STATUS REPORT ON

Parrya nudicaulis

IN BRIDGER-TETON NATIONAL FOREST

Prepared for Bridger-Teton National Forest

By

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28 March 1995

ACKNOWLEDGEMENTS

I wish to thank Dr. Ron Hartman, curator of the Rocky Mountain Herbarium, for sharing location data on new occurrences of Parrya nudicaulis from his field work in the Gros Ventre Range in 1994. Thanks are also extended to Steve Laster, Range Management Specialist for the BLM Pinedale Resource Area, for loaning me his personal truck so that I could conduct some field work while my truck was in intensive care in a Pinedale repair shop and to Bill Noblitt, TES Biologist with Bridger-Teton National Forest for helping organize this project.

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I. INTRODUCTION

Parrya nudicaulis (Naked-stemmed parrya) is designated as a Sensitive plant species by US Forest Service (USFS) Regions 2 and 4 in Wyoming (Estill 1993; Joslin 1994). The species has a circumboreal distribution across Siberia, Alaska, and northern Canada, but is significantly disjunct in the Beartooth and Wind River Mountains of Wyoming. Prior to 1990, the species was known from only three historical herbarium records in the state.

In 1994, Bridger-Teton National Forest (BTNF) contracted on a cost-share basis with The Nature Conservancy's Wyoming Natural Diversity Database (WYNDD) to conduct field surveys for Parrya nudicaulis on Forest lands. The objectives of this project were to collect information on the biology, distribution, habitat use, population size, and potential threats to this species to be used in guiding management decisions.

II. METHODS

Information on habitat and distribution of Parrya nudicaulis was obtained from secondary sources, including WYNDD files and computer databases, collections of the Rocky Mountain Herbarium (RM), the literature, and knowledgeable individuals. USGS topographic maps, geologic maps (Love and Christiansen 1985), and US Forest Service maps were used to identify areas of potential habitat for ground survey.

Field surveys were conducted in August 1994 (survey routes and collection sites are indicated in Appendix B). Data on biology, habitat, population size, and management needs were collected using WYNDD plant survey forms (Appendix C). Locations of occurrences were mapped on 7.5' USGS topographic maps. Information gathered in the field was entered into the computerized Element Occurrence database of WYNDD.

III. SPECIES INFORMATION

A. CLASSIFICATION

1. SCIENTIFIC NAME: Parrya nudicaulis (L.) Regel (Bull. Soc. Imp. Naturalistes Moscou 34 (3): 176. 1861).

2. SYNONYMS: Parrya platycarpa Rydb., P. rydbergii Botsch., Neuroloma nudicaule (L.) DC.

3. COMMON NAME: Naked-stemmed parrya.

4. FAMILY: Brassicaceae or Cruciferae (Mustard family).

5. SIZE OF GENUS: Parrya is primarily a Eurasian genus of about 30 species. Rollins (1993) recognizes two species in North America: P. arctica of the Canadian arctic and P. nudicaulis in Alaska, northwestern Canada, Wyoming, and Utah.

6. PHYLOGENETIC RELATIONSHIPS: P. nudicaulis is an unusually variable taxon that has historically been divided into numerous species or varieties. Disjunct populations in the Uinta Mountains of Utah and the Beartooth and Wind River mountains of Wyoming are morphologically distinct enough to have been treated as separate species by some authors (Welsh et al. 1993). Rollins (1993) however, has observed the same morphological characters distinguishing these segregate species in populations throughout northern Eurasia. Varieties recognized by Hulten (1968) have also been found to be poorly differentiated in natural populations. Unsatisfied with the taxonomic recognition of minor variants, Rollins (1993) favors treating P. nudicaulis as a single, polymorphic species.

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. NATIONAL

a. LEGAL STATUS: Parrya nudicaulis is listed as a Category 3 (3C) species by the US Fish and Wildlife Service (1985). Category 3 includes taxa that have either proven more abundant or widespread than previously believed or which are not subject to any identifiable threat. The species is currently listed as Sensitive by USFS Regions 2 and 4 (Estill 1993; Joslin 1994).

b. HERITAGE RANK: Parrya nudicaulis is ranked G5 in The Nature Conservancy's Natural Heritage Network system. As a species, it is considered to be demonstrably secure over most of its range (although disjunct populations or those at the periphery of its range may be quite rare).

