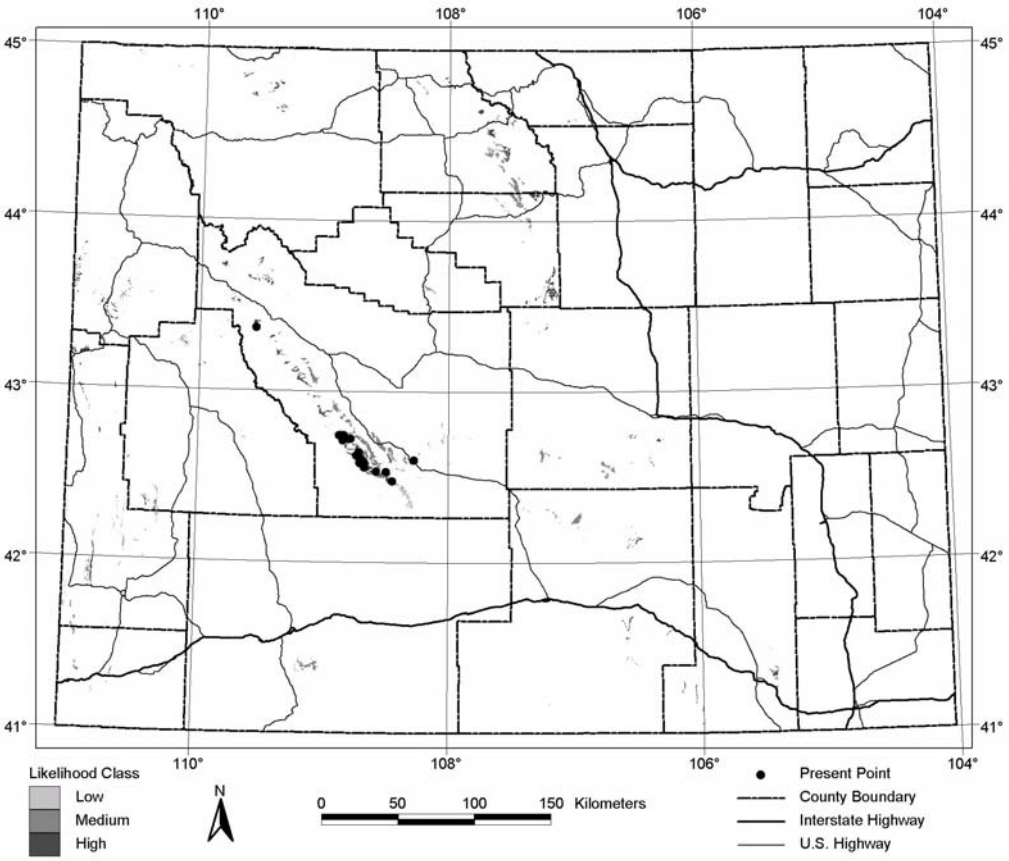
Rollins, R.C. 1993. The Cruciferae of Continental North America, Systematics of the Mustard Family from the Arctic to Panama. Stanford Univ. Press, Stanford, CA.

Rollins, R.C., and Shaw, E.A. 1973. The Genus *Lesquerella* (Cruciferae) in North America. Harvard Univ. Press, Cambridge, MA.

Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.



Lesquerella macrocarpa — Large-Fruited Bladderpod

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G2/ S2

Description: Large-fruited bladderpod is a densely silvery-gray pubescent perennial herb with decumbent stems 5-30 cm long. The basal leaf blades are ovate to oblanceolate, 0.5-3 cm long, 3-20 mm wide, and petioled. Stem leaves are narrower and stalkless. Flowers have four yellow petals 4-7 mm long. The inflated, globose fruits are 4-8 mm long and borne on recurved stalks. The fruits are slightly hairy on the outer wall and glabrous on the inner surface.

Similar Species: *Lesquerella fremontii* has smaller fruits that are slightly flattened and densely pubescent on the outer wall and lightly hairy on the inner wall. Other Wyoming species of *Lesquerella* differ in having linear leaves or fruits borne on S-shaped fruitstalks. The large fruits of this species are similar to those of twinpods (*Physaria* spp.), but are rounded at the tips rather than notched.

Flowering/Fruiting Period: mid May to late June/late May to July.

Range: Endemic to central and southwestern Wyoming in the Great Divide (Fremont and Sweetwater Cos.) and Green River basins (Lincoln and Sublette Cos.).

Habitat: Typically occurs in sparsely vegetated *Atriplex gardneri-Elymus elymoides* communities on barren, fine-textured clays and shales, often with gypsum or bentonite. Populations are usually on slopes of 0-15% on low hills, knolls, and colluvial fans at elevations of 6800-7700 feet. It is usually absent from rocky soils (although it may be present on fine clays with a surface of oily-shale rock) and areas dominated by sagebrush or high cover of grasses (Fertig 1995).

Above: Lesquerella macrocarpa *by Jane Dorn from Fertig et al. (1994).*

Abundance and Trends: Known from 9 occurrences, 6 of which have been discovered or relocated since 1994. Populations range in size from several hundred to tens of thousands of individuals. Total population size estimated at ca 52,000 plants in 1994 covering an area of 2079 acres (Fertig 1995). Trend data are limited, but suggest that populations are stable over the long term in the Bush Rim area. Annual fluctuations may be expected based on seedling survival in adverse climate years.

Management Status: Occurs on lands managed by the BLM Kemmerer, Pinedale, and Rock Springs Field Offices. Two populations are found in the BLM Steamboat ACEC. Two other occurrences are located in the Honeycomb Buttes Wilderness Study Area..

Selected References:

Fertig, W. 1995. Status report on *Lesquerella macrocarpa* in southwestern Wyoming. Unpublished report prepared for the BLM Wyoming State Office and the Rock Springs District by the Wyoming Natural Diversity Database, Laramie WY.

Fertig, W. 1998. Plant species of special concern of the Ross Butte ecosystem, Sublette County, Wyoming. Prepared for the Bureau of Land Management Wyoming State Office and Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.

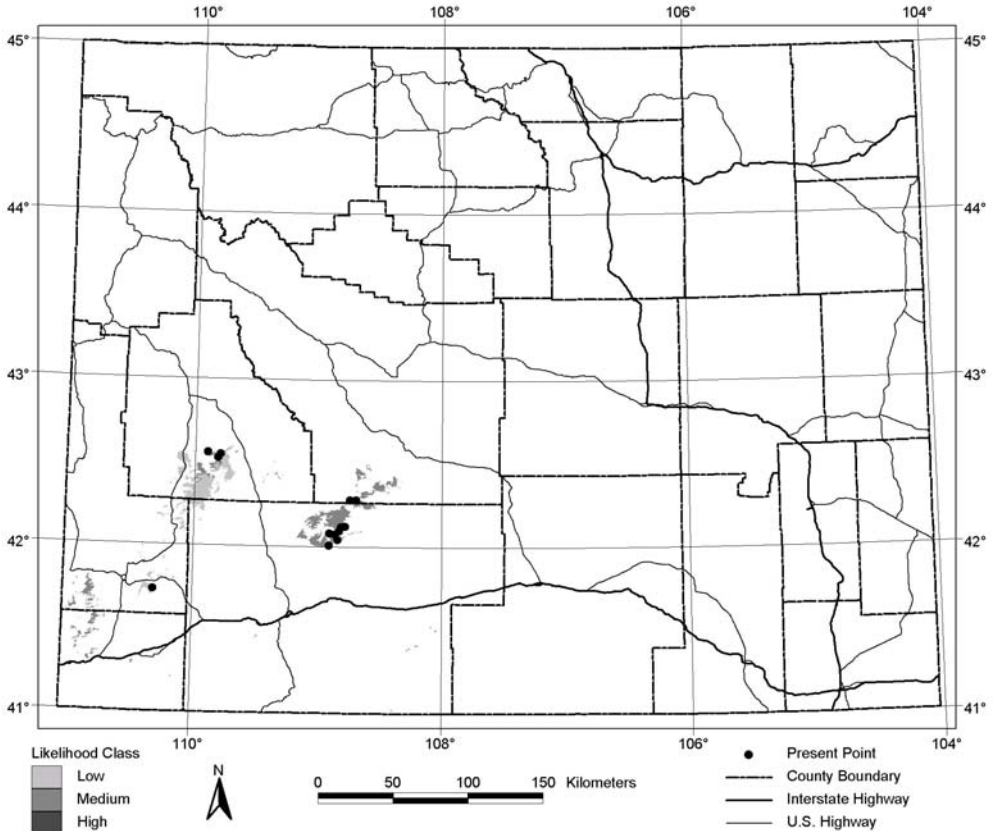
Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Jones, G. and W. Fertig. 1996. Plant associations and plant species of special concern in the Jack Morrow Hills Ecosystem. Unpublished report prepared for the Bureau of Land Management Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.

Marriott, H.J. 1988. Draft habitat management plan for threatened, endangered and sensitive plant species and their habitats on the Rock Springs District, Bureau of Land Management. Prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.

Rollins, R.C. 1993. The Cruciferae of Continental North America, Systematics of the Mustard Family from the Arctic to Panama. Stanford Univ. Press, Stanford, CA.

Rollins, R.C., and Shaw, E.A. 1973. The Genus *Lesquerella* (Cruciferae) in North America. Harvard Univ. Press, Cambridge, MA.



Lesquerella multiceps **Western Bladderpod**

Status:
US Fish & Wildlife Service: None.
Agency Status: WY BLM Sensitive.
Heritage Rank: G3/SH

Description: Western bladderpod is a low-growing, caespitose perennial herb 2-25 cm tall with dense pubescence of tiny star-like hairs that impart a grayish cast. Leaf blades are elliptic to ovate, 2-4 cm long, and gradually narrowed to slender petioles. Flowers are small (5-10 mm long) and yellow. Fruits are 3.5-5 mm long, dry, nearly globose, and elevated on S-shaped pedicels 3-10 mm long.

Similar Species: *Lesquerella prostrata* has leaf blades which are rhombic or deltoid in outline and abruptly narrowed to the petiole. *L. alpina* var. *alpina* has narrow, linear leaves and elongate, non-globose fruits. *L. macrocarpa* has fruits on recurved pedicels. All other Wyoming species of *Lesquerella* have either flattened fruits or recurved pedicels.

Flowering/Fruiting Period: May-July/June-early August.

Range: Regional endemic of northeastern Utah, southeastern Idaho, and western Wyoming. In Wyoming, it is known only from the Snake River Range and Overthrust Belt in Lincoln County.

Habitat: Rangewide, this species is typically found on dry, gravelly limestone ridges and slopes with thin pockets of soil (Rollins 1993). Wyoming populations are reported from red sandy or stoney slopes at elevations of 8300-8600 feet.

Abundance and Trends: Known from 2 locations in Wyoming, neither of which has been relocated since 1964. No information is available on population size or trend in Wyoming.

Above: Lesquerella multiceps *by Walter Fertig.*

Management Status: Found in Targhee National Forest (on lands managed by Bridger-Teton NF) and possibly the BLM Kemmerer Field Office. All known populations are in areas managed for multiple use.

Selected References:
Fertig, W. 2000. Rare vascular plant species in the Wyoming portion of the Utah-Wyoming Rocky Mountains Ecoregion. Prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.

Maguire, B. 1942. Great Basin Plants -VII. Cruciferae. American Midland Naturalist 27:463-471.

Rollins, R.C. 1993. The Cruciferae of Continental North America, Systematics of the Mustard Family from the Arctic to Panama. Stanford Univ. Press, Stanford, CA.

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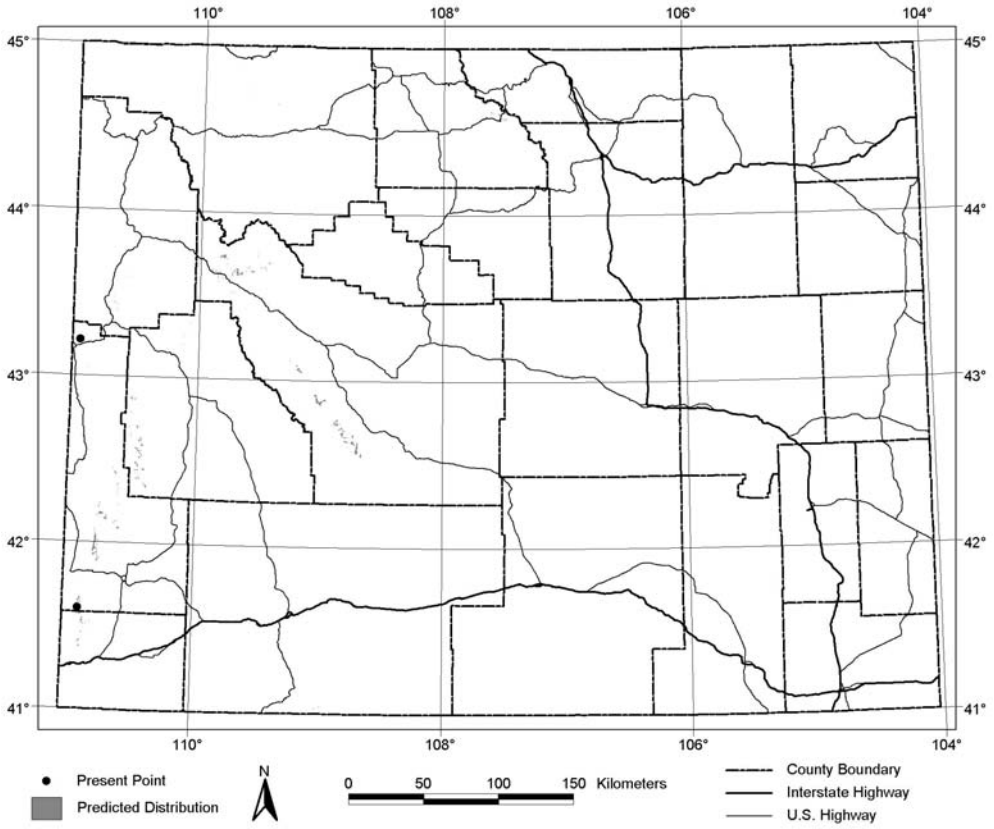

Lesquerella prostrata **Prostrate Bladderpod**

Status:
US Fish & Wildlife Service: None
Agency Status: WY BLM Sensitive.
Heritage Rank: G3/S1

Description: Prostrate bladderpod is a perennial forb with several prostrate to decumbent stems 6-15 cm long from a sparsely branched caudex. Leaves are densely silvery-pubescent with sessile, forked hairs. The basal leaves are 1-5 cm long, 5-10 mm wide, and have diamond, arrowhead-like, deltate, or elliptic leaf blades that taper abruptly to a long petiole. Stem leaves are 0.5-1.5 cm long, linear to oblanceolate, and become sessile above. The inflorescence is an elongated, open raceme of yellow flowers with 4 sepals and 4 petals 7-9 mm long. Fruits are 5-10 mm long, slightly compressed, ovoid to elliptic siliques with styles 3-6 mm long and are borne on S-shaped to erect stalks 5-10 mm long. Fruit walls are densely pubescent on the outside with loose, multi-branched hairs and glabrous to sparsely hairy on the inside. Ovules 2 (occasionally 4) per locule.

Similar Species: *Lesquerella multiceps* has sparsely pubescent, globose fruits that are not compressed, basal leaves with elliptic to obovate blades 4-12 mm wide that taper gradually to a long petiole, and a multi-branched caudex. *L. alpina* var. *alpina* has linear to narrowly oblanceolate basal leaf blades less than 5 mm wide that are often poorly differentiated from the petiole. *L. alpina* var. *condensata* has densely tufted stems with the flowering branches barely (if at all) exceeding the basal leaves and spreading stellate hairs that give the herbage a shaggy appearance. *L. macrocarpa* and *L. fremontii* have styles under 2 mm long and fruits on recurved stalks.

Flowering/Fruiting Period: Mid-April to late June/early June to early July.

Range: Regional endemic with a bimodal distribution in central Idaho and southwestern

Above: Lesquerella prostrata.*(with hairs magnified) by E.B. Payson from Payson (1922).*

Wyoming, southeastern Idaho, and northeastern Utah. Wyoming populations occur in the southern Overthrust Belt in Lincoln and Uinta counties.

Habitat: Wyoming populations are most abundant on west to south or southeast-facing slopes and rims of whitish to reddish or gray limey clays and soft sandstones with a surface layer of fine gravel at elevations of 7200-7700 feet. These sites are primarily entisols or aridisols derived from the Green River (Laney member) or Wasatch formations. Populations in the southern Overthrust Belt and Bridger Butte are found on soils derived from the Aspen Shale and Bridger Formation. Most of these sites are dominated by sparse cushion plants, bunchgrasses, and low shrubs with a total vegetative cover of 10-25%. At least one Wyoming population is also found on northwest-facing reddish-gray rocky clay-shale slopes in *Juniperus osteosperma* woodlands with an open understory of *Artemisia tridentata* and *Poa secunda*.

Abundance and Trends: Known from 6 extant occurrences in Wyoming (5 of which were last observed in 1999). The total state population was estimated at 4700-11000 plants in 1999. Individual populations range in size from 10-100 plants to nearly 5000 in patches of 1-50

acres. Trend data are lacking for most occurrences, although several have been stable from 1995-1999 and some have been known for nearly a century.

Management Status: Occurs on lands managed by the BLM Kemmerer Field Office. All known populations are on lands managed for multiple use.

Selected References:

Fertig, W. 2000. Status of prostrate bladderpod (*Lesquerella prostrata*) in southwest Wyoming. Report prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.

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Nelson, A. 1899. New plants from Wyoming VI. Bulletin of Torrey Botanical Club 26: 122-134.

Payson, E.B. 1922. A monograph of the genus *Lesquerella*. Annals Missouri Botanical Garden 8:103-236.