2. STATE

a. LEGAL STATUS: None.

b. HERITAGE RANK: WYNDD ranks P. nudicaulis as S1, indicating that it is imperiled because

of extreme rarity in the state of Wyoming (Fertig 1994 b). S1 species are typically known from 5 or fewer extant occurrences and have small population sizes.

C. DESCRIPTION

1. GENERAL NON-TECHNICAL DESCRIPTION: Parrya nudicaulis is a glandular, perennial herb with stems up to 8 inches (20 cm) high (Figures 1-2). The stout, woody rootstalk is branched and covered by old leaf bases. Leaves are mostly basal and have oblanceolate, entire to coarsely toothed, stalked blades 1/4-2 inches (5-25 mm) wide. The flowers have four pink to lavender (sometimes white) petals and four purple glandular or glabrous sepals, and are arranged in a raceme. The oblong, flattened fruits are usually over 3/4 inches (2 cm) long and constricted between the seeds (torulose) (Dorn 1977; Fertig 1994 a; Fertig et al. 1994; Rollins 1993).

2. TECHNICAL DESCRIPTION: Perennial, caespitose, glabrous or glandular-scabrous herb. Roots stout, up to 50 cm long and 1.5 cm thick, caudex enlarged, usually branched, clothed in old leaf bases. Flowering stems leafless, 4-37 cm tall. Basal leaves 3-10 cm long, spatulate or linear-oblong to broadly oblanceolate to nearly obovate, entire or irregularly serrate or dentate to almost lobed, tapering to a long petiole sometimes as long as the blade, 0.5-1.5 (3) cm wide. Sepals 5.5-9 mm long, often purplish, white-membranaceous along margins. Petals purple or white, 12-20 mm long, 5-9 mm wide. Siliques flat, tapering at both ends, 3-6.5 cm long, 4-6 mm wide, glabrous or glandular pubescent. Styles 1-2.5 mm long. Seeds light brown, elliptic, covered with a loose, net-like seed coat that forms wings, flattened, 4-5.5 mm long, 3-4.5 mm wide including wings, uniseriate or biseriate (modified from Rollins 1993).

3. LOCAL FIELD CHARACTERS: Parrya nudicaulis can be recognized by its basal cluster of oblanceolate, (often toothed) leaves, 4-petaled pinkish flowers, and large, legume-like fruit. This species is the only alpine mustard in Wyoming with glandular pubescence.

4. SIMILAR SPECIES: The fruits of Parrya nudicaulis superficially resemble those of many members of the pea family (Fabaceae), but differ in having an

Figure 1. Line drawing of Parrya nudicaulis. Illustration by Kaye Thorne (Atwood et al. 1994).

internal dividing membrane (replum) (Fertig et al. 1994). Chorispora tenella also has glandular herbage and purple flowers, but differs in having narrowly linear fruits and inhabits low-elevation, weedy habitats (Dorn 1992).

Parrya rydbergii is a segregate taxon of the P. nudicaulis group reported to be endemic to the Uinta Mountains of northeastern Utah (Franklin 1991; Welsh et al. 1993). It differs from arctic populations of P. nudicaulis in having larger sepals (7.7-9.3 mm vs. 5-7.5 mm), longer petals (16-23 mm vs. 12-20 mm), and more consistently sinuate-dentate leaves (Welsh et al. 1993). Wyoming specimens from the RM collections and those observed in the field in 1994 closely match Utah material of P. rydbergii in petal and leaf features (only the length of the sepals is slightly shorter on average). It appears that P. rydbergii and Wyoming populations considered P. nudicaulis are not taxonomically distinct.

D. GEOGRAPHICAL DISTRIBUTION

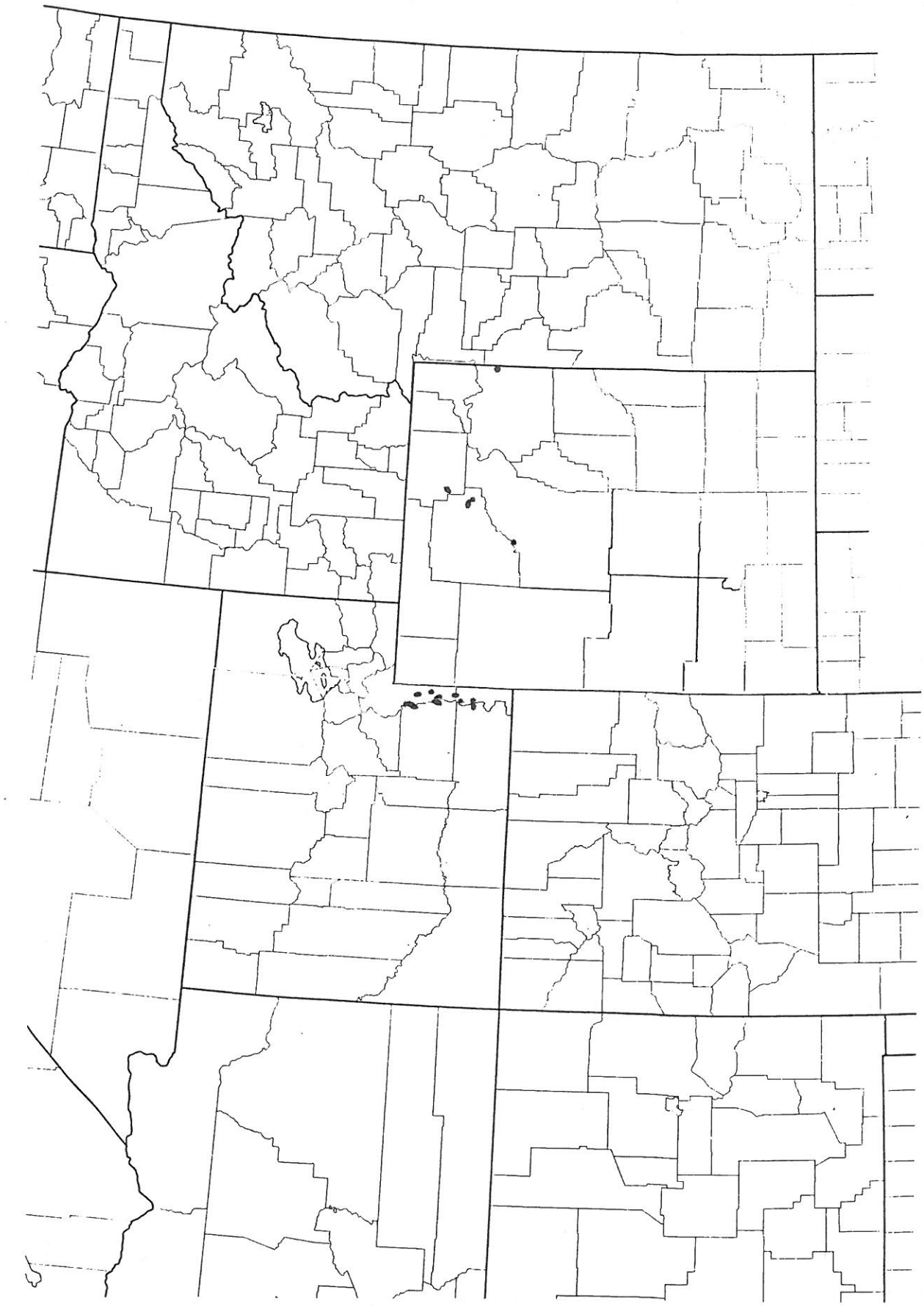
1. RANGE: Parrya nudicaulis occurs from northern and central Eurasia to Alaska and Canada's Yukon and Northwest Territories (Hulten 1968; Rollins 1993). Disjunct populations occur in the Beartooth, Gros Ventre, and Wind River mountains of northwestern Wyoming and the Uinta Mountains of northeastern Utah (Figure 3) (Franklin 1991; Rollins 1993; Fertig et al. 1994). In Wyoming, P. nudicaulis is known from Fremont, Park, Sublette, and Teton counties.