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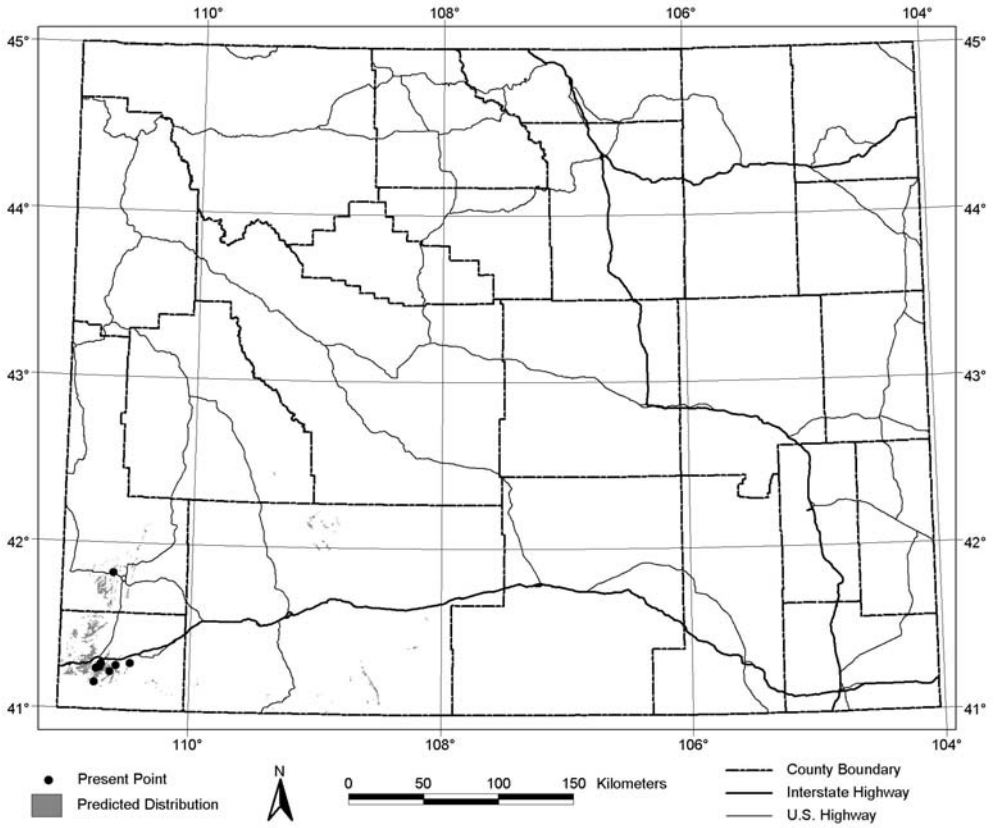
Rollins, R.C., and Shaw, E.A. 1973. The Genus Lesquerella (Cruciferae) in North America. Harvard Univ. Press, Cambridge, MA.



Penstemon absarokensis **Absaroka Beardtongue**

Status:
US Fish & Wildlife Service: None.
Agency Status: WY BLM Sensitive.
Heritage Rank: G2/S2

Description: Absaroka beardtongue is a perennial herb with one to several stems growing to 18 cm tall. The leaves are elliptic to ovate, somewhat fleshy, slightly glossy, and 2.5-9 cm long and 7-25 mm wide. Young leaves are often purplish. The inflorescence is leafy and somewhat one-sided with flowers crowded toward the tip. Each cyme making up the inflorescence has 2-8 flowers. The corollas are purplish-blue, 14-33 mm long, and have bright blue mouths. Sepals are 7-12 mm long with long-tapering tips equaling or longer than the ragged-margined basal portion. Sepals and flower stalks are often glandular.

Similar Species: *Penstemon glaber* var. *glaber*, *P. subglaber*, and *P. cyaneus* typically have shorter sepals with a short pointed tip smaller than the broad basal portion.

Flowering/Fruiting Period: mid-June through mid-July.

Range: Endemic to the Absaroka Range of northwest Wyoming in Park County. An isolated population from the northeast Wind River Range in Fremont County may represent a different, undescribed taxon according to Dorn (1989).

Habitat: On loose, volcanic, rocky soils and scree along sparsely vegetated slopes, rocky ridges, and creek bottoms at 5920-10000 feet. Plants usually occur on very barren, steep slopes with little competition from other vegetation.

Abundance and Trends: 20 occurrences are currently recognized, all of which have been observed since 1984 (12 have been surveyed since 1996). Dorn recognized only 2 extensive

Above: Penstemon absarokensis *by Walter Fertig.*

populations in his 1989 status survey for the US Fish and Wildlife Service. The single Fremont County occurrence may represent a different taxon (Dorn 1989). Dorn estimated the population at over 2000 for his 2 extensive occurrences in the Absarokas. More recent field work by Fertig suggests that this species may be more abundant, numbering in the range of 8000-15000. Individual populations are often exceedingly small and restricted to areas of suitable micro-habitat. Population size may vary from year to year based on moisture availability, but long-term trends have not been studied.

Management Status: Occurs on lands managed by the Shoshone National Forest, BLM Cody Field Office, and the Wind River

Indian Reservation. At least 9 occurrences are protected within the Washakie and Northern Absaroka Wilderness areas.

Selected References:

Dorn, R.D. 1989. A report on the status of *Penstemon absarokensis*, a Candidate Threatened species. Unpublished report prepared for the US Fish and Wildlife Service by Mountain West Environmental Services, Cheyenne, WY.

Evert, E.F. 1984. *Penstemon absarokensis*, a new species of Scrophulariaceae from Wyoming. Madrono 31 (3): 140-143.

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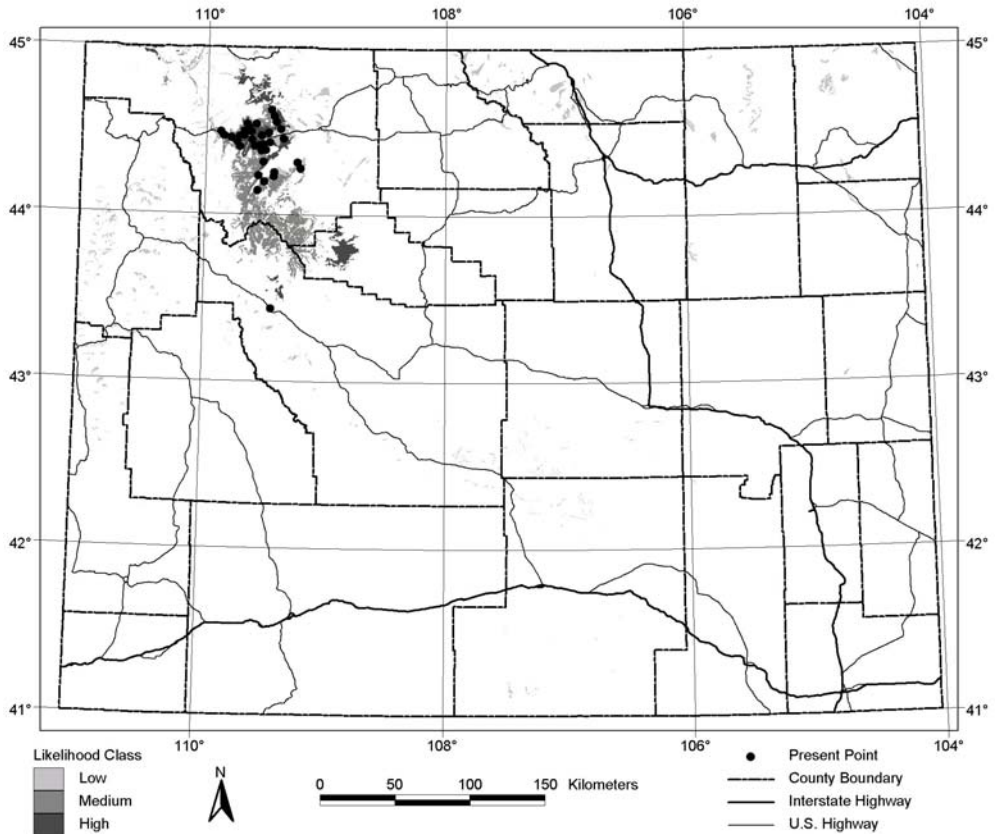
Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.



Penstemon acaulis var. *acaulis* — Stemless Beardtongue

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: USFS Region 4 Sensitive; WY BLM Sensitive
Heritage Rank: G2/S1

Description: Stemless beardtongue is a mat-forming perennial forb less than 4 cm tall. The leaves are all basal, densely clustered, and have linear blades less than 1.6 mm wide and 20 mm long with minutely roughened margins. The bluish-purple, 5-lobed glandular flowers are 12-16 mm long, sessile, occur singly or in pairs, and barely exceed the basal leaves. The sterile filament is yellow and bearded about 2/3 of its length. Anther sacs are glabrous, blue-black, and 0.7-0.9 mm long.

Similar Species: *Penstemon acaulis* var. *yampaensis* has broader, linear to narrowly oblanceolate leaves over 2 mm wide and typically has 4 flowers per shoot. *P. caespitosus* has short, erect, leafy stems and short-stalked flowers.

Flowering/Fruiting Period: mid May to late June/mid-June to mid-July.

Range: Narrow endemic of southwestern Wyoming (Sweetwater County) and northeastern Utah (Daggett County) in the vicinity of Mckinnon and Manila.

Habitat: In Wyoming, Stemless beardtongue is found primarily in sparsely vegetated cushion plant/bunchgrass communities in openings within *Artemisia nova* grasslands on low slopes, outwash fans, ridgetops, and flats.
Less frequently, *P. acaulis* is found within similar openings in *Artemisia tridentata* var. *wyomingensis* or *Chrysothamnus nauseosus* grasslands or on sparsely vegetated roadcuts or roadside ditches within a dense matrix of shrubs. At all sites, the species occurs on shallow, rocky soils derived from the Bridger Formation. It is usually absent or sparse in areas with deeper soils and dense sagebrush or juniper cover. Elevations range from 6080-8020 feet.

Above: Penstemon acaulis *var.* acaulis *by Mike Evans.*

Abundance and Trends: Known from 3 main occurrences in Wyoming, consisting of 21 subpopulations and small colonies (most recently surveyed in 2000). The current state population is estimated at ca 10,000 plants in 100 acres of occupied habitat (Fertig and Welp 2001). Individual colonies may be very small, with 30-50 plants in areas of 0.1-20 acres. Long-term trends are probably down due to the loss of some subpopulations to gravel quarries and road construction.

Management Status: Occurs on lands managed by the BLM Rock Springs District and Ashley National Forest (Flaming Gorge National Recreation Area). All known populations occur on public or private lands managed for multiple use (one site is in a former quarry).

Selected References:

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. 1984. Intermountain Flora. Vascular Plants of the Intermountain West, USA. Vol. 4. Subclass Asteridae. New York Botanical Garden, Bronx, NY.

Dorn, R.D. and J.L. Dorn. 1980. Illustrated Guide to Special Interest Vascular Plants of Wyoming. Published by US Fish and Wildlife Service and Bureau of Land Management.

Fertig, W. and L. Welp. 2001. Status of Stemless beardtongue (*Penstemon acaulis* var. *acaulis*) in southwest Wyoming. Report prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.

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Keck, D.D. 1937. Studies in *Penstemon* IV. The section Ericopsis. Bulletin Torrey Botanical Club 64:357-381.

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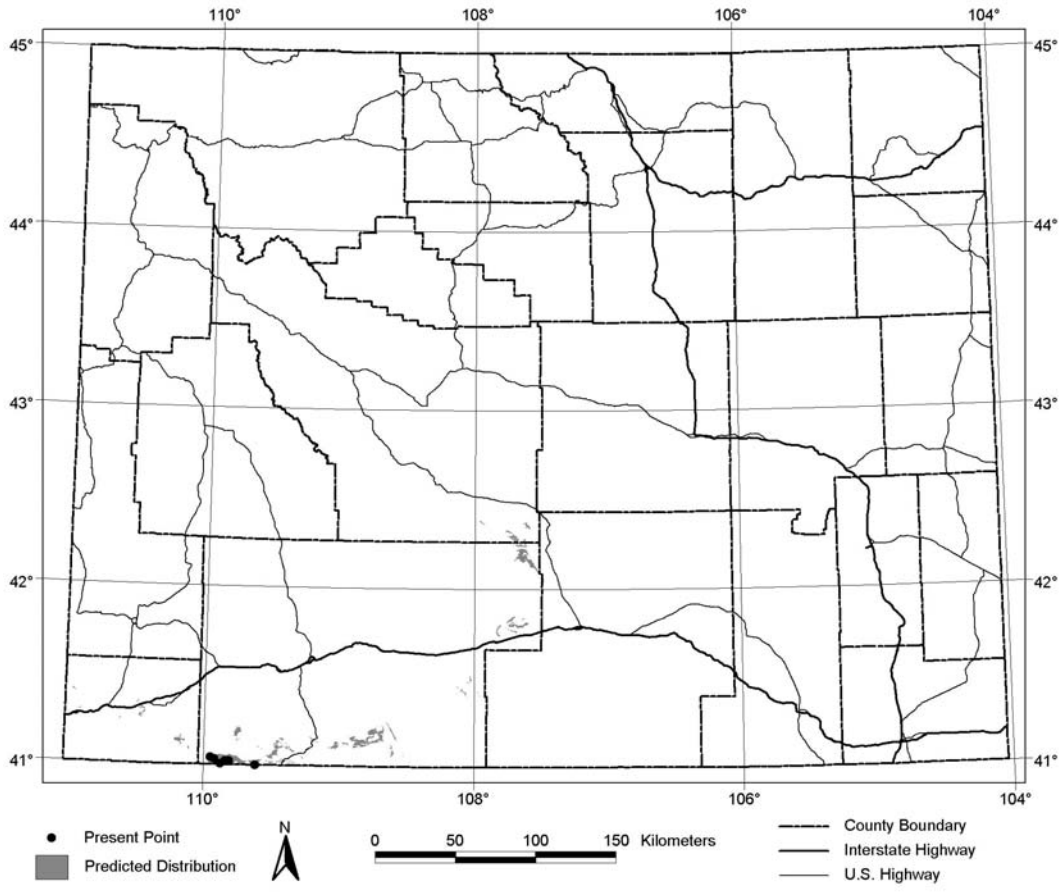
Williams, L.O. 1934. Field and Herbarium Studies, III. Annals of the Missouri Botanical Gardens 21: 343-346.



Penstemon caryi **Cary Beardtongue**

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act)
Agency Status: USFS Region 2 Sensitive; WY BLM Sensitive (Dropped in 2002).
Heritage Rank: G3/S2

Description: Cary beardtongue is a glabrous perennial herb with flowering stems 10-40 cm tall. Leaf blades are narrowly linear to lance-shaped, entire, opposite, and 2-12 cm long (with the longest leaves at the base of the stem). Flowers have long-tipped sepals 6-11 mm long and a blue, tubular corolla 20-38 mm long. Anthers are straw-colored with numerous long, tangled white hairs on the back.

Similar Species: *Penstemon aridus* and *P. attenuatus* have glandular flowers and inflorescences. *P. rydbergii* has smaller, more densely clustered flowers and glabrous anthers (Fertig et al. 1994).

Flowering/Fruiting Period: May-July/June-July.

Range: Regional endemic of the Bighorn and Pryor mountains of north-central Wyoming (Big Horn, Sheridan, and Washakie counties) and south-central Montana.

Habitat: Sparsely-vegetated calcareous rock outcrops and rocky soil within sagebrush, juniper, Douglas-fir, and limber pine communities. Populations on the Tensleep Preserve are found mostly on upland sites with thin soils. Elevation 5200-8500 feet. Observations in Wyoming suggest that the species does not favor areas of dense grass or shrub cover.

Abundance and Trends: *P. caryi* is known from 22 extant occurrences in Wyoming, 17 of which have been discovered or relocated since 1989. Populations are typically small and localized in specialized microhabitats. Of the few populations that have been censused, most contain 50-100 individuals per colony. One of the larger populations on TNC's Tensleep Preserve contains over 2500 plants. Trend data are lacking for most occurrences, but the species is thought to be relatively stable at present.

Above: Penstemon caryi *by Linda Shoemaker from Fertig et al. (1994).*

Management Status: Occurs on lands managed by Bighorn National Forest and the BLM Cody and Worland Field Offices. Two occurrences are protected within the Nature Conservancy's Tensleep Preserve. Two populations are also found within the Spanish Karst and Little Mountain ACECs and potentially within the Shell Canyon RNA. At least 4 populations occur in the Medicine Lodge and Trapper Canyon Wilderness Study Areas.

Selected References:

Fertig, W. 2002. Status of Cary beardtongue (*Penstemon caryi*) in Wyoming. Report prepared for the BLM Wyoming State Office and Wyoming Natural Diversity Database by Walter Fertig, Botanical Consultant, Kanab, UT.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Humphrey, A. and P. Shephard. 1994. Status report: longterm monitoring of *Penstemon caryi* on The Nature Conservancy's Tensleep Preserve, Ten Sleep, Wyoming. Unpublished report prepared for the TNC Wyoming State Office.