2. EXTANT SITES: Five extant occurrences of Parrya nudicaulis are currently known from BTNF in northwestern Wyoming. Three of these populations are located in the vicinity of the Green River Lakes in the western Wind River Range (Fertig 1992 a; Fertig and Jones 1994). These occurrences (on Big Sheep, Gypsum, and Osborn mountains) were extensively surveyed and mapped in 1993-94. Two new occurrences were documented by Dr. Ron Hartman in the Gros Ventre Range during a floristic survey in 1994.

An additional population is known from the South Fork Lakes area in the southeastern Wind River Range (Shoshone National Forest). This site has not been relocated since 1965 but is presumed to be still extant.

Figure 2. Parrya nudicaulis from alpine calcareous talus slopes on the southeast rim of the summit of Gypsum Mountain, Sublette County, Wyoming. Note the legume-like siliques of this mustard species. WYNDD photograph by W. Fertig.

Figure 3. Distribution of Parrya nudicaulis in Wyoming and Utah.



Exact locations of extant populations are listed in Table 1. More detailed information is provided in the Element Occurrence Records and maps in Appendix A.

3. HISTORICAL SITES: Reed Rollins and C. Munoz documented a population of Parrya nudicaulis from "Beartooth Peak" (probably Beartooth Butte) on the Beartooth Plateau in 1939 (RM and WYNDD records). Rollins (1993) noted that these plants were morphologically distinct from other North American populations, but could be "matched in detail in material from northeast Asia". According to WYNDD and RM records, this occurrence has not been relocated in recent years. Location information for this population is included in Table 1 and Appendix A.

4. POPULATIONS KNOWN OR ASSUMED EXTINCT: None known.

5. UNVERIFIED/UNDOCUMENTED REPORTS: None known.

6. AREAS SURVEYED BUT SPECIES NOT LOCATED: Potential alpine calcareous habitat in the Salt River and Wyoming ranges was intensively surveyed by Hartman and Nelson (1993, 1994), but no populations of Parrya nudicaulis were located. White Rock Mountain in the Green River Lakes area of the western Wind River Range has potential habitat, but no plants were found in recent surveys (Fertig 1992 a, 1992 b). Suitable habitat may also occur on Arrow and Whiskey mountains in the northeastern Wind River Range, although no Parrya plants have been observed there in the past (Dr. Richard Scott, personal communication). Additional habitat is likely to exist in the eastern Gros Ventre Range (R. Hartman, personal communication).

E. HABITAT

1. ASSOCIATED VEGETATION: In Wyoming, Parrya nudicaulis typically occurs on steep, unconsolidated talus slopes of grey limestone or pinkish sandstone in the alpine or upper subalpine zones (Figure 4) (Fertig 1992 a; Fertig et al. 1994). These sites usually have low vegetative cover (20-25%) of scattered cushion plants. Occasionally, P. nudicaulis can be found on moist, grassy hummocks of broad saddles with 75-80% vegetative cover. Utah populations occur in alpine tundra, talus, and boulder slope communities, often associated with quartzite

Table 1. Location information for known populations of Parrya nudicaulis in Wyoming.

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1. Wind River Range

Occurrence # 001
County: Sublette.
Legal Description: T38N R109W S12 (W2 & E2 of NE4) and 13 (N4 of NW4). T38N R108W S6 (W2) and 7 (NW4).
Latitude: 43° 17' 00" N (centrum).
Longitude: 109° 52' 35" W (centrum).
Elevation: 10500-11400 ft (3200-3475 m).
USGS 7.5' Quads: Big Sheep Mountain and Green River Lakes.
Location: Rim of large cirque on east face and on west slope of Big Sheep Mountain.

Occurrence # 003
County: Fremont.
Legal Description: T33N R103W S30.
Latitude: 42° 47' 57" N.
Longitude: 109° 12' 15" W.
Elevation: 11400 ft (3475 m).
USGS 7.5' Quads: Lizard Head Peak.
Location: 1 mile south of South Fork Lakes on east side of the Continental Divide, due west of Lander.

Occurrence # 004
County: Sublette.
Legal Description: T38N R109W S10 (E2 & S2 of SE4), 11 (SW4 & SW4 of NE4 & SE4 of NW4), 14 (N2 of NW4) and 15 (NE4).
Latitude: 43° 16' 25" N (centrum).
Longitude: 109° 54' 40" W (centrum).
Elevation: 9900-11200 ft (3020-3420 m).
USGS 7.5' Quads: Big Sheep Mountain.
Location: North, south, east, and west flanks of Gypsum Mountain and saddles connecting adjacent ridges.

Occurrence # 005
County: Sublette.
Legal Description: T39N R108W S28 (S2).
Latitude: 43° 18' 55" N (centrum).
Longitude: 109° 49' 25" W (centrum).
Elevation: 11000 ft (3355 m).
USGS 7.5' Quads: Green River Lakes.
Location: Calcareous ridge ("Stormy Ridge") on west flank of Osborn Mountain, immediately east of Lower Green River Lake.

Table 1, continued

2. Gros Ventre Range

Occurrence # 006
County: Teton.
Legal Description: T40N R112W S33 (W2).
Latitude: 43° 23' 20" N.
Longitude: 110° 18' 15" W.
Elevation: 9600-10800 ft (2925-3290 m).
USGS 7.5' Quads: Darwin Peak.
Location: East slope of Darwin Peak.

Occurrence # 007
County: Sublette.
Legal Description: T39N R112W S2 (W4), 3 (SE4) and 10 (N4).
Latitude: 43° 21' 57" N.
Longitude: 110° 16' 02" W.
Elevation: 10400-11535 ft (3170-3515 m).
USGS 7.5' Quads: Doubletop Peak.
Location: Triangle Peak.

3. Beartooth Plateau

Occurrence # 002
County: Park.
Legal Description: T58N R106W S36.
Latitude: 44° 57' 25" N.
Longitude: 109° 36' 32" W.
Elevation: 10500 ft (3200 m).
USGS 7.5' Quads: Beartooth Butte.
Location: "Beartooth Peak" (Beartooth Butte).

Figure 4. Habitat of Parrya nudicaulis from the west slope of the calcareous ridge on the southwest corner of Osborn Mountain in the northwestern Wind River Range. Plants are located on loose, calcareous talus with extremely low vegetative cover. Photograph by Charmaine Refsdal.

(Atwood et al. 1991; Franklin 1991). In the arctic, P. nudicaulis occurs on tundra, flood plains, sandy ridges, mossy carpets, and wet meadows (Rollins 1993).

2. FREQUENTLY ASSOCIATED SPECIES:

Antennaria aromatica (Aromatic pussy-toes)
Astragalus kentrophyta var. tegetarius (Thistle milkvetch)
Chaenactis alpina (Alpine chaenactis)
Dryas octopetala var. hookeriana (White mountain-avens)
Elymus scribneri (Spreading wheatgrass)
Erigeron compositus var. discoideus (Cut-leaved daisy)
Erigeron lanatus (Woolly fleabane)
Erigeron leiomerus (Smooth daisy)
Eriogonum ovalifolium var. purpureum (Cushion buckwheat)
Festuca brachyphylla (Alpine sheep fescue)
Penstemon montanus (Mountain beardtongue)
Polemonium viscosum (Sky-pilot)
Salix arctica var. petraea (Arctic willow)
Salix rotundifolia var. dodgeana (Dodge willow)
Saussurea weberi (Weber's saw-wort)
Saxifraga oppositifolia (Purple saxifrage)
Sedum lanceolatum (Lance-leaved stonecrop)
Senecio amplectens var. holmii (Clasping groundsel)
Senecio canus (Woolly groundsel)
Silene acaulis var. subacaulescens (Moss campion)
Smelowskia calycina (Alpine smelowskia)
Telesonix heucheriformis (James' saxifrage)
Trisetum spicatum (Spike trisetum)

3. TOPOGRAPHY: Parrya nudicaulis is typically found on talus slopes of over 45°. It is absent from ridgetops and summits, although it may occasionally be found on hummocky terrain in saddles between ridges. P. nudicaulis has been found on all aspects, but appears to be most abundant on west or south-facing slopes. Known occurrences range in elevation from 9600-11,535 feet (2925-3515 m).