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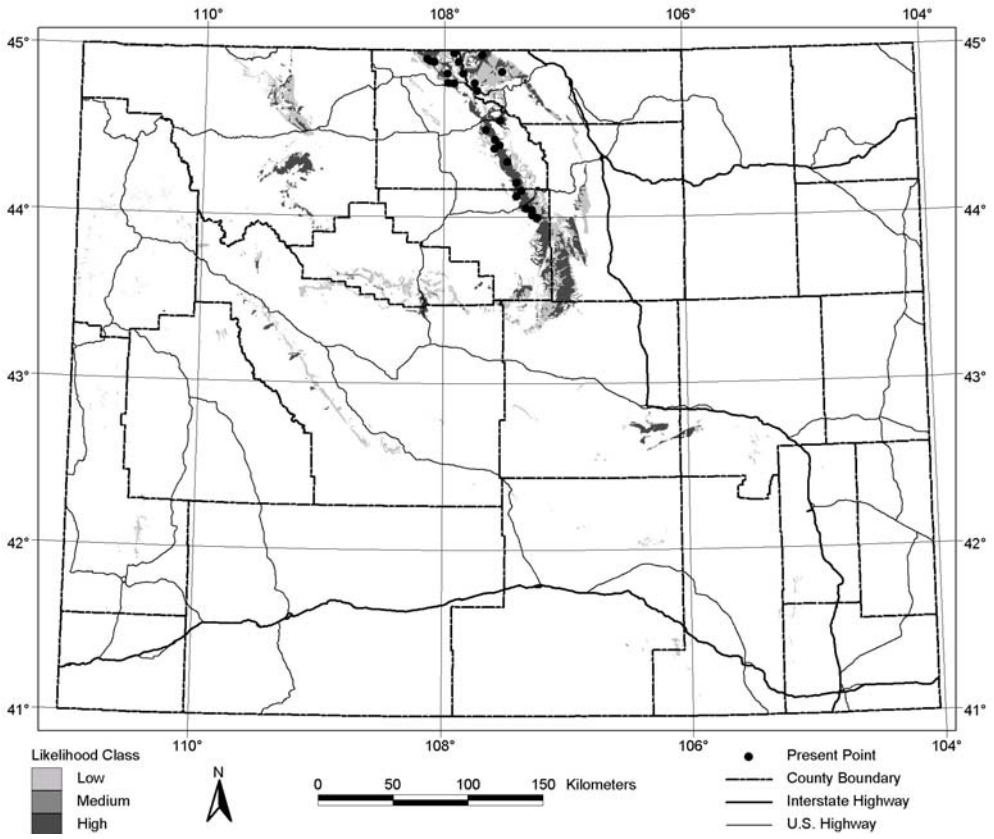


Penstemon gibbensii — Gibbens' Beardtongue

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G1/S1

Description: Gibbens' beardtongue is a perennial herb with several erect pubescent (rarely glabrous) stems 10-35 cm long. The leaves are linear to linear-lanceolate and often folded down the length of the midrib, opposite, smooth-margined, pubescent to glabrate, and mostly less than 5 mm wide. The inflorescence and flowers (including the sepals) are glandular-hairy. The bright blue corolla is tube-shaped and 15-20 mm long. Anther sacs are dark purple, 1.2-1.5 mm long, and short hairy on the back. Fruits are oval, tawny-brownish capsules.

Similar Species: *Penstemon saxosorum* has leaves over 5 mm wide and glabrous stems and sepals. *P. fremontii* and *P. cyananthus* have non-glandular inflorescences and wider leaves. *P. scariosus* has glabrous lower stems and leaves, wider leaf blades, and larger flowers.

Flowering/Fruiting Period: early June to September.

Range: Regional endemic of south-central Wyoming and adjacent northwestern Colorado, and northeastern Utah. Wyoming populations are restricted to the southern Washakie Basin and North Platte River Valley in Carbon and Sweetwater counties.

Habitat: Gibbens' beardtongue is found primarily on barren shale or sandstone slopes of the Browns Park Formation or Laney member of the Green River shale. Populations typically are found in sparsely vegetated grasslands of *Elymus spicatus, Oryzopsis hymenoides,* and *Stipa comata* with scattered shrubs. One population in eastern Carbon County is found within sparsely vegetated openings in *Cercocarpus montanus* thickets. Total vegetative cover is typically 5-10%. Wyoming populations range in elevation from 6200-7700 feet.

Above: Penstemon gibbensii *by Kaye Thorne from Fertig et al. (1994).*

Abundance and Trends: *P. gibbensii* is known from 4 occurrences in Wyoming. Fertig and Neighbours (1996) surveyed 3 populations west of Baggs in 1995 and documented 8600-8900 plants. A fourth population on Sheep Rock (discovered by Amy Roderick Taylor in 1997) had 4500-5000 individuals in 1999.

At present, the total area occupied by this species in Wyoming is ca 100 acres. Long-term trend data are lacking, but the species appears to be stable to slightly increasing at present.

Management Status: Occurs on lands managed by the BLM Rawlins Field Office, state of Wyoming, and The Nature Conservancy.

Selected References:

Dorn, R.D. 1982. A new species of *Penstemon* (Scrophulariaceae) from Wyoming. Brittonia 34 (3): 334-335.

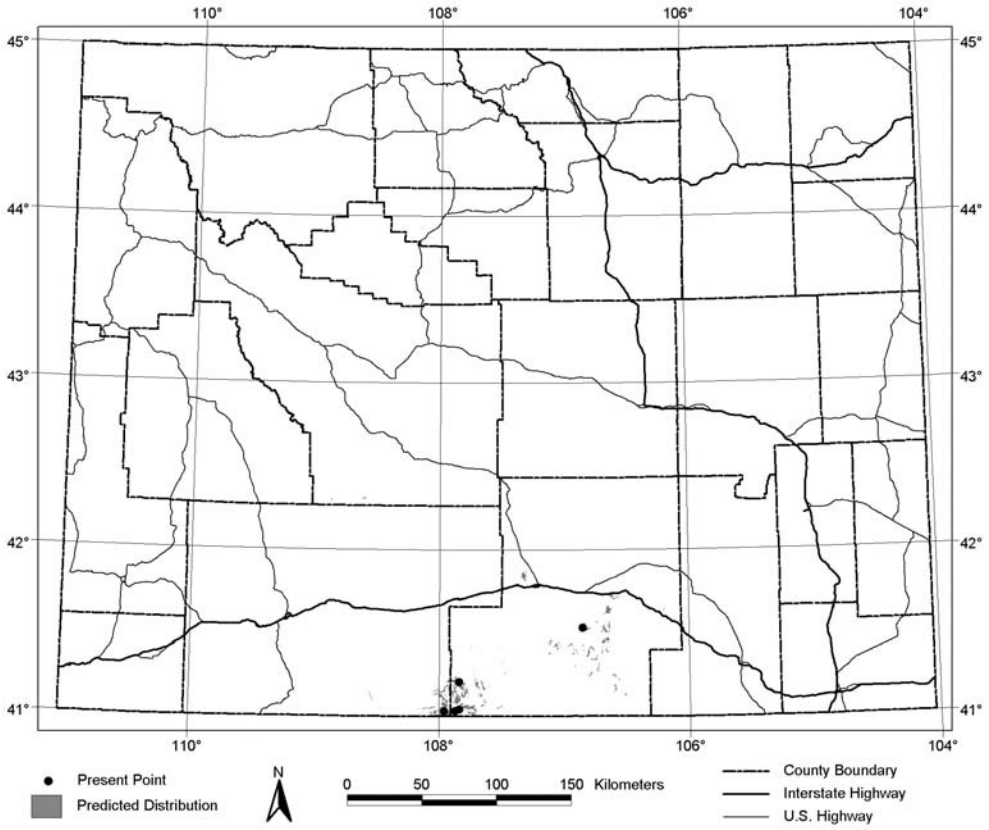
Dorn, R.D. 1989. Report on the status of *Penstemon gibbensii*, a candidate Threatened species. Unpublished report prepared for the US Fish and Wildlife Service by Mountain West Environmental Services, Cheyenne, Wyoming.

Fertig, W. and M.L. Neighbours. 1996. Status report on *Penstemon gibbensii* in south-central Wyoming. Unpublished report prepared for the Bureau of Land Management Wyoming State Office and Rawlins District by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Spackman, S. and D. Anderson. 1999. Field survey for the globally imperiled Gibbens' beardtongue, *Penstemon gibbensii* Dorn in Colorado. Report prepared for the Colorado Natural Areas Program by the Colorado Natural Heritage Program, Fort Collins, CO.

Whiskey Basin Consultants. 1982. Threatened and endangered plants inventory for the Bureau of Land Management. Unpublished report prepared by Whiskey Basin Consultants.



Penstemon haydenii **Blowout Penstemon**

Status:
US Fish & Wildlife Service: Endangered
Agency Status: Endangered
Heritage Rank: G1/S1

Description: Blowout penstemon is a perennial herb with 1 to many glabrous stems arising from a branched caudex or buried stem nodes. 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 linear leaves at the base and broad-based, clasping, waxy leaves 0.7-3 cm wide above that taper abruptly to a narrow tip. 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 sepals. Anther sacs are 1.8-2 mm long and glabrous. Fruits are 13-16 mm long capsules with light-brown, disc-shaped seeds.

Similar Species: *Penstemon grandiflorus* has ovate to spoon-shaped leaves that are widest near the middle, larger non-aromatic flowers, and larger fruits. *P. angustifolius* var. *caudatus* has smaller flowers.

Flowering/Fruiting Period: mid June to early July/July-August.

Range: Regional endemic of the Nebraska Sand Hills and the northeastern Great Divide Basin in Carbon County, Wyoming.

Habitat: Blowout penstemon is restricted to sparsely vegetated, early successional, shifting sand dunes and the lee slopes of blowout depressions created by wind erosion. In Wyoming, this species is found primarily on sandy aprons or the lower half of steep sandy slopes deposited at the base of granitic or

Above: Penstemon haydenii *in flower by W. Fertig.*

sedimentary mountains or ridges. On unstable windward slopes Blowout penstemon is found in communities of *Redfieldia flexuosa*, *Psoralidium lanceolatus* and *Elymus lanceolatus* var. *lanceolatus* with less than 5% vegetative cover or on barren slopes above small stands of *Prunus virginiana* and *Urtica dioica* associated with seep springs. Populations on more stable, lee slopes occur in similar communities with vegetative cover reaching 15-40%. Wyoming populations occur at elevations of 6680-7440 feet. *P. haydenii* is absent from gently undulating dune fields that are not associated with steep mountain slopes. These sites are probably too dry and lack supplemental water sources from springs or enhanced runoff from adjacent slopes (Fertig 2001).

Abundance and Trends: Known from 2 occurrences in Wyoming, both relocated in 2000. This species was initially discovered in Wyoming by Frank Blomquist in 1996, but was not confirmed until 1999. Previously, it was thought to be endemic to Nebraska. The Wyoming population estimated at 4200-5800 individuals at two main sites by Fertig and Blomquist in 2000 (Fertig 2001). Trends are not

known, but populations may fluctuate yearly in response to moisture conditions.

Management Status: Occurs on lands managed by the BLM Rawlins Field Office and the state of Wyoming. No populations are currently afforded special management designation.

Selected References:

Caha, C.A., D.J. Lee, and J. Stubbendieck. 1998. Organellar genetic diversity in *Penstemon haydenii* (Scrophulariaceae): an Endangered plant species. American Journal of Botany 85(12):1704-1709.

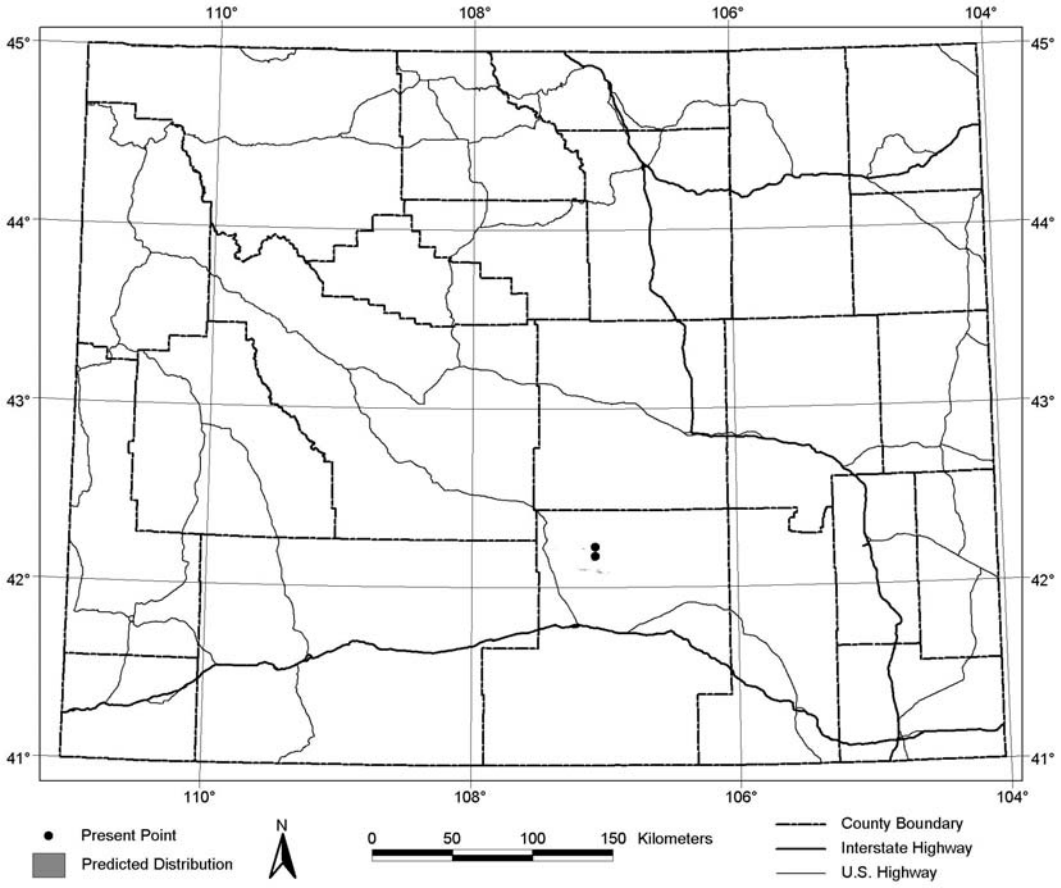
Fertig, W. 2001. 2000 survey for Blowout penstemon (*Penstemon haydenii*) in Wyoming. Prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, University of Wyoming, Laramie, WY.

Fritz, M., J. Stubbendieck, and W. Jobman. 1992. Blowout Penstemon (*Penstemon haydenii* S. Watson) Recovery Plan. US Fish and Wildlife Service Region 6, Denver, CO.

Lawson, H.R., V.J. Tepedino, and T. L. Griswold. 1989. Pollen collectors and other insect visitors to *Penstemon haydenii* S. Wats. Proceedings of the Eleventh North American Prairie Conference 233-235.

Stubbendieck, J. and T. Seibert. 1991. Status, ecology, and propagation of blowout penstemon (*Penstemon haydenii* S. Wats.). Prepared for Nebraska Game and Parks Commission by the University of Nebraska.

Stubbendieck, J., R.R. Weedon, J. Traeger, and D.T. Lindgren. 1982. Blowout penstemon (*Penstemon haydeni*, S. Watson): description, status, and culture of a rare species. Bulletin American Penstemon Society 41(1):4-6.



Phlox pungens **Beaver Rim Phlox**

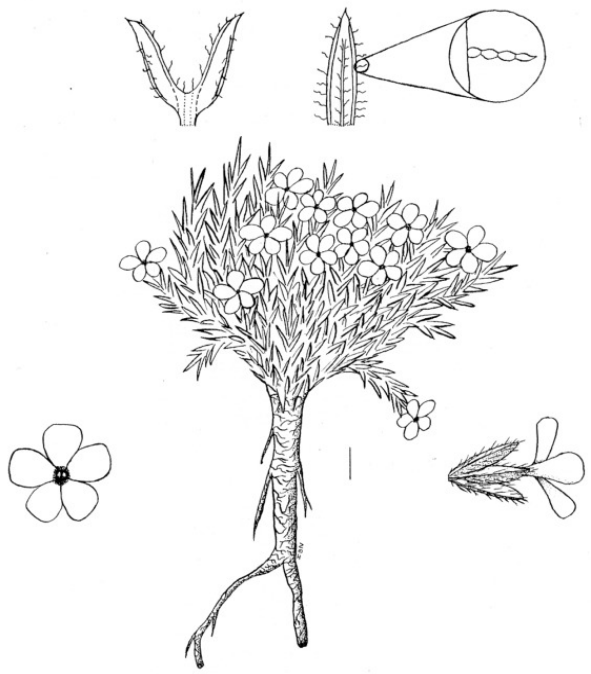
Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G2/S2

Description: Beaver Rim phlox is a leafy perennial forb that forms loose mats of prostrate or short, erect stems less than 5 cm high. The stiff, prickly leaves are lance-shaped, 1-1.5 mm wide, and have glandular or ciliate margins. The margins and midribs of the leaves are prominently thickened and gradually taper to a sharp tip. The white-petaled flowers are usually over 15 mm in diameter and have a glandular-hairy calyx tube. Populations of *Phlox pungens* from the Green River Basin differ from "typical" populations of the southeast Wind River Range and Beaver Rim in having short-stalked glandular hairs on the leaves and narrower leaf blades (under 1 mm wide) that lack thick midribs and margins. These populations have been referred to as the "Ross Butte morph" and may represent an undescribed variety (Fertig 1998).

Similar Species: *Phlox kelseyi* has soft leaves without thickened midribs or margins. *P. multiflora* has glabrous leaves and calyces. *P. hoodii* has flowers less than 12 mm wide and more slender, non-glandular leaves. *P. opalensis* has non-glandular foliage.

Flowering/Fruiting Period: May-June.

Range: Endemic to the Wind River and Green River basins and southeastern foothills of the Wind River Range in Fremont, Natrona, Lincoln, and Sublette counties, Wyoming. The "typical" form is restricted to Fremont and Natrona counties, and the "Ross Butte morph" is restricted to the Green River Basin in Lincoln and Sublette counties.



Above: Phlox pungens *by Isobel Nichols (from Fertig et al. 1994).*

Habitat: *Phlox pungens* is typically found in sparsely vegetated cushion plant communities on slopes of limestone, volcanic-rich sandstone, siltstone, or red-bed clays at 6000-7400 feet (Fertig et al. 1994). Populations of the “Ross Butte” form in the Green River Basin often occur in concave washes along summit rims, midslopes, and ridgetops of gray to reddish-brown clay-shale soils with a surface layer of white limey-sandstone in cushion plant/ bunchgrass vegetation or openings in *Artemisia nova/A. tridentata* grasslands. Less frequently, this species may be associated with *Atriplex gardneri*, *Cercocarpus montanus*, or *Chrysothamnus nauseosus* communities.

Abundance and Status: Known from at least 20 occurrences in the state, all of which have

been discovered or relocated since 1990. Dorn (1990) estimated the population to be 200,000 plants at two known sites in the Beaver Rim area in 1990. Since 1990, additional sizeable populations have been discovered, especially in the Green River Basin. Tens to hundreds of thousands of plants have been discovered in the Ross Butte, Little Colorado Desert, and Red Canyon areas by Fertig from 1993-1998. Dorn (1990) believed the known populations were stable.

Management Status: Occurs on lands managed by the BLM Lander, Pinedale, and Rock Springs Field Offices. Several populations of the "typical" form of this species are protected on Nature Conservancy easements and the Red Canyon Ranch preserve and in the BLM Beaver Rim ACEC. All other occurrences of the typical form and all known occurrences of the glandular "Ross Butte morph" are found on public lands managed for multiple use.

Selected References:

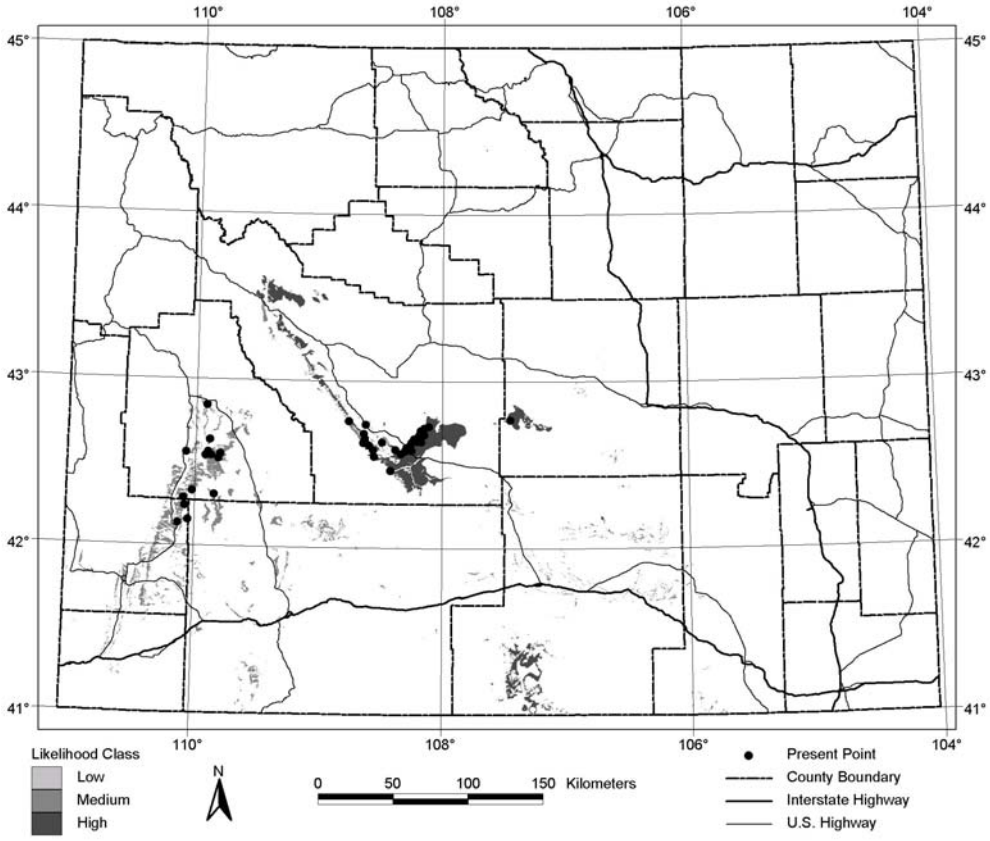
Dorn, R.D. 1988. Vascular Plants of Wyoming. Mountain West Publ., Cheyenne.

Dorn, R.D. 1990. Report on the status of *Phlox pungens*, a candidate Threatened species. Prepared for the US Fish and Wildlife Service by Mountain West Environmental Services.

Fertig, W. 1998. Plant species of special concern of the Ross Butte ecosystem, Sublette County, Wyoming. Prepared for the Bureau of Land Management Wyoming State Office and Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.



Physaria condensata **Tufted Twinpod**

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G2/S2

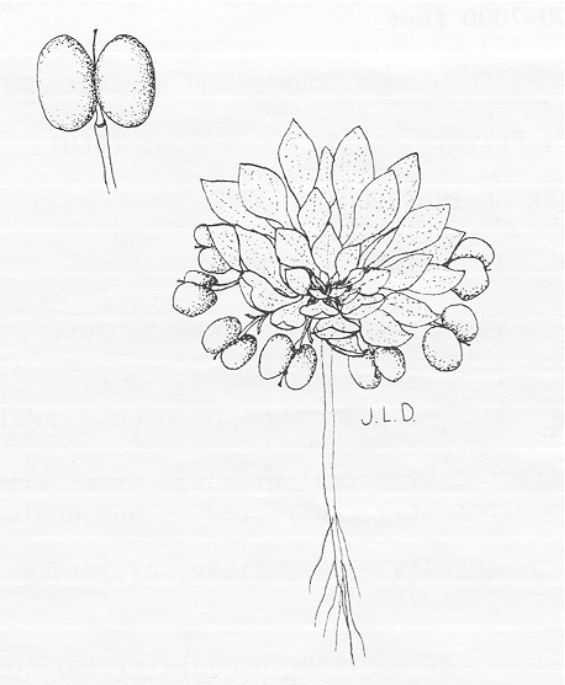
Description: Tufted twinpod is a prostrate, rosette-forming perennial forb with ascending stems to 8 cm high. The silvery-pubescent basal leaves are obovate, acute-tipped, entire, and 0.5-1.5 cm long x 4-8 mm wide. Stem leaves are smaller and reduced upwards. The inflorescence is a compact, few-flowered raceme of bright yellow, 4-petaled flowers 4-7 mm long. Fruits are inflated, deeply 2-lobed pods 0.5-1 cm wide and have appressed to spreading silvery hairs. The membranous partition (replum) between each half of the fruit is oblong to obovate, 3-4 mm long, and usually bears 4 stubby seed-bearing stalks (funiculi). Seeds are flat and lack a membranous margin.

Similar Species: *Physaria eburniflora* has whitish or pale flowers and spreading hairs on the fruit. *P. dornii* has mature fruits over 1.5 mm wide, longer leaves, and a more erect basal rosette. *P. didymocarpa* has erect stems and leaves that are often toothed. *P. acutifolia* has more erect stems and a narrowly linear replum with only 2 funiculi per face.

Flowering/Fruiting Period: May-July.

Range: Narrow endemic of the southern Overthrust Belt and lower Green River Basin in southwest Wyoming (Lincoln, Sublette, and Uinta counties).

Habitat: Occurs on dry, rocky calcareous knolls and ridges, clay banks, and shaley hills in sparsely vegetated cushion plant communities in openings within sagebrush grassland at 6700-7400 feet.



Above: Physaria condensata *by Jane Dorn.*

Abundance and Trends: Reported from 16 extant occurrences, 13 of which have been discovered or relocated since 1982 (most recently in 2000). Whiskey Basin Consultants (1982) estimated the state population at 21,200 plants in 6 large occurrences in 1982. The total state population probably numbers 40,000-60,000 at present, based on sampling by W. Fertig in 1997. Most populations are probably stable at present.

Management Status: Found on lands managed by Fossil Butte NM and the BLM Kemmerer, Pinedale, and Rock Springs Field Offices. One population is protected within the Kemmerer Cushion Plant No Surface Occupancy Area on BLM lands.

Selected References:
Fertig, W. 2000. Vascular plant species checklist and rare plants of Fossil Butte National Monument. Report prepared for the

National Park Service Northern Colorado Plateau Network by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W. 2002. Status of Tufted twinpod (*Physaria condensata*) in southwest Wyoming. Report prepared for the BLM Wyoming State Office and the Wyoming Natural Diversity Database by Walter Fertig, Botanical Consultant, Kanab, UT.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, Wyoming.

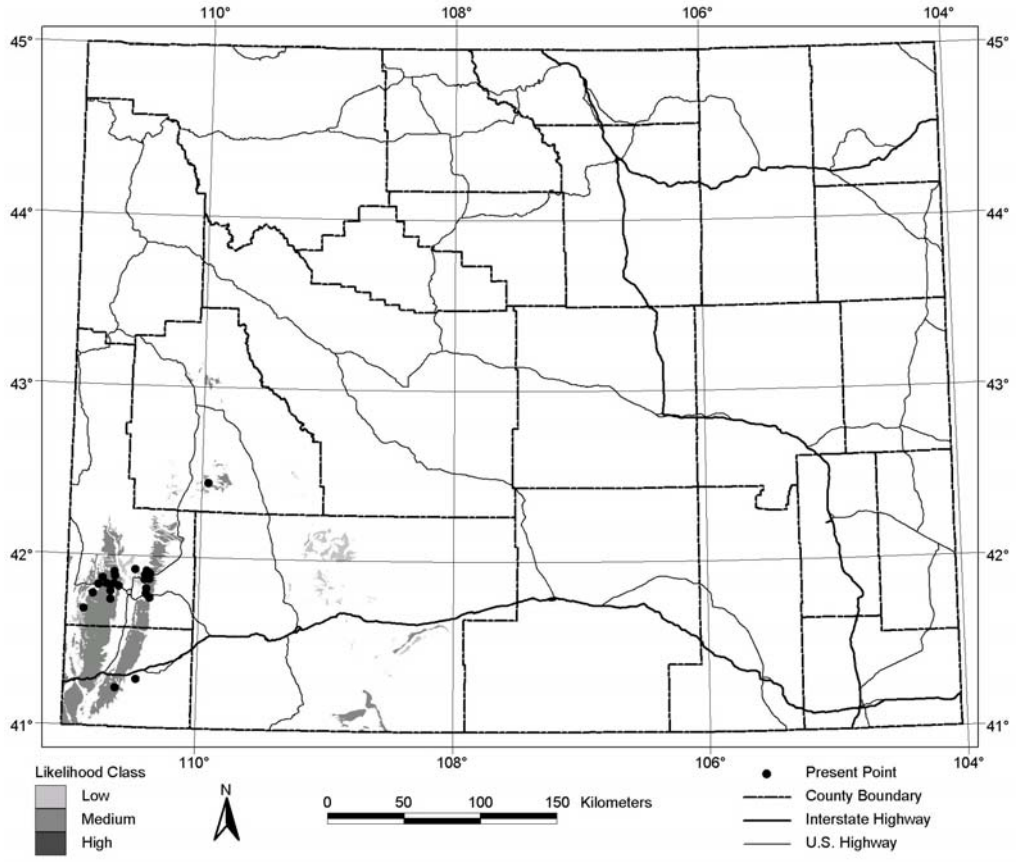
Lichvar, R.W. 1982. Taxonomy of *Physaria condensata*. Unpublished report prepared for the Wyoming Bureau of Land Management by the Wyoming Natural Heritage Program.

Marriott, H.J. 1988. Draft habitat management plan for threatened, endangered and sensitive plant species and their habitats on the Rock Springs District, Bureau of Land Management. Prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.

Rollins, R.C. 1939. The Cruciferous Genus *Physaria*. Rhodora 41:391-414.

Rollins, R.C. 1993. The Cruciferae of Continental North America, Systematics of the Mustard Family from the Arctic to Panama. Stanford Univ. Press, Stanford, CA.

Whiskey Basin Consultants. 1982. Threatened and endangered plants inventory for the Bureau of Land Management. Unpublished report prepared by Whiskey Basin Consultants.



Physaria dornii **Dorn's Twinpod**

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G1/S1

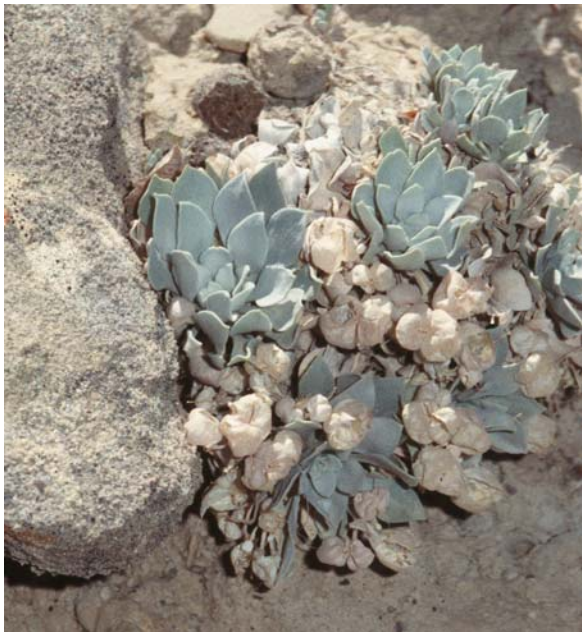
Description: Dorn's twinpod is a tufted, silvery-pubescent perennial herb up to 10 cm high. The basal rosette of leaves are erect, 5-7 cm long, oblanceolate to obovate, and acute-tipped. Flowers are yellow, 10-14 mm long, and have styles 4-5 mm long. Fruiting stems spread nearly horizontal to the ground and barely exceed the basal rosette. The fruits are inflated, two-lobed, 1-1.5 cm wide, and pubescent with thinly appressed hairs. The membranous partition (replum) between each half of the fruit is obovate and bears 4 (rarely 2-6) stubby stalks (funiculi) on each face.

Similar Species: *Physaria condensata* has shorter leaves (0.5-1.3 cm wide and 1-3.5 cm long) arranged in a flattened rosette and narrower fruits (0.5-1 cm wide) with dense pubescence. *P. eburniflora* has round-tipped leaves in a flattened basal rosette, narrower fruits with coarsely spreading hairs, and pale whitish flowers. *P. integrifolia* has erect stems that exceed the basal leaves by 5 cm or more and styles over 6 mm long. *P. didymocarpa* often has toothed leaves and smaller fruits with denser, spreading hairs.

Flowering/Fruiting Period: Late May to mid-June/late May-early July.

Range: State endemic restricted to the southern Overthrust Belt in Lincoln and Uinta counties, Wyoming.

Habitat: At the northern end of its range (Rock Creek Ridge area), Dorn's twinpod occurs primarily in openings within sparsely vegetated communities of *Cercocarpus montanus*,



Above: Physaria dornii *by Walter Fertig.*

Oryzopsis hymenoides, and *Poa secunda* on whitish clay-gravel slopes of the Twin Creek Limestone. Total vegetative cover of these sites is 1-15%. Occasional populations may occur in openings in shrub stands where *Cercocarpus* is co-dominant with *Artemisia tridentata* and *Symphoricarpos oreophilus* var. *utahensis* or has been replaced by *Artemisia nova*, *Chrysothamnus viscidiflorus*, and *Purshia tridentata*. Populations from Uinta County are found in cushion plant communities on semi-barren knolls or midslopes with scattered *Amelanchier utahensis*, *Chrysothamnus nauseosus*, and *Oryzopsis hymenoides* on fine-textured red sandstone-clays (with or without a surface layer of gravel) or gray sandy-shale soils derived from the Wasatch Formation. Elevation ranges from 6500-7600 feet.

Abundance and Trends: Known from 4 extant occurrences (consisting of 53 essentially contiguous subpopulations), all from an area of less than 35 square miles in southwestern Wyoming. Total known habitat covers less than

450 acres. Population size estimated at 20,000 plants in 1996-97 survey (Fertig 1998). Individual subpopulations range in size from 50-5000 plants in areas of 0.5-20 acres. 97% of the global population occurs along Rock Creek Ridge in Lincoln County. Overall density is often low, with as few as 0.4 plants per square meter in monitoring plots (Fertig 1998). Long-term monitoring data from Rock Creek Ridge suggests that this population is probably stable. Trend data are not available for other sites.

Management Status: All known occurrences are on lands managed by the BLM Kemmerer Field Office or on adjacent state and private lands. No occurrences are currently protected within special management areas. 4 small subpopulations of the Rock Creek Ridge occurrence are designated as No-Surface Occupancy areas by the BLM (Kemmerer Resource Area plan).

Selected References:

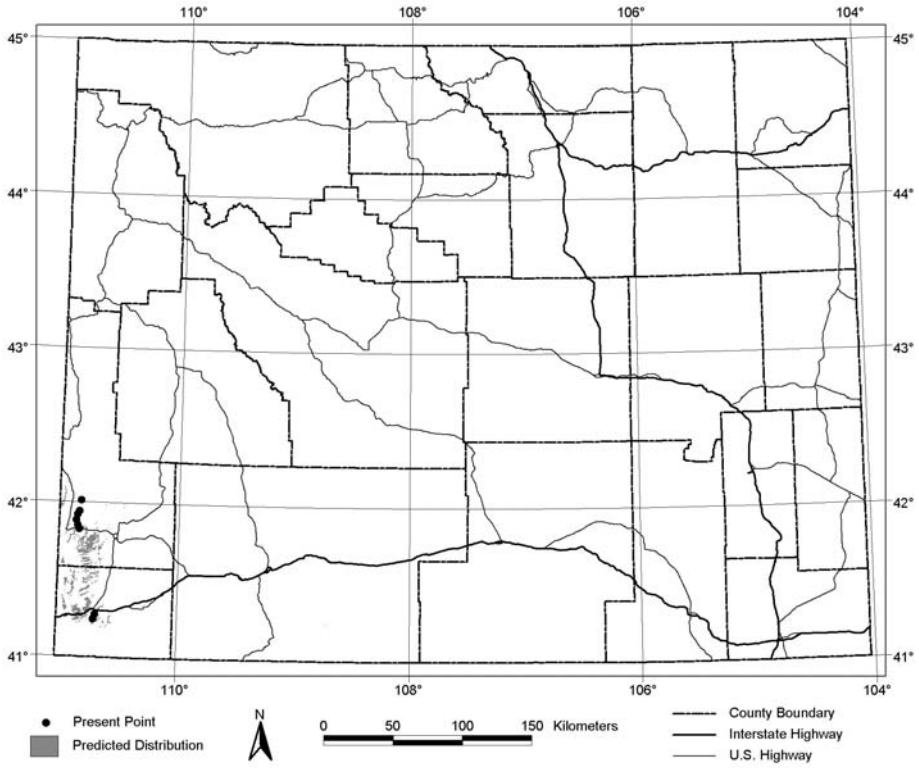
Fertig, W. 1998. Status report on Dorn's twinpod (*Physaria dornii*) in southwestern Wyoming. Unpublished report prepared for the BLM Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Lichvar, R.W. 1983. A new species of *Physaria* (Cruciferae) from Wyoming. Brittonia 35: 150-155.