4. SOIL RELATIONSHIPS: In Wyoming, Parrya nudicaulis is found primarily on thin, young soils derived from sandstone or limestone parent rock. These coarse, gravelly soils are typically restricted to the spaces between boulders and among talus on alpine slopes. Usually these soils are low in

organic material. Plants are occasionally found among sod-forming grasses and sedges on fine, moist soils with higher amounts of organic matter. In Utah, P. nudicaulis may occur on soils derived from quartzite parent material (Atwood et al. 1991; USDA Forest Service 1991).

5. REGIONAL CLIMATE: The Wind River Range receives an average of 52-60 inches (1320-1524 mm) of precipitation per year, with approximately 65% falling as snow (Martner 1986; Potkin 1991). On the west slope of the range, precipitation occurs throughout the year with a major peak in May and June and a minor peak in mid-winter (Martner 1986). In Titcomb Basin at 10,500 feet (3200 m), annual temperature has been estimated to be 26° F (- 3.3° C), with a range from 49° F (9.4° C) in July to 5° F (- 15° C) in January (Kelsey 1988). Mean annual precipitation averages higher and annual temperatures slightly lower in the Gros Ventre Range (Martner 1986).

6. LOCAL MICROCLIMATE: The habitats occupied by Parrya nudicaulis are typically exposed to high winds and high solar radiation, and are thus drier than regional climate data would suggest. Due to the thinner atmosphere and low cloud cover at these high elevations, night temperatures are cooler than at downslope locations.

F. POPULATION BIOLOGY AND DEMOGRAPHY

1. PHENOLOGY: In Wyoming, Parrya nudicaulis flowers from July to early August (Fertig et al. 1994). Elsewhere in its range, flowering has been documented from June to August (Atwood et al. 1991; Rollins 1993). Fruits can be found from late July through late August, depending on seasonal moisture conditions. In the drought year of 1994, fruits were largely past maturity in mid-August.

2. POPULATION SIZE AND CONDITION: There are currently five extant populations of Parrya nudicaulis known from the BTNF in Wyoming. The three populations from the Wind River Range occupy a minimum area of 407 acres of habitat and number between 75,000-88,000 individuals. (An individual P. nudicaulis plant is defined as a discrete cluster of rosettes isolated from neighboring clusters by ca 30 cm). Data on population area and abundance are not

available for other extant or historical locations of P. nudicaulis.

Previous studies suggested that P. nudicaulis populations in Wyoming were much smaller in area and total numbers. Fewer than 1000 plants were estimated from the northwestern Wind River Range by Fertig (1992 a). The large increase in estimated population size since 1992 reflects greater survey intensity, rather than a sudden increase in population size.

Populations observed in 1994 were found to be locally dominant in many areas of suitable habitat. Individual plants typically occurred in small clumps (possibly representing separate ramets of a single genet). These clumps in turn were distributed in a patchy, non-random fashion.

Demographic data from known populations on BTNF are summarized in Table 2.

3. REPRODUCTIVE BIOLOGY

a. TYPE OF REPRODUCTION: Parrya nudicaulis is a long-lived perennial herb that reproduces by seed. The plant also spreads vegetatively by underground rhizomes.

b. POLLINATION BIOLOGY: The pollinator of Parrya nudicaulis is not known. The plant's large, bright pinkish-purple flowers are likely to attract insect pollinators, such as alpine bees or flies.

c. SEED DISPERSAL AND BIOLOGY: The seeds of Parrya nudicaulis are flattened and have a wing-like, loosely-fitting seed coat. These seeds are probably dispersed by wind. Germination requirements of the seeds are unknown.

G. POPULATION ECOLOGY

1. GENERAL SUMMARY: Parrya nudicaulis is restricted to steep, alpine or subalpine talus slopes or tundra in pockets of shallow, young soils. Populations are often locally abundant but somewhat scattered in areas of suitable habitat.

Table 2. Demographic information for known populations of Parrya nudicaulis in Bridger-Teton National Forest.