Marriott, H.J. 1988. Draft habitat management plan for threatened, endangered and sensitive plant species and their habitats on the Rock Springs District, Bureau of Land Management. Prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.

Rollins, R.C. 1993. The Cruciferae of Continental North America, Systematics of the Mustard Family from the Arctic to Panama. Stanford Univ. Press, Stanford, CA.



Physaria saximontana var. *saximontana* — Rocky Mountain Twinpod

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G3T2/S2

Description: Rocky Mountain twinpod is a perennial herb with a basal rosette of mostly entire, spoon-shaped or rounded, hairy, grey-green, long-petioled leaves. Flowering stems are usually prostrate to decumbent with small, linear leaves. Flowers are yellow with 4 petals 8-10 mm long. Mature fruits are gray-hairy, inflated, and deeply notched at the top but not at the base. The membranous partition (replum) dividing each half of the fruit is oval with two stubby stalks (funiculi) on each face.

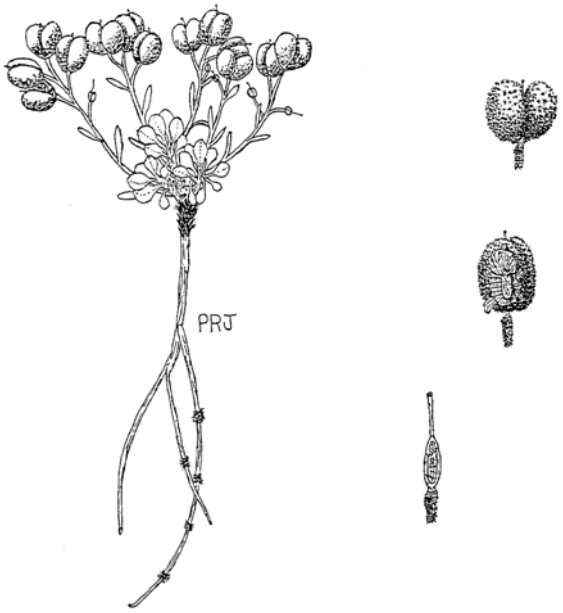
Similar Species: *Physaria didymocarpa* has three or more funiculi on each face of the partition and longer leaves. *P. acutifolia* has a linear replum and fruits that are equally lobed above and below (Fertig et al. 1994).

Flowering/Fruiting Period: May-late June/ late June-August.

Range: Var. *saximontana* is endemic to Wyoming's southern Bighorn and Wind River Basins, and foothills of the Wind River and Absaroka Ranges in Fremont, Hot Springs, and Park counties. Recently reported for Carbon County by Roderick et al. (1999).

Habitat: Sparsely vegetated slopes on sandy, gravelly soils, or talus of limestone, red sandstone, or clay at 5200-8300 feet.

Abundance and Trends: Known from 18 extant occurrences in Wyoming, 9 of which have been relocated or discovered since 1990. Populations may be small and sparse to locally abundant, depending on the suitability of habitat. Trends are probably stable at present.



Above: Physaria saximontana *var.* saximontana *by Robin Jones (from Fertig et al. 1994).*

Management Status: Found on lands managed by the BLM Lander and Worland Field Offices, Wind River Indian Reservation, and Shoshone National Forest. Two occurrences are protected within TNC's Red Canyon Preserve and in the Beaver Rim ACEC.

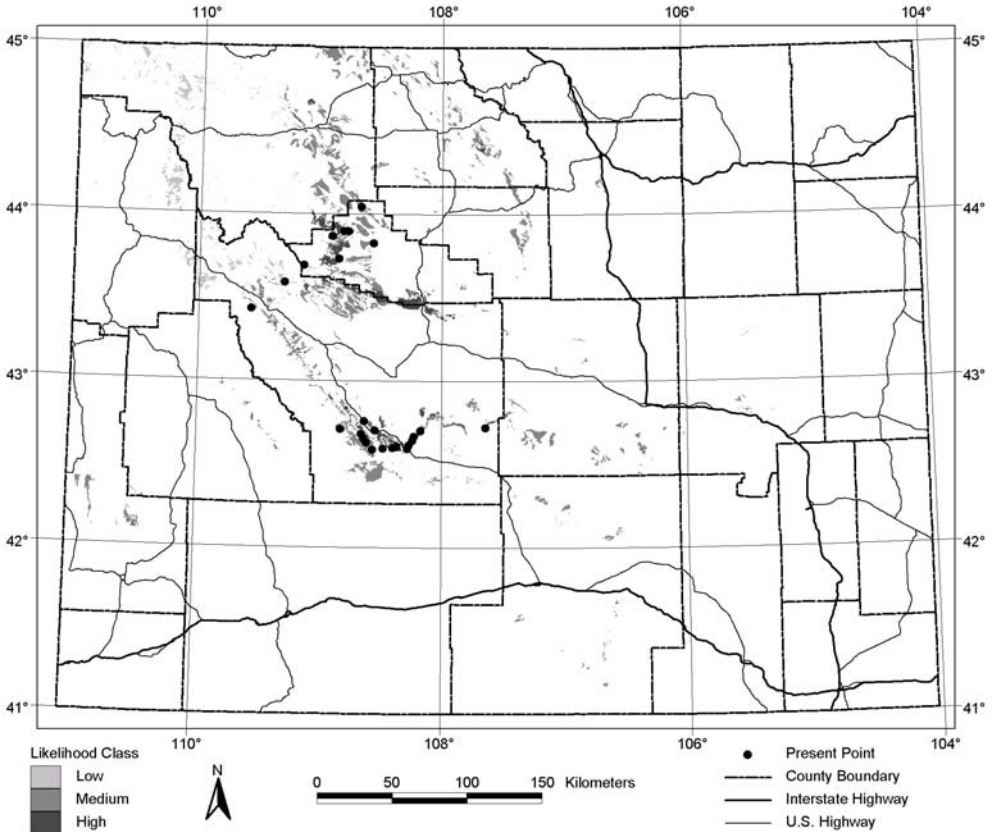
Selected References:
Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Lichvar, R.W. 1982. Taxonomy of *Physaria condensata*. Unpublished report prepared for the Wyoming Bureau of Land Management by the Wyoming Natural Heritage Program.

Mills, S. and W. Fertig. 1996. Field guide to rare and Sensitive plants of the Shoshone National Forest. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Taylor, A.R. 2000. The vascular flora of the Upper North Platte River drainage, Wyoming. Master's thesis, Dept. of Botany, University of Wyoming, Laramie, WY.

Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.



Rorippa calycina — Persistent-Sepal Yellowcress

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G3/S2S3

Description: Persistent-sepal yellowcress is a rhizomatous perennial herb with stems 10-40 cm tall. The stems and foliage are pubescent throughout with stiff, unbranched hairs. Stem leaves are pinnately divided or wavy-lobed, sessile, and 2.5-5 cm long. The flowers are borne in terminal and axillary inflorescences and have 4 yellow petals 3-5 mm long and 4 sepals that persist in fruit. Fruits are ovoid to nearly globose, 2-4 mm long, and conspicuously pubescent with unbranched hairs that are broadest at the base. Styles in fruit are 1-2 mm long and glabrous.

Similar Species: *Rorippa sinuata* has elongate, glabrous fruits over 5 mm long, deciduous sepals, and round, glassy, ball-like hairs on the leaves. *R. curvipes* often has white petals, finely hairy sepals, deeply pinnate leaves and glabrous to sparsely hairy fruits and leaves. All other Wyoming species of *Rorippa* are taprooted annuals or biennials with longer, more erect stems and fruits that are either round or narrowly elongate. Seedlings of *Ambrosia tomentosa* have wider leaves with whitish undersides. Seedlings of annual *Potentilla* species have 3-5 round-lobed leaflets (Fertig and Welp 1998).

Flowering/Fruiting Period: Late May to August, although blooming may extend into October under favorable circumstances.

Range: *Rorippa calycina* is a regional endemic of south-central Montana, western North Dakota, and central Wyoming, with a disjunct population 2,500 miles to the north on the Arctic coast of Canada's Northwest Territories

Above: Rorippa calycina *by Walter Fertig.*

(Mulligan and Porsild 1966). In Wyoming, it is known from the Bighorn Basin, North Platte River drainage, and Great Divide, Green River, and Wind River basins in Albany, Big Horn, Carbon, Fremont, Park, Sweetwater, and Washakie counties.

Habitat: Found primarily along moist sandy to muddy banks of streams, stock ponds, and man-made reservoirs near the high-water line at 3660-6800 feet. Most populations are in semi-disturbed or recently flooded openings in small inlets or bays with scattered clumps of *Hordeum jubatum, Poa secunda, Elymus smithii* and a variety of native or exotic early successional forbs. Occasionally, plants can also be found on grassy shores or in openings amid *Salix exigua* or *Tamarix chinensis* thickets.

Abundance and Trends: *R. calycina* is known from 24 occurrences (consisting of 70 subpopulations) in Wyoming, all of which have been observed since 1977. Fertig and Welp (1998) conservatively estimated the total state population at 15,000-25,000 plants based on surveys of 27 subpopulations in 1997. Long-term trend data are not available for most

populations, but individual colonies appear to vary in size and area from year to year in response to flooding levels.

Management Status: *R. calycina* occurs on lands managed by Ashley National Forest (Flaming Gorge National Recreation Area), Bighorn Canyon National Recreation Area, Pathfinder National Wildlife Refuge, the BLM Cody, Lander, Rawlins, and Worland Field Offices and Wyoming state park lands at Boysen, Buffalo Bill, and Seminoe Reservoirs. At least 11 populations are on protected lands managed by The Nature Conservancy (Red Canyon Ranch), BLM Red Canyon ACEC, US Fish and Wildlife Service and WY state parks

Selected References:

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

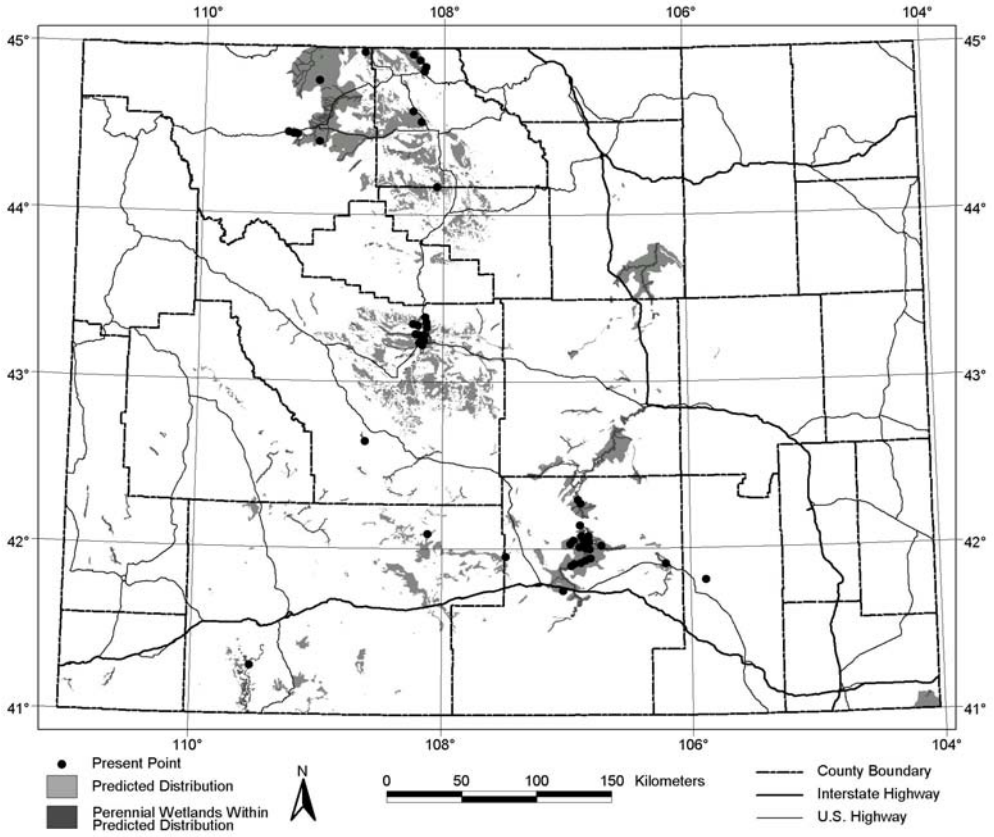
Fertig, W. and L. Welp. 1998. Status report on persistent sepal yellowcress (*Rorippa calycina*) in Wyoming. Unpublished report prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, WY

Heidel, B. 2001. Conservation status of *Rorippa calycina* (persistent-sepal yellowcress) in Montana. Report prepared for the US Fish and Wildlife Service by the Montana Natural Heritage Program, Helena, MT.

Heidel, B. and W. Fertig. 2000. Rare plants of Bighorn Canyon National Recreation Area. Report prepared for the National Fish and Wildlife Foundation and Bighorn Canyon National Recreation Area, National Park Service by the Montana Natural Heritage Program, Helena, MT and Wyoming Natural Diversity Database, Laramie, WY.

Lichvar, Robert W. 1981. Field survey for *Rorippa calycina* (Engelm.) Rydb. Report to the Bureau of Land Management by the Wyoming Natural Heritage Program, Cheyenne, WY.

Stuckey, R.L. 1972. Taxonomy and distribution of the genus *Rorippa* (Cruciferae) in North America. Sida 4:279-430.



Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act.)
Agency Status: USFS Region 2 Sensitive; WY BLM Sensitive.
Heritage Rank: G2G3/S2

Description: Shoshonea is a perennial herb that forms dense green mats 2-8 cm tall and up to 45 cm across. The leaves are 2-25 mm long, once-pinnately compound with 5-11 pairs of leaflets, and have swollen, papery petioles. Flowers are either bisexual or male (staminate), minute, yellow, and arranged in compact, flat umbels 0.75-1.5 cm wide. The fruit are sessile, oblong, and prominently ribbed. Both the fruits and the inflorescence are noticeably rough to the touch (scabrous).

Similar Species: Species of *Musineon* have erect stems and stalked, glabrous fruit. Other members of the carrot family in Wyoming differ in having twice or more compound leaves, corky-winged fruit, or glabrous inflorescences and fruits.

Flowering/Fruiting Period: Mid-May through mid-July.

Range: Regional endemic of northwest Wyoming and south-central Montana. In Wyoming, known only from the eastern Absaroka and Owl Creek mountains in Fremont, Hot Springs, and Park counties.

Habitat: Shallow, stony, calcareous soils of exposed limestone outcrops, ridge tops, and talus slopes. Associated with other low-growing forbs and cushion plants on sites with sparse cover. Elevation 5800-9200 feet.

Abundance and Trends: Shoshonea is known from 8 occurrences in Wyoming, all of which have been discovered or relocated since 1982 (7 of these were intensively studied between 1989-1996). Individual populations often number in the tens of thousands of mats. Dorn (1989) estimated the total number of plants in Wyoming at ca 210,000. Approximately 12,000 plants were reported in Montana in the late 1980s (Shelly 1988). Trends appear to be stable at present.

Above: Shoshonea pulvinata *by W. Fertig.*

Management Status: Shoshonea occurs on lands managed by the Shoshone National Forest, BLM Cody and Worland Field Offices, and Wind River Indian Reservation. One occurrence is located on the Nature Conservancy's Heart Mountain preserve. An additional population is within the proposed Bald Ridge RNA on Shoshone National Forest. All other known populations are on public lands managed for multiple use.

Selected References:

Dorn, R.D. 1989. Report on the status of *Shoshonea pulvinata*, a Candidate Threatened species. Unpublished report prepared for the US Fish and Wildlife Service by Mountain West Environmental Services, Cheyenne, WY.

Evert, E.F. and L. Constance. 1982. *Shoshonea pulvinata*, a new genus and species of Umbelliferae from Wyoming. Systematic Botany 7 (4): 471-475.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

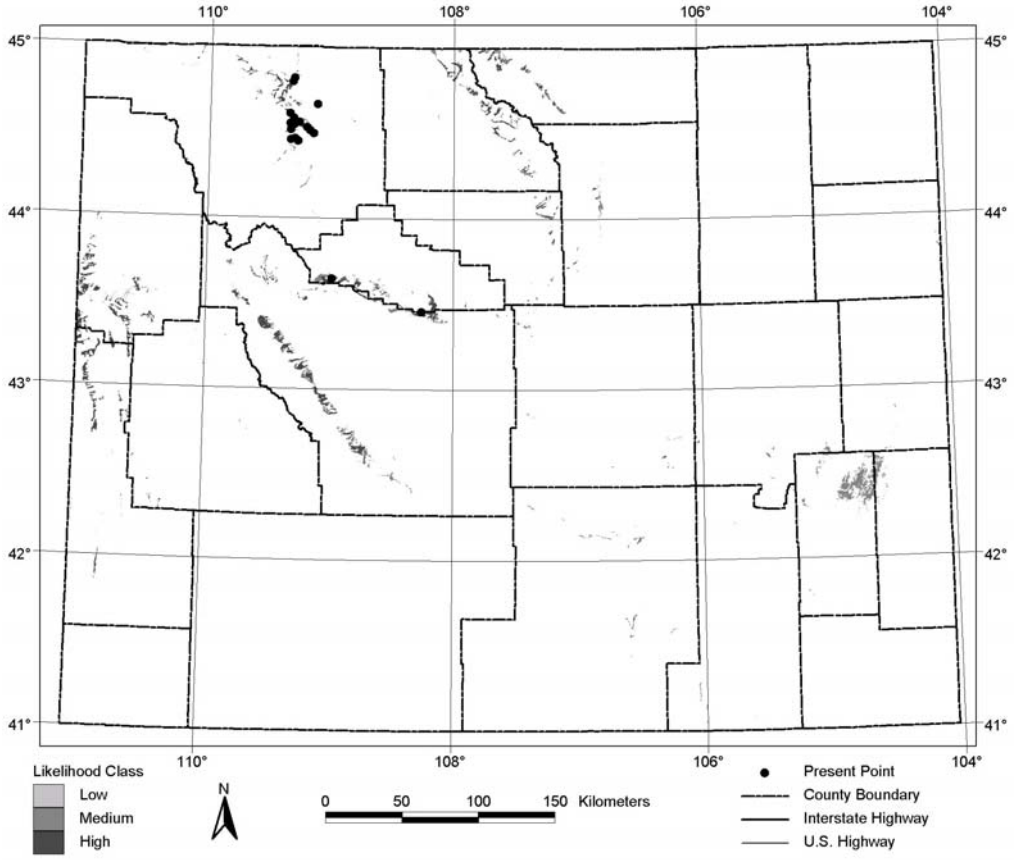
Lesica, P. 1992. Monitoring populations of *Shoshonea pulvinata* in the Pryor and Beartooth Mountains, Carbon County, Montana. Unpublished report prepared by the Montana Natural Heritage Program, Helena MT.

Marriott, H.J. 1988. Survey of sensitive plant species on Shoshone National Forest. Unpublished report prepared for Shoshone National Forest by the Wyoming Natural Diversity Database, Laramie, WY.

Marriott, H.J. 1992. Field survey for *Claytonia lanceolata* var. *flava*, *Cryptantha subcapitata* and *Shoshonea pulvinata* in the Owl Creek and southeastern Absaroka Mountains. Prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.

Shelly, J.S. 1988. Report on the conservation status of *Shoshonea pulvinata*, a candidate Threatened species. Unpublished report prepared for the US Fish and Wildlife Service by the Montana Natural Heritage Program, Helena, MT.

Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.



Sisyrinchium pallidum — Pale Blue-Eyed Grass

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: USFS Region 2 Sensitive; WY BLM Sensitive (Dropped in 2002)
Heritage Rank: G2G3/S2S3

Description: Pale blue-eyed grass is a single-stemmed or tufted perennial herb, usually less than 30 cm tall. The smooth-margined, erect leaves are shorter and usually narrower than the stem. One to five flowers are borne in a terminal inflorescence subtended by a pair of unequal, flattened, leaf-like bracts. The inner bract is often half as long as the outer bract and has a conspicuous membranous margin for its entire length. The petals and sepals are pale blue with a yellow base and 7.5-10 mm long. Fruits are brown capsules 3-5 mm long.

Similar Species: *Sisyrinchium montanum* differs in having darker, blue-purple flowers and inner bracts that lack a membranous margin at their tips. *S. idahoense* var. *occidentale* typically has shorter bracts and dark blue flowers.

Flowering/Fruiting Period: mid June-mid July/late June-late August.

Range: Regional endemic of southeastern Wyoming and north-central Colorado. In Wyoming, known from the Laramie, North Platte, and Great Divide basins in Albany and Carbon counties.

Habitat: Wet meadows, stream banks, roadside ditches, and irrigated hay meadows where standing water is available through the early growing season (elevation 7000-7900 feet). Often found on slightly alkaline soil.

Above: Sisyrinchium pallidum. *Photo by The Colorado Nature Conservancy (from Fertig et al., 1994).*

Abundance and Trends: *S. pallidum* is known from 25 locations in Wyoming, of which 22 have been discovered or relocated since 1990 (most recently in 2000). Hartman (1992) found the species to be locally abundant and estimated the population in Wyoming to be ca 250,000 individuals. Long-term trends are not known, but plants may be increasing due to the creation of suitable habitat by irrigated agriculture.

Management Status: In Wyoming, Pale blue-eyed grass occurs on the BLM Rawlins Field Office, Mortensen Lake National Wildlife Refuge, and private lands. Populations may also occur on Hutton Lake National Wildlife Refuge.

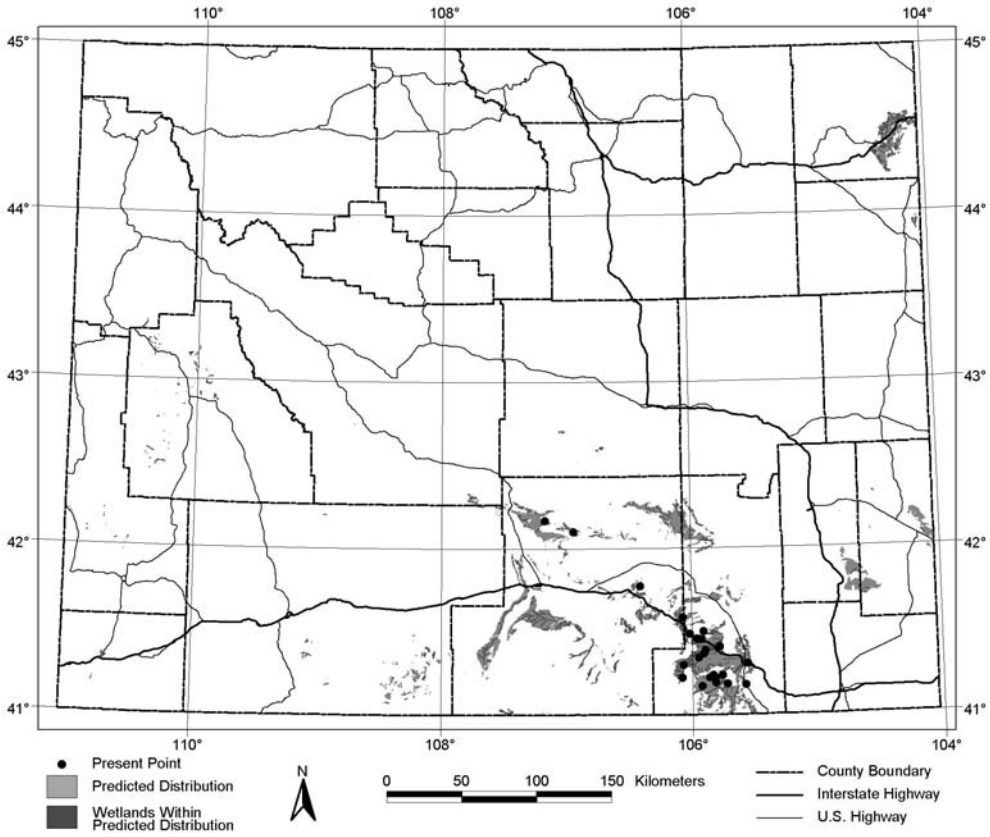
Selected References:
Cholewa, A.F., and D.M. Henderson. 1984. Biosystematics of *Sisyrinchium* section *Bermudiana* (Iridaceae) of the Rocky Mountains. Brittonia 36(4): 342-363.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Hartman, R.L. 1992. Report on the status of *Sisyrinchium pallidum*, a candidate threatened species. Status survey prepared for the U.S. Fish and Wildlife Service by the Rocky Mountain Herbarium.

Mills, S. and M. Neighbours. 1995. Intensive data gathering project (fine-filter analysis) for occurrences of rare, threatened, endangered and sensitive species in sections M331H and M331I, north central highlands and northern parks and ranges, in Wyoming. Unpublished report prepared for Medicine Bow National Forest by the Wyoming Natural Diversity Database, Laramie, WY. 294 pp.

Spackman, S., B. Jennings, J. Coles, C. Dawson, M. Minton, A. Kratz, and C. Spurrier. 1997. Colorado Rare Plant Field Guide. Prepared for the Bureau of Land Management, US Forest Service, and US Fish and Wildlife Service by the Colorado Natural Heritage Program, Ft. Collins, CO.



Sphaeromeria simplex — Laramie False Sagebrush

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act.)
Agency Status: USFS Region 2 Sensitive; WY BLM Sensitive.
Heritage Rank: G2/S2

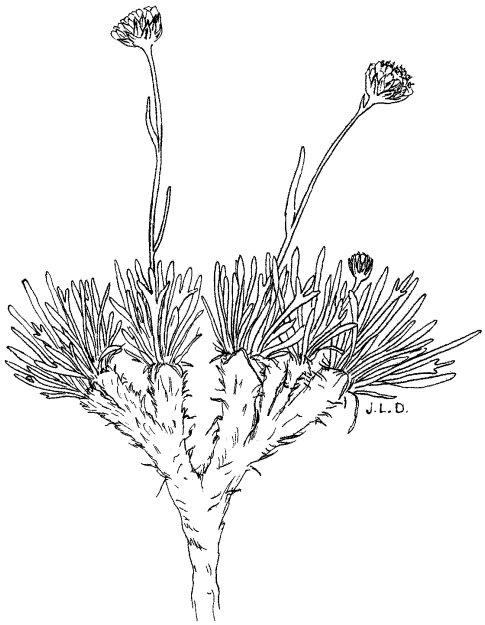
Description: Laramie false sagebrush is a mat-forming perennial herb or subshrub less than 10 cm tall. The silvery-hairy linear leaves are crowded at the base of the stem and are entire or 2-3 toothed at the tip. Flowering stems have 2-3 small, linear leaves and a single, terminal flower head of numerous, yellow disk flowers (ray flowers are absent). The involucre is composed of two sets of green bracts with membranous margins. No pappus is present on the ribbed achenes.

Similar Species: *Sphaeromeria capitata* has a single, head-like terminal inflorescence composed of 2 or more separate, sessile flower heads (recognizable by the presence of more than one involucre). *S. argentea* has several distinct, short-stalked heads in a loose inflorescence. Herbaceous and low shrubby species of *Artemisia* have numerous flowering heads arranged in spikes, racemes, or panicles. Vegetative and rayless specimens of *Hymenoxys acaulis* differ in having tufts of white hairs at the base of the sessile, entire basal leaves.

Flowering/Fruiting Period: May to August.

Range: Endemic to southeast Wyoming in the western foothills of the Laramie Range, Shirley Basin, and Shirley Mountains (Albany, Carbon, Converse, and Natrona counties).

Habitat: Occurs primarily on gentle slopes or rims of dry, rocky limestone-sandstone "pebble plains" in wind-scoured openings dominated by cushion plant communities within more densely vegetated juniper, limber pine, big sagebrush, or mountain mahogany stands. Occasional high elevation populations occur on thin-soiled outcrops of limestone bedrock associated with redbeds in cushion plant/*Artemisia tripartita* var. *rupicola* communities. Elevation ranges from 7200-8760 feet.



Above: Sphaeromeria simplex *by Jane Dorn.*

Abundance and Trends: Laramie false sagebrush is known from 11 occurrences in Wyoming, all of which have been observed or discovered since 1996 (6 new sites were discovered in 1997). Robert Dorn estimated the population at the north end of the Laramie Range and Shirley Mountains at ca 860,000 individuals in 1996 (Mountain West Environmental Services 1996). With the discovery of 6 additional populations in 1997, this figure is probably closer to over 1 million. The Laramie population has probably declined over the past century due to habitat loss. Trends elsewhere are unknown, but probably stable.

Management Status: *S. simplex* occurs on the BLM Rawlins Field Office and state and private lands. The Nature Conservancy has a conservation easement on 20 acres at the Laramie limestone quarry site. All other populations are on lands managed for multiple use.

Selected References:

Fertig, W. 1993. Field survey for *Cryptantha subcapitata*, *Physaria eburniflora*, and *Sphaeromeria simplex* on Bureau of Land Management lands in Central Wyoming. Report prepared for the BLM Casper District by the Wyoming Natural Diversity Database, Laramie, WY.

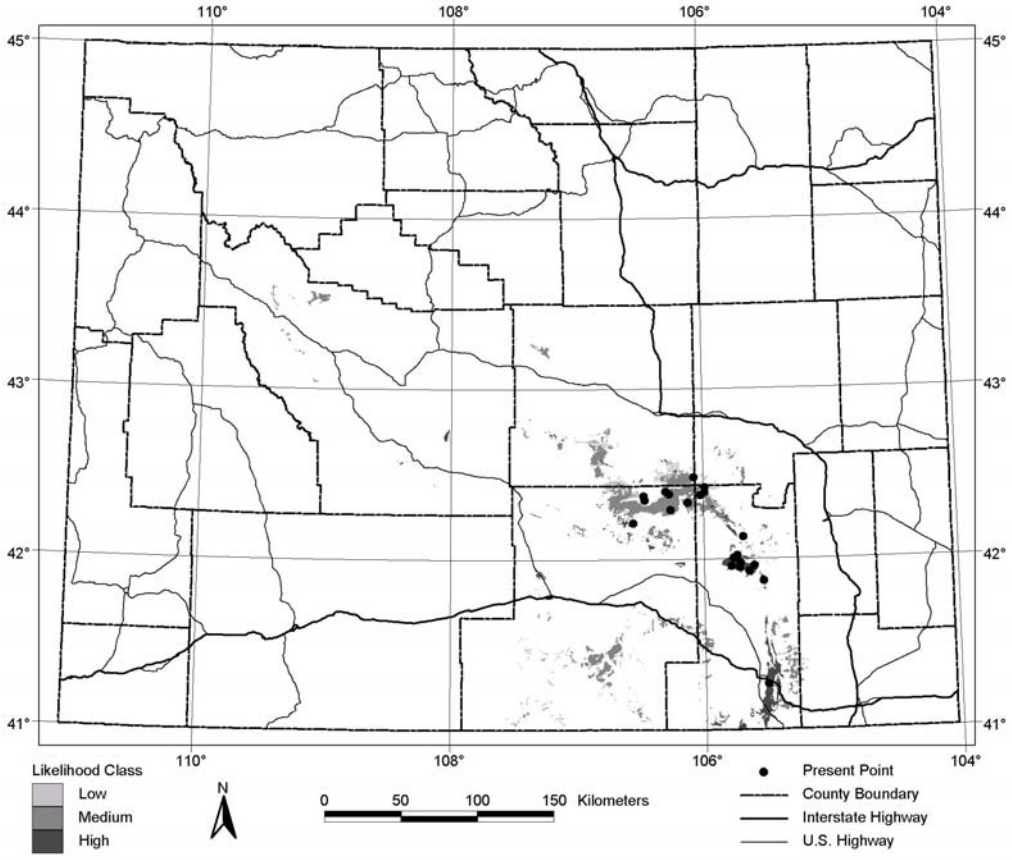
Fertig, W. and G. Jones. 1997. Plant species of special concern and plant associations of the Shirley Mountains ecosystem Carbon County, Wyoming. Unpublished report prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie Wyoming.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Holmgren, A.H., L.M. Shultz, and T.K. Lowrey. 1976. *Sphaeromeria*, a genus closer to *Artemisia* than to *Tanacetum* (Asteraceae: Anthemideae). Brittonia 28: 252-262.

Mountain West Environmental Services. 1996. Inventory and status survey for *Sphaeromeria simplex*. Unpublished report prepared for the Bureau of Land Management.

Nelson, A. 1899. New plants from Wyoming X. Bulletin Torrey Botanical Club 26: 480-487.



Spiranthes diluvialis Ute Ladies-Tresses

Status:
US Fish & Wildlife Service: Threatened
Agency Status: Threatened
Heritage Rank: G2/S1

Description: Ute ladies' tresses is a perennial herb with erect, glandular-pubescent stems 12-50 cm tall arising from tuberous-thickened roots. Basal leaves are linear, up to 1 cm wide and 28 cm long, and persist at flowering time. Leaves become progressively reduced higher up the stem. The inflorescence is a loose spike 3-15 cm long of numerous, small white to ivory flowers arranged in a gradual spiral. The lip petal is oval to lance-shaped, narrowed at the middle, and has crispy-wavy margins. Sepals are separate or fused only at the base (not forming a hood-like structure) and are often spreading at their tips.

Similar Species: *Spiranthes romanzoffiana* has deeply constricted lip petals, sepals fused for at least 1/2 their length into a hood-like tube, and a densely congested inflorescence and occurs in montane wetlands. *S. magnicamporum* (a prairie species not currently known from Wyoming) has strap-shaped, wavy-margined lip petals and lacks leaves at flowering time. *Habenaria* [*Platanthera*] *dilatata* has a more elongate inflorescence, broader leaves, and white flowers with an elongated spur on the back of the lip petal.

Flowering/Fruiting Period: Late July-September.

Range: Currently known from western Nebraska, southeastern Wyoming, north-central Colorado, northeastern and southern Utah, east-central Idaho, southwestern Montana, and central Washington. An historical population is also known from south-central Nevada. In Wyoming, *S. diluvialis* is known from the western Great Plains in Converse, Goshen, Laramie, and Niobrara counties.

Above: *Spiranthes diluvialis* from Goshen County, WY by Walter Fertig.

Habitat: In Wyoming, *S. diluvialis* is found mostly on low, flat floodplain terraces or abandoned oxbows within 0.5-15 m of small streams. These sites are subirrigated and seasonally flooded, remaining moist into the summer. Populations occur in moist meadow communities dominated by *Agrostis stolonifera, Elymus repens, Juncus balticus, Panicum virgatum,* and *Hordeum jubatum* within a narrow band between emergent aquatic vegetation and adjacent dry upland prairie. Vegetative cover is typically 75-90%, but is usually short (under 45 cm tall). Soils range from alluvial sand and coarse silt to whitish loamy-clays with a slightly basic pH and are derived from Quaternary alluvial deposits or sandstones and claystones of the Wasatch

Formation. Wyoming populations range in elevation from 4650-5420 feet (Fertig 2000).

Abundance and Trends: Known from 4 occurrences in Wyoming, all discovered between 1993-1997. The total state population is estimated at ca 830-1200 plants in a total area of about 10 acres (this number may fluctuate from year to year). Individual populations range from 12-35 individuals to 450-500 plants (Fertig 2000). Long-term trends are not known, but are probably stable at most sites in Wyoming. The Converse County population may be in decline as its habitat becomes more overgrown with denser vegetation.

Management Status: Wyoming populations are found on lands managed by the BLM Casper Field Office, state lands office, and private owners. All known occurrences are on lands managed for multiple use.