Occurrence # 001 (Big Sheep Mountain)
Area: 242 acres.
Number and age of plants: 40,000-50,000 individual plants (usually representing clusters of rosettes presumed to be connected by underground rhizomes) were estimated to occur in the extensive colony on the west side of the mountain in 1994. An additional 8,000-10,000 plants were found in a separate subpopulation on the east side of Big Sheep Mountain in 1994. Seedling plants were not readily observed in field surveys. Most of the plants observed in 1994 were in late fruit or vegetative condition.
Density: Parrya plants typically exhibited a clumped, non-random distribution pattern.
Presence of dispersed seed: Seeds were evident within fruits still on the parent plant but were rarely observed on the ground.
Evidence of reproduction: Less than 25% of all plants were still in fruit in mid-August.
Evidence of expansion/contraction: This population was found to be more extensive than previously reported (Fertig et al. 1991; Fertig 1992 a). The widespread colony on the east side of the mountain had not been previously reported. Data are lacking to determine population trends on Big Sheep Mountain.

Occurrence # 004 (Gypsum Mountain)
Area: 155 acres.
Number and age of plants: Population estimated at 25,000 plants in 1994. Plants were mostly vegetative or in late fruit.
Density: Parrya plants typically exhibited a clumped, non-random distribution pattern.
Presence of dispersed seed: Seeds were observed only within mature fruits.
Evidence of reproduction: Approximately 10% of all plants were in fruit in August, 1994.
Evidence of expansion/contraction: This population was originally known only from the west side of the mountain and was estimated to contain 200-300 individuals (Fertig et al. 1991). Surveys in 1991 resulted in the discovery of an additional colony on an adjacent ridge (Fertig 1992 a). More intensive surveys in 1994 lead to the discovery of extensive colonies on the north, east, and south slopes of the mountain. Data are lacking to determine population trends on Gypsum Mountain.

Table 2 (continued)

Occurrence # 005 (Osborn Mountain)
Area: approximately 10 acres.
Number and age of plants: This population was estimated at 2,000-3,000 plants in 1993 (Fertig and Jones 1994; WYNDD records). Plants were mostly in flower or fruit.
Density: Parrya was observed to be locally dominant within its specialized habitat. Plants showed a clumped, non-random distribution pattern.
Presence of dispersed seed: None observed.
Evidence of reproduction: Plants were observed in flower and fruit in 1991 and 1993.
Evidence of expansion/contraction: This population was known only from a small area when first discovered by Marriott in 1991 (Fertig 1992 a). Surveys in 1993 resulted in the discovery of a larger area of occupied habitat (Fertig and Jones 1994). Data are lacking to determine population trends.

Occurrence # 006 (Darwin Peak)
Area: Not known.
Number and age of plants: Not known.
Density: Not known.
Presence of dispersed seed: Not known.
Evidence of reproduction: Plants collected in fruit in August 1994.
Evidence of expansion/contraction: This population was newly discovered by R. Hartman in 1994. No baseline data are available to determine population trends.

Occurrence # 007 (Triangle Peak)
Area: Not known.
Number and age of plants: Relatively few plants observed in 2-3 areas by R. Hartman in 1994 (RM records).
Density: Not known.
Presence of dispersed seed: Not known.
Evidence of reproduction: Plants observed in fruit in August 1994.
Evidence of expansion/contraction: This population was newly discovered in 1994. No baseline data are available to determine population trends.

2. COMPETITION: This species typically occurs in habitats with very low vegetative cover (usually below 25%) and few competing species. Occasionally, colonies can be found among turf-forming graminoids at sites with total cover of 75-80%. Plants here are less numerous, but otherwise appear to thrive. Parrya plants have also been found on talus slopes just below timberline, but appear to avoid areas that are shaded.

3. HERBIVORY: Leaves, stems, and inflorescences of Parrya nudicaulis showed little to no evidence of herbivory in 1994. Glandular hairs on the leaves and fruits may help reduce some herbivory. Plants in the Wind River Range were found to be infected by a powdery mildew in the genus Sphaerotheca in 1994 (Baxter 1994).

4. HYBRIDIZATION: There is no field nor experimental evidence to suggest that Parrya nudicaulis hybridizes with any other mustard species in Wyoming.

H. LAND OWNERSHIP

1. US FOREST SERVICE: All known Wyoming populations of Parrya nudicaulis occur on lands managed by the US Forest Service. Five occurrences are found in BTNF. The populations from the Gros Ventre Range occur within the Jackson Ranger District and Gros Ventre Wilderness. Populations from the northwestern Wind River Range all occur within the Pinedale Ranger District and Bridger Wilderness. The Osborn Mountain population is also found within the Osborn Mountain Research Natural Area (RNA) (Fertig and Jones 1994). Two additional occurrences are known from Shoshone National Forest.