Selected References:

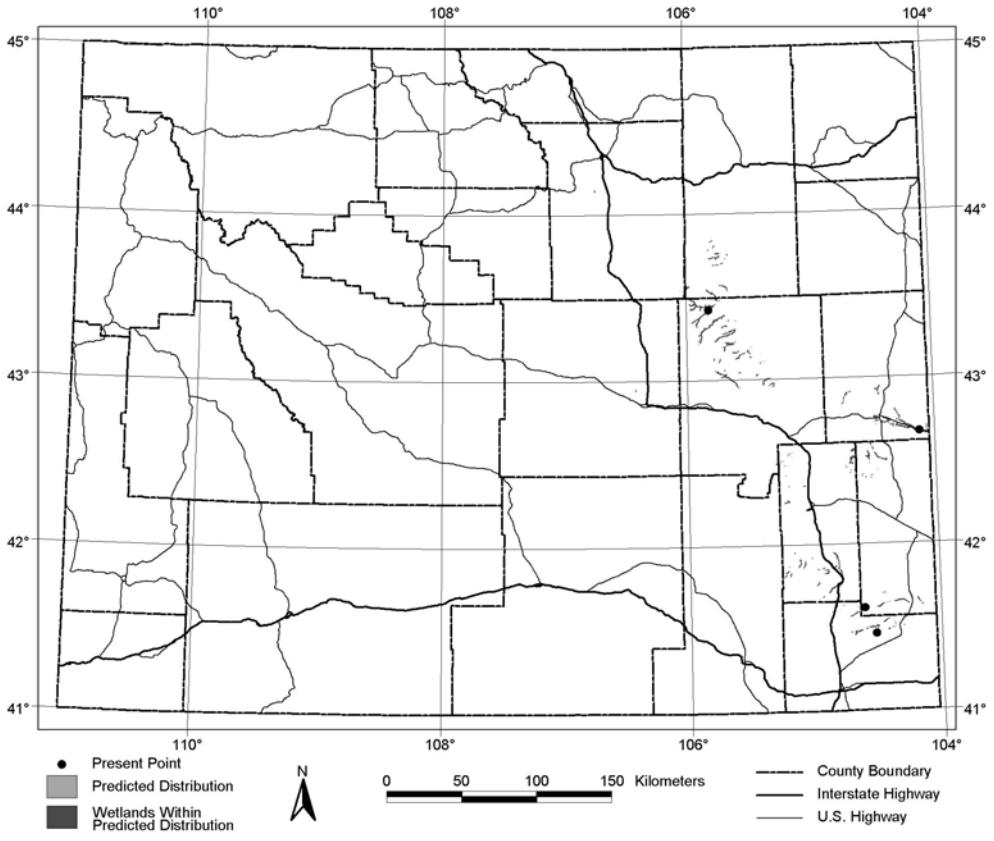
Fertig, W. 2000. Status review of the Ute ladies tresses (*Spiranthes diluvialis*) in Wyoming. Report prepared for the Wyoming Cooperative Fish and Wildlife Research Unit, US Fish and Wildlife Service, and Wyoming Game and Fish Department by the Wyoming Natural Diversity Database, Laramie, Wyoming.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Sheviak, C. J. 1984. *Spiranthes diluvialis* (Orchidaceae), a new species from the western United States. Brittonia 36(1): 8-14.

Sipes, S. D. and V. J. Tepedino. Reproductive biology of the rare orchid, *Spiranthes diluvialis*: breeding system, pollination, and implications for conservation. Conservation Biology 9 (4): 929-938.

Szalanski, A.L., G. Steinauer, R. Bischof, and J. Petersen. 2001. Origin and conservation genetics of the Threatened Ute ladies'-tresses, *Spiranthes diluvialis* (Orchidaceae). American Journal of Botany 88(1):177-180.



Thelesperma caespitosum — Green River Greenthread

Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: USFS Region 4 Sensitive; WY BLM Sensitive.
Heritage Rank: G1/S1

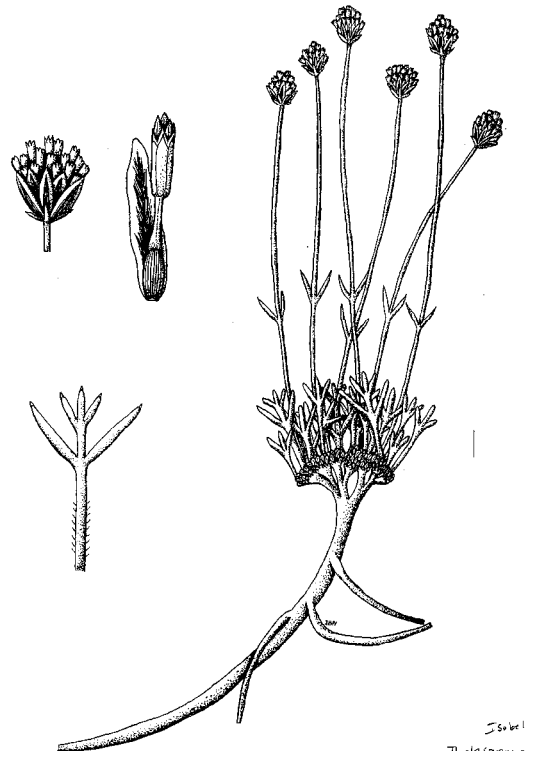
Description: Green River greenthread is a tap-rooted perennial herb with glabrous flowering stems 4-19 cm tall. The mostly basal leaves are pinnately compound with 3-5 short, narrow leaflets. Leaves are glabrous except for the ciliate margins of the petiole (although some specimens in Utah may have sparsely pubescent leaf blades). Flower heads occur singly or in pairs on each stem and contain only reddish-yellow disk flowers. The involucre consists of two distinct rows of connate bracts, with the inner bracts conspicuously larger than the reflexed outer ones. Individual flowers lack a pappus but are subtended by a membranous receptacle bract.

Synonyms: *Thelesperma subnudum* var. *caespitosum*; *T. pubescens* var. *caespitosum*.

Similar Species: *Thelesperma pubescens* differs in having grayish leaf blades that are pubescent throughout. *T. marginatum* has leaves that are completely glabrous (including the petiole), numerous flower heads per stem, and a more northerly distribution. *Hymenopappus filifolius* has multiple flowering heads per stem and ashy-gray woolly-pubescent leaves. Rayless specimens *of Erigeron compositus* differ in having thin pappus bristles and involucre bracts in a single, uniform series.

Flowering/Fruiting Period: late May to mid July/late June through July.

Range: Regional endemic of the Green River Basin in southwestern Sweetwater County, Wyoming and Uinta Basin in southern Duchesne County, Utah.



Above: Thelesperma caespitosum *by Isobel Nichols (from Fertig et al. 1994).*

Habitat: In Wyoming, Green River greenthread occurs in sparsely vegetated cushion plant communities dominated by *Arenaria hookeri*, *Haplopappus armerioides*, and *H. nuttallii* on bleached, white or brownish limey-slate outcrops of the Eocene-age Green River Formation (Wilkins Peak member). Vegetative cover is typically 2-15%, while bare soil and rock account for 50-75% of total cover. Soils are dry, weakly developed inceptisols or carbonate-rich aridisols with a shallow lithic contact.

Abundance and Trends: In Wyoming, *T. caespitosum* is known from 3 occurrences (consisting of 13 subpopulations) occupying an area of less than 25 acres. The total population was estimated at 26,500-31,500 in 1998. Individual colonies may be locally abundant, with average densities as high as 3.8-5.7 plants per square meter. Long term trends are not known, but disturbance from road construction and off-road vehicles has resulted in some habitat loss and mortality at one of the Wyoming sites.

Management Status: Populations in Wyoming occur on the BLM Rock Springs Field Office, Ashley National Forest (Flaming Gorge National Recreation Area), FMC Park (managed by the city of Green River) and private lands. No populations currently occur within special management areas.

Selected References:

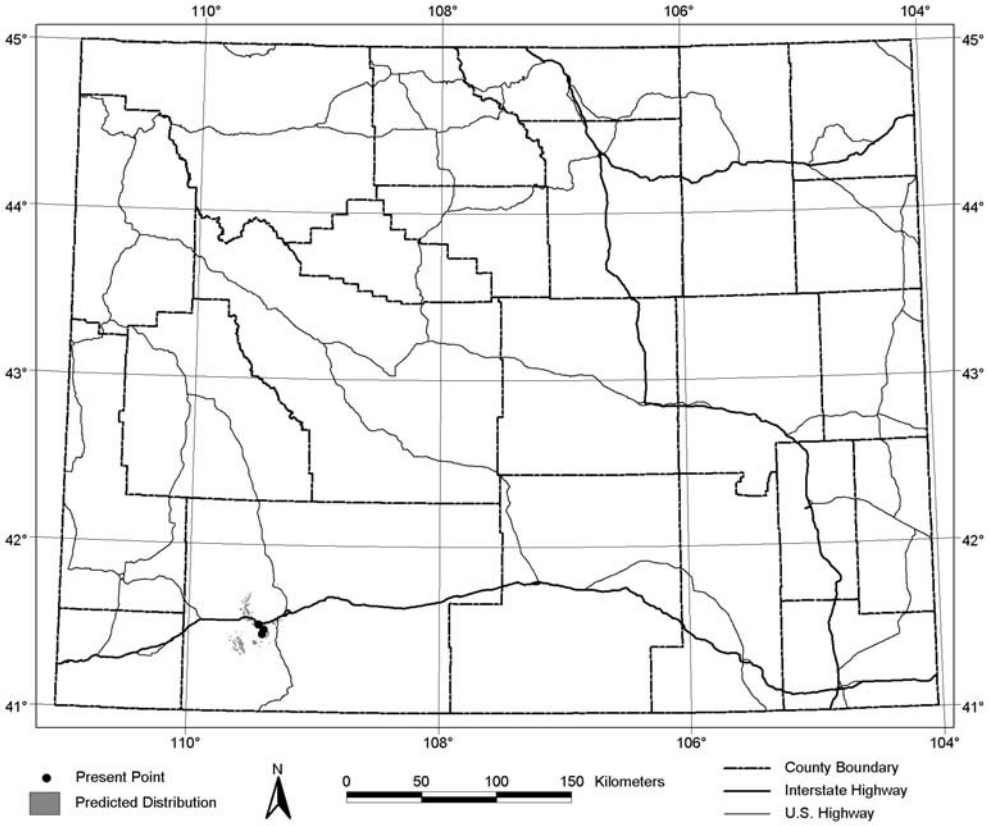
Dorn, R.D. 1990. *Thelesperma caespitosum* (Asteraceae), a new species from Wyoming and Utah. Madrono 37:293-298.

Fertig, W. 1995. Status report on *Thelesperma caespitosum* in southwestern Wyoming. Report prepared for the BLM Rock Springs District by the Wyoming Natural Diversity Database.

Fertig, W. 1999. Updated status report on Green River greenthread (*Thelesperma caespitosum*) in southwestern Wyoming. Report prepared by the Wyoming Natural Diversity Database, University of Wyoming, Laramie, Wyoming.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Refsdal, C.H. 1996. A general floristic inventory of southwest Wyoming and adjacent northeast Utah, 1994-1995. Unpublished report prepared for the Bureau of Land Management Wyoming State Office, Bureau of Land Management Vernal Supervisor's Office, US Fish and Wildlife Service, and US Forest Service Region 4 by the University of Wyoming, Rocky Mountain Herbarium, Laramie, WY.



Status:
US Fish & Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act)
Agency Status: USFS Region 4 Sensitive; WY BLM Sensitive
Heritage Rank: G1/S1

Description: Uinta greenthread is a perennial herb from a thick, woody, branched caudex and taproot covered with old leaf bases. Flowering stems are 3-12 cm high, glabrous, and mostly leafless. Basal leaves are 1-5 cm long, pinnately compound with 3-5 linear leaflets, and densely short gray-hairy. Flower heads occur singly or rarely in pairs and have 2 rows of unequal scarious-margined bracts, with the outer bracts shorter and often reflexed. Ray flowers are absent. Disk flowers are yellow, 5 mm long, and lack a pappus. Achenes are glabrous, angular, about 4 mm long, and subtended by a long membranous bract.

Similar Species: *Thelesperma caespitosum* has glabrous leaf blades. Other Wyoming species of *Thelesperma* have conspicuous ray flowers, leafy stems, or glabrous herbage. *Hymenopappus filifolius* has long cobwebby pubescence, scale-like pappus, and many flower heads per stem. Rayless *Erigeron compositus* specimens have hair-like pappus bristles and a single row of involucre bracts.

Flowering/Fruiting Period: July-August.

Range: Endemic to foothills of southern Green River Basin and northern Uinta Range in southwest Wyoming (Uinta and Sweetwater counties) and reported for adjacent northeast Utah.

Habitat: Uinta greenthread grows on cobbly soils, typically along the summit edges of relict surfaces that now stand as isolated "mountains".

Above: Thelesperma pubescens *by Hollis Marriott.*

These mesa-like mountains are capped with the Bishop Conglomerate and are sparsely vegetated with cushion plant communities and sagebrush grasslands. *T. pubescens* may occasionally be found at the edge of mountain mahogany communities found just below the summit rim (Marriott 1988).

Abundance and Trends: *T. pubescens* is known from 4 extant occurrences in Wyoming, most recently observed in 1999. Dorn (1989) estimated the total population at 9200 plants covering 270 acres. This estimate is probably conservative, based on observations by Marriott (1988) and Fertig in 1994. Trends are probably stable at present.

Management Status: Occurs on lands managed by the BLM Rock Springs Field Office and Wasatch-Cache National Forest. All 4 known populations are within Special Status Plant ACECs established in 1997 by the BLM Rock Springs Field Office.

Selected References:

Dorn, R.D. 1989. Report on the status of *Thelesperma pubescens*, a Candidate Threatened species. Prepared for the US Fish and Wildlife Service by Mountain West Environmental Services, Cheyenne, WY.

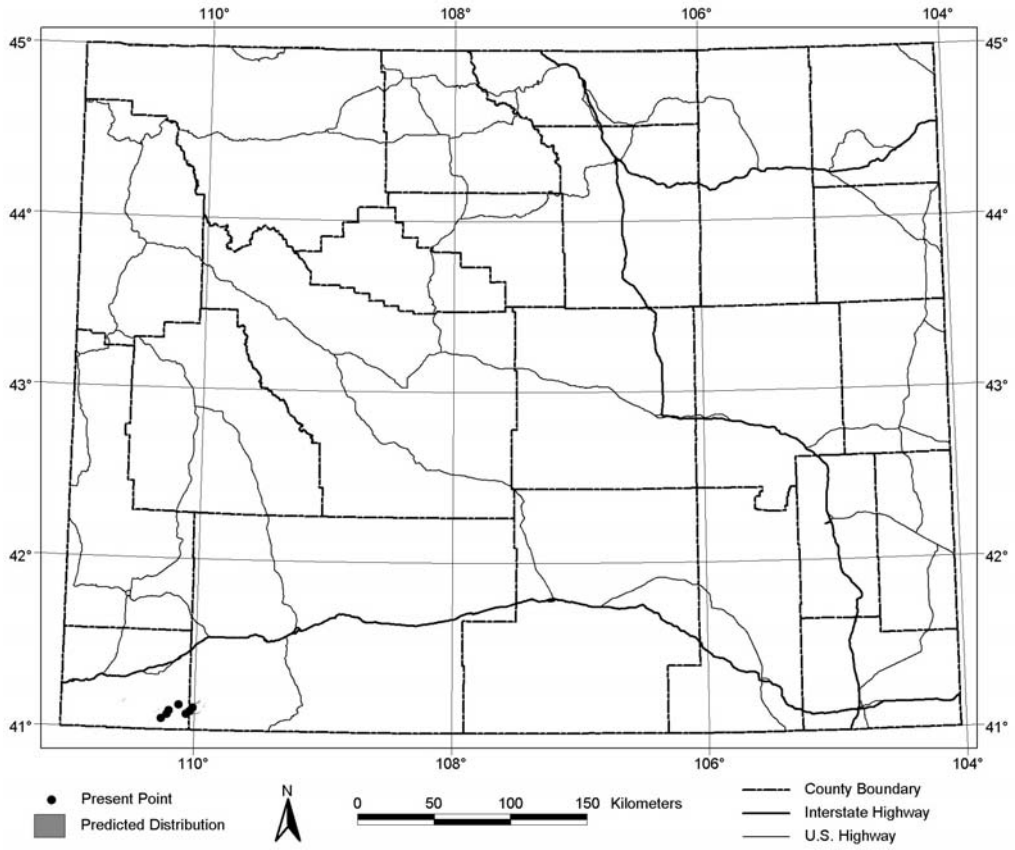
Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.

IHI Environmental. 1995. Draft Conservation Strategy and Action Plan, *Thelesperma pubescens* (Uinta greenthread). Unpublished report prepared for Wasatch-Cache National Forest by IHI Environmental, Salt Lake City, UT.

Marriott, H.J. 1988. Draft habitat management plan for threatened, endangered and sensitive plant species and their habitats on the Rock Springs District, Bureau of Land Management. Report prepared for the BLM by the Wyoming Natural Diversity Database, Laramie, WY.

Marriott, H.J. 1988. Inventory and monitoring of *Thelesperma pubescens* (Uinta greenthread), a Category 2 candidate plant species for Federal listing, on Wasatch National Forest and the Rock Springs District, BLM. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.



Townsendia microcephala — Cedar Mountain Easter Daisy

Status:
US Fish and Wildlife Service: None (formerly a C2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G1/S1

Description: Cedar Mountain Easter daisy is a rosette-forming, taprooted, perennial forb. The leaves are mostly oblanceolate, 1-2.5 mm wide, and moderately to densely pubescent with tangled, soft, woolly hairs. Flowers heads are mostly sessile and borne among the leaves. The involucre is 6-8 mm long and 4-8 mm wide with mostly lance-shaped, pointed-tipped bracts with long hairs. Ray flowers are white and 5-8 mm long. The achenes are glabrous and smooth-surfaced with deciduous pappus bristles.