IV. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

A. POTENTIAL THREATS TO CURRENTLY KNOWN POPULATIONS: Due to its severe and relatively isolated habitat, there are few threats to populations of Parrya nudicaulis in Wyoming. All populations in the BTNF occur within designated wilderness areas that are not under lease for grazing or mineral development. Recreation use is extremely low at present on the peaks occupied by P. nudicaulis in both the Gros Ventre and Wind River ranges. Trampling or dislodging of talus could be a

potential problem if recreational use were to increase greatly in the future.

B. MANAGEMENT PRACTICES AND RESPONSE: No experimental data exist on the response of this species to most management actions.

C. CONSERVATION RECOMMENDATIONS

1. RECOMMENDATIONS REGARDING PRESENT OR ANTICIPATED ACTIVITIES: No special management actions are currently needed to safeguard existing Parrya nudicaulis habitat or populations from human disturbances. Periodic monitoring is recommended to ensure that plant populations remain in good condition (Fertig 1992 a).

2. NOTIFICATION OF USFS PERSONNEL OF LOCATIONS ON BTNF LANDS: To prevent inadvertent impacts to known populations, all appropriate USFS personnel involved in planning and on-the-ground land management activities should be provided with location data for Parrya nudicaulis.

3. AREAS RECOMMENDED FOR PROTECTION: Although all known populations of Parrya nudicaulis on BTNF are currently within Wilderness Areas, only one population is within a RNA or Special Interest Area (SIA). Fertig (1992 a) recommended designation of the alpine zones of Gypsum and Big Sheep mountains in the northern Wind River Range as SIAs to protect populations of this and three other Forest Service Sensitive plant species (Draba densifolia var. apiculata, Erigeron lanatus, and Saussurea weberi). SIA designation may also be worthwhile on selected alpine peaks in the eastern Gros Ventre Range to protect P. nudicaulis and other unusual alpine species. Designation of SIAs would require no changes in current management of these areas, but would serve to draw attention to the botanical values they contain.

D. STATUS RECOMMENDATIONS: Parrya nudicaulis is currently designated as Sensitive in US Forest Service Region 4 (USDA Forest Service 1991; Fertig et al. 1994). Floristic surveys and intensive field studies in the past 5 years have resulted in the discovery of several new populations and many more individual plants than were previously recognized. As a result, P. nudicaulis is no longer as severely threatened as once thought. The species' abundance elsewhere in its range also

precludes it from being considered for listing as Threatened or Endangered by USFWS. It is recommended that the species be removed from the Regional Sensitive species list in Region 4. Requirements for the maintenance of viable populations of all species under the National Forest Management Act are sufficient to protect P. nudicaulis in the BTNF.

Nevertheless, the disjunct nature and specialized habitat requirements of P. nudicaulis make it of some conservation interest. The species should continue to be tracked by WYNDD and should serve as an indicator species to gauge the health of alpine ecosystems on BTNF.

E. SUMMARY: Parrya nudicaulis is primarily an arctic species that is significantly disjunct in the mountains of northwestern Wyoming and northeastern Utah. It is currently listed as Sensitive by Regions 2 and 4 of the US Forest Service. Studies from 1990-1991 suggested that extant populations of P. nudicaulis in Wyoming were small and restricted to the northwestern Wind River Range on BTNF. Floristic studies by the RM in 1994 resulted in the discovery of 2 new occurrences in the Gros Ventre Range. Concurrently, intensive surveys of suitable habitat in the northern Wind River Range by WYNDD staff resulted in the discovery of extensive populations numbering over 75,000 individuals. P. nudicaulis was found to be locally abundant, although often scattered, on limestone or sandstone talus slopes in the alpine and upper subalpine zones. These populations were found to be minimally threatened by natural or human-induced impacts. All occurrences on the BTNF are currently protected within designated Wilderness areas and one population is within a Research Natural Area. Due to the lack of threat, adequate protection, and high population numbers, P. nudicaulis is no longer in need of Sensitive designation on BTNF or in Region 4.

V. LITERATURE CITED

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