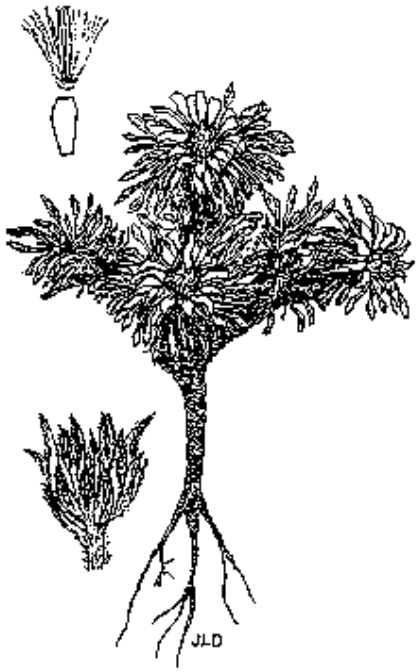
Similar Species: *Townsendia condensata* and *T. spathulata* have larger flowering heads with involucres mostly 8-40 mm wide and hairy, papillate achenes. *T. nuttallii* has narrower involucre bracts arranged in 5-7 series, wider heads, and pubescent achenes.

Flowering/Fruiting Period: Late May-July.

Range: Cedar Mountain Easter daisy is endemic to Cedar and Sage Creek mountains in the southern Green River Basin at the foothills of the Uinta Range in Sweetwater and Uinta counties, Wyoming.

Habitat: Occurs in sparsely vegetated cushion plant communities dominated by low forbs and scattered graminoids on west-facing, wind-blasted rims and adjacent ridgetops capped by coarse gravels of the Bishop Conglomerate. Soils are shallow, sandy entisols or inceptisols. *T. microcephala* is absent from areas dominated by *Cercocarpus montanus* or *Artemisia tridentata* grasslands.

Abundance and Trends: Cedar Mountain Easter daisy is known from 3 extant occurrences, all of which have been observed or relocated since 1994. Fertig (1995) documented 330-380 plants in 16 acres of habitat in surveys in 1994 and estimated the total population at 2280-4550 plants. Long-term trends are not known.



Ill. by Jane Dorn (Madrono 39:189-192, 1992)

Above: Townsendia microcephala *by Jane Dorn from Fertig et al. 1994.*

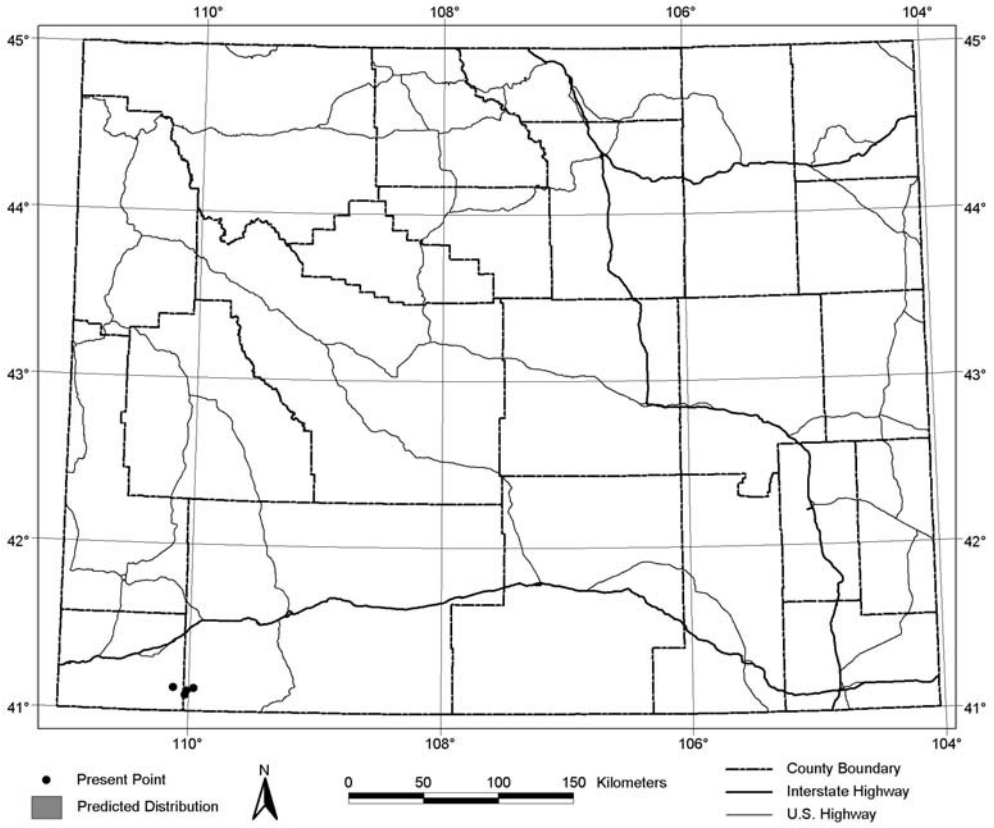
Management Status: Occurs entirely on lands managed by the BLM Rock Springs Field Office. All 3 known populations co-occur with *Thelesperma pubescens* in designated Special Status Plant ACECs on BLM lands.

Selected References:
Dorn, R.D. 1992. *Townsendia microcephala* (Asteraceae: Astereae): a new species from Wyoming. Madrono 39(3):189-192.

Fertig, W. 1995. Status report on *Townsendia microcephala* in southwestern Wyoming. Report prepared for the BLM Rock Springs District by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.



Trifolium barnebyi **Barneby's Clover**

Status:
US Fish & Wildlife Service: None (formerly a Category 2 candidate for listing under the Endangered Species Act).
Agency Status: WY BLM Sensitive.
Heritage Rank: G4T1/S1

Description: Barneby's clover is a mat-forming perennial herb growing up to 5 cm high. The leaves are divided into 3 oblanceolate, toothed leaflets with 12-18 pairs of closely spaced veins. Leaflets are glabrous or occasionally pubescent along the midvein. The flowers are whitish, pea-like, and arranged in a pubescent, head-like inflorescence that is not subtended by an involucre.

Synonyms: *Trifolium haydenii* var. *barnebyi.*

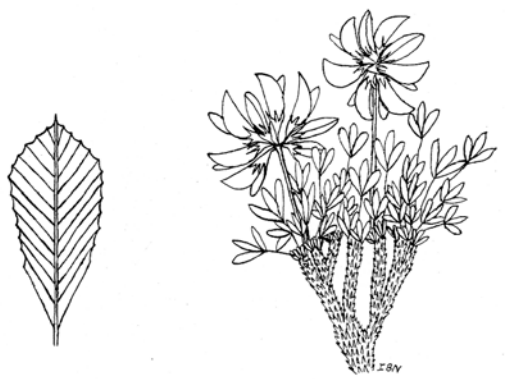
Similar Species: *Trifolium haydenii* is an alpine or upper montane species with glabrous leaflets and sepals. *T. gymnocarpon* has pubescent, leathery leaflets with 5-10 widely spaced veins and is not mat-forming. *T. andinum* has flower heads subtended by stipules that form a false involucre.

Flowering/Fruiting Period: May-July.

Range: Local endemic restricted to the southeastern foothills of the Wind River Range and southern Beaver Rim area in Fremont County, Wyoming.

Habitat: Occurs in ledges, crevices, and seams of reddish-cream Nugget Sandstone at 5600-6700 feet.

Abundance and Trends: Barneby's clover is known from 2-3 locations in Wyoming (at least 2 of which were newly discovered by Dr. Richard Scott in 1999). Marriott estimated the population to consist of ca 11,000 plants in 1986, with most occurring on the summit rim of Red Canyon. Census data are not yet available for the other populations. Observations since 1986 suggest that the population is stable.



Above: Trifolium barnebyi *by Isobel Nichols (from Fertig et al. 1994).*

Management Status: *T. barnebyi* is found on lands managed by the BLM Lander Field Office and on private lands. One large population is protected in TNC's Red Canyon Ranch preserve and the adjacent BLM Red Canyon ACEC.

Selected References:
Dorn, R.D. and R.W. Lichvar. 1981. Specific status for *Trifolium haydenii* var. *barnebyi* (Fabaceae). Madrono 28: 188-190.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

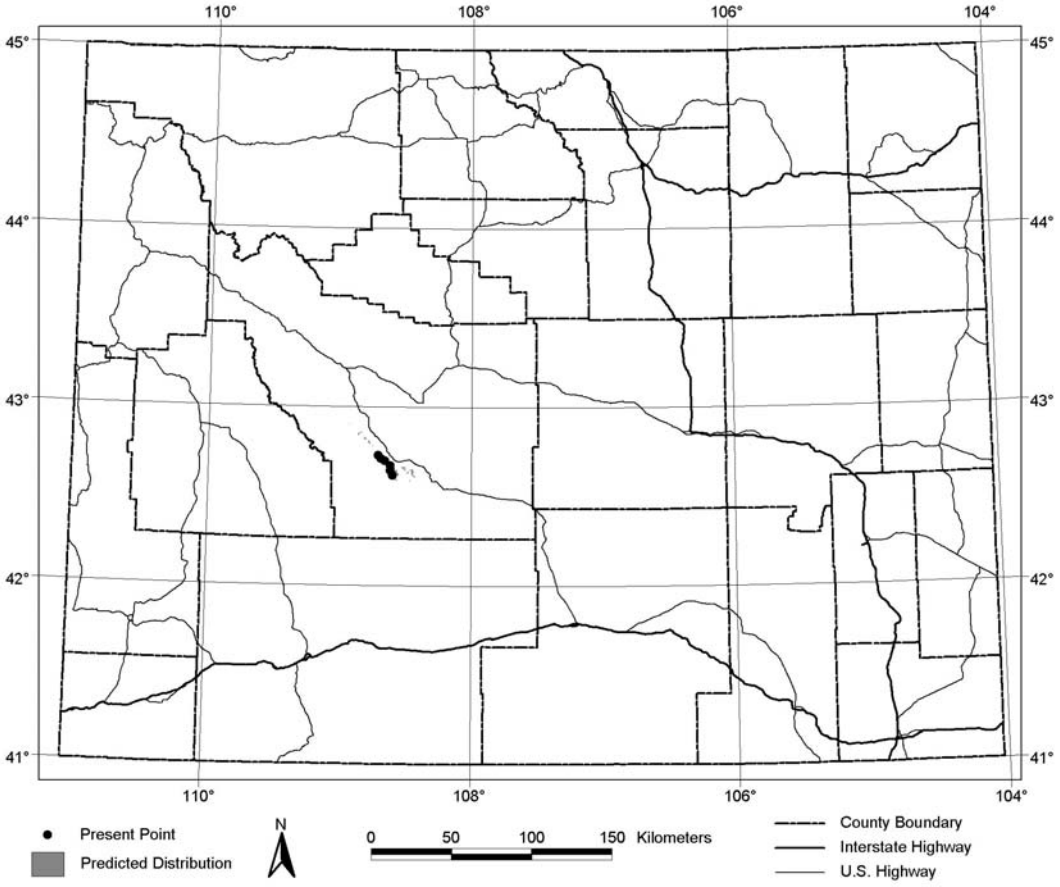
Isely, D. 1980. New combinations and one new variety in *Trifolium* (Leguminosae). Brittonia 32 (1): 55-57.

Isely, D. 1998. Native and Naturalized Leguminosae (Fabaceae) of the United States (exclusive of Alaska and Hawaii). Monte L.

Bean Life Science Museum, Brigham Young Univ., Provo, UT.

Marriott, H.J. 1986. A report on the status of *Trifolium barnebyi*, a Candidate Threatened species. Prepared for the US Fish and Wildlife Service by the Wyoming Natural Diversity Database, Laramie, WY.

Scott, R.W. and K. Sato. 1998. Plant species mapping in the Red Canyon area, Fremont County, Wyoming. Report prepared by Dept. of Biology, Central Wyoming College, Riverton, WY.



Yermo xanthocephalus **Desert Yellowhead**

Status:
US Fish & Wildlife Service: Threatened
Agency Status: Threatened.
Heritage Rank: G1/S1

Description: Desert yellowhead is a tap-rooted, glabrous perennial herb with leafy stems to 30 cm high. The leathery leaves are alternate, lance-shaped to oval, 4-25 cm long, and often folded along the midvein. Leaf edges are smooth or toothed. Flower heads are numerous (25-180) and crowded in a broad terminal inflorescence. Each head contains 4-6 yellow disk flowers (ray flowers are absent) surrounded by five yellow, keeled involucre bracts. The pappus consists of numerous white bristles.

Similar Species: Rayless species of groundsel (such as *Senecio hydrophilus* and *S. rapifolius*) can be distinguished by their more numerous and green involucre bracts. Dorn (1991) considers *Yermo* to be most closely related to species of *Cacalia*, a genus native to eastern North America.

Flowering/Fruiting Period: June-July.

Range: Endemic to the Sweetwater River Plateau in Fremont County, Wyoming.

Habitat: *Yermo xanthocephalus* occurs in sparsely vegetated cushion plant communities on low slopes, rim margins, colluvial fans, abandoned roadbeds and bottoms within deflation hollows. It is limited to dry, shallow, silty-clay entisols derived from the Miocene-age Split Rock Formation. Desert yellowhead is typically absent from surrounding areas dominated by Wyoming big sagebrush, bluebunch wheatgrass, and needle-and-thread.

Abundance and Trends: *Y. xanthocephalus* is known from a single occurrence in Wyoming, last observed in 2001. Surveys from 1990-2001 have failed to locate additional sites. Dorn (1991) reported ca 500 individuals when he first discovered the plant in 1990. Dr. Richard Scott of Central Wyoming College has been conducting annual population censuses since 1995 and has documented an increase from 9293 plants to 13,244 plants in 2000 (Scott 2000), although this has leveled off to ca 12,000 individuals in 2001 (Heidel 2002). Historically, this species is probably in decline and this site may represent its last refugium.

Above: Yermo xanthocephalus *by Jennifer Whipple.*

Management Status: All known populations are on lands managed by the BLM Lander Field Office. No occurrences are currently found in special management areas.

Selected References:

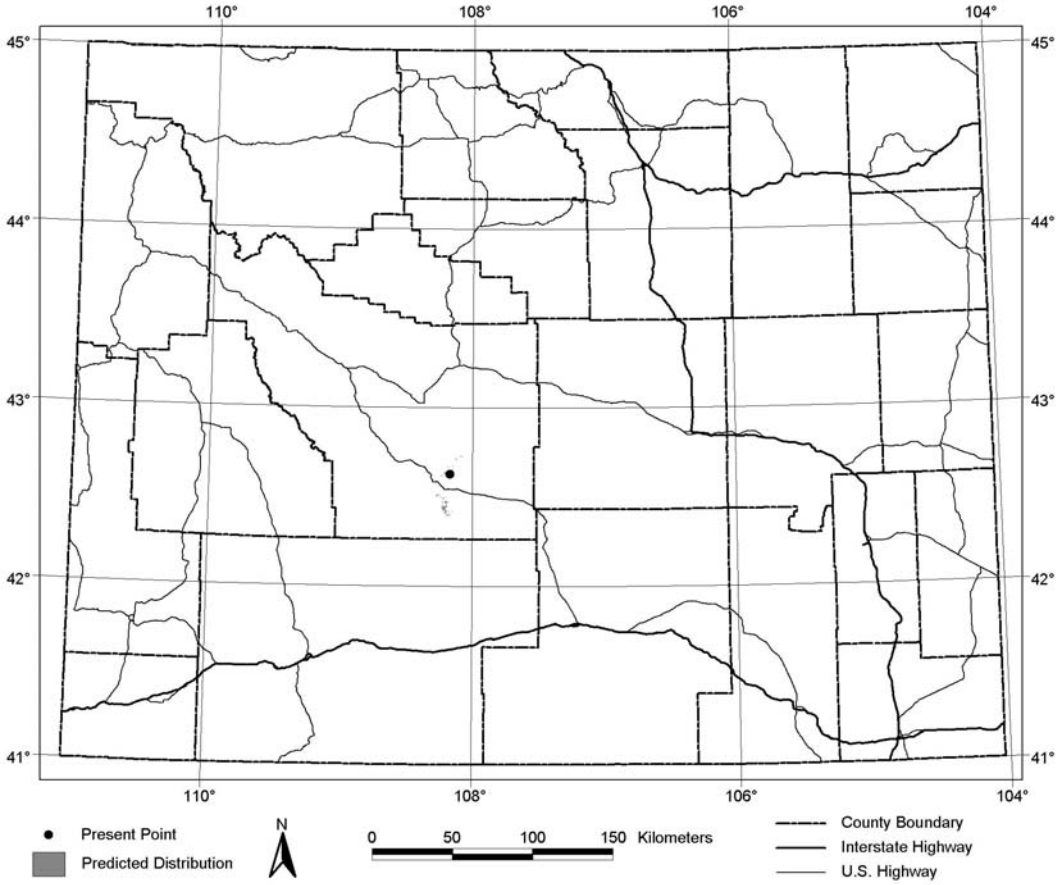
Dorn, R.D. 1991. *Yermo xanthocephalus* (Asteraceae: Senecioneae): A new genus and species from Wyoming. Madrono 38(3): 198-201.

Fertig, W. 1995. Status report on *Yermo xanthocephalus* in central Wyoming. Unpublished report prepared for the BLM Wyoming State Office and Rawlins District by the Wyoming Natural Diversity Database.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Heidel, B. 2002. Status report on Desert yellowhead (*Yermo xanthocephalus*) in Wyoming. Report prepared for the BLM Wyoming State Office and Rawlins Field Office by the Wyoming Natural Diversity Database, Laramie, WY.

Scott, R.W. 2000. Field studies on *Yermo xanthocephalus* Dorn. Report prepared for the Bureau of Land Management. Department of Biology, Central Wyoming College, Riverton, WY.

Scott, R. and B. Hoster. 2000. On the germination and viability of *Yermo xanthocephalus* achenes. Castilleja 19(1): 4-6.

USDI Fish and Wildlife Service. 1998. Endangered and Threatened Wildlife and Plants: Threatened status for the plant *Yermo xanthocephalus*. Federal Register 63(245): 70745-70751.