

Ecological Evaluation for the Browns Peak Research Natural Area Within the Medicine Bow National Forest, Albany County, Wyoming¹

Independent Ecological Evaluation for the Browns Peak Research Natural Area
Submitted by Bonnie Heidel, Wyoming Native Plant Society

Boundary Map

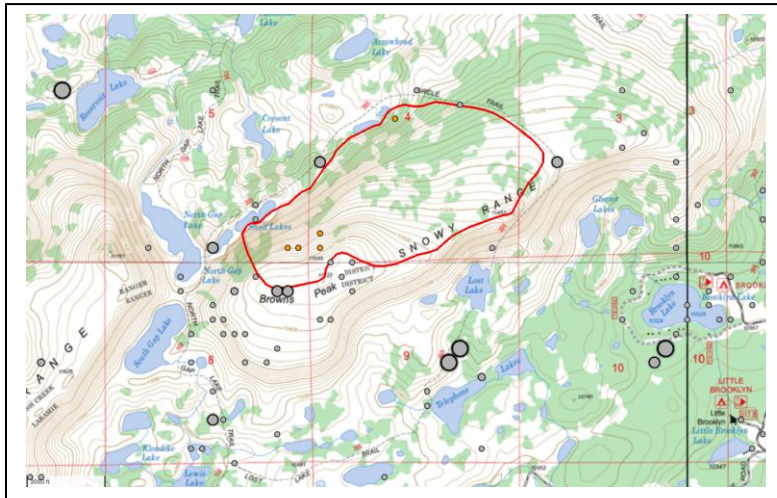


Figure 1. Browns Peak RNA boundary map, showing plant collection locations of specimens collected within or near boundaries, as deposited at Rocky Mountain Herbarium.

Legal Description

The Browns Peak Research Natural Area (RNA) is National Forest System land administered within the Laramie District of the Medicine Bow National Forest (MBNF), approximately 18 km (11.2 mi) northwest of the town of Centennial. The current boundary area is 170 ha (420 ac) as encompassing part of the summit and most of the north-facing slope (Figure 1). It lies within T16N R79W in Sections 4, 5, 8 and 9 as spanning the Medicine Bow Peak and Sand Lake USGS topographic maps (7.5').

Browns Peak RNA is located approximately 55 km (34.2 mi) west of Laramie, WY, where the Medicine Bow Supervisors Office is located. From the Office, go to US Hwy 287 north to Interstate-80, going west. Take the first exit at the State Hwy 130 (Snowy Range Road) going west for 55 km. The highway passes

¹ Disclaimer

This document was independently prepared by the Wyoming Native Plant Society (WYNPS) and represents a compilation and evaluation submitted for consideration by the U.S. Forest Service. The findings presented herein reflect the work of the author, are not complete for agency purposes and do not constitute an official federal evaluation, or designation. This document is intended to inform and support, but not replace or supersede, any formal review, analysis, or decision-making processes conducted by the U.S. Forest Service.

through Centennial. The RNA can be accessed via the Forest Service road to Brooklyn Lake (north of Hwy 130) and the Sheep Mountain Trail (Trail 389) that runs east and north of the RNA, or via the Forest Service road to Lewis Lake (north of Hwy 130) 2 km north) and the Gap Lakes Trail (Trail 108) that runs west of the RNA. It is also bordered on the south by the Lost-Glacier Lakes Trail (Trail 395). Access into the RNA from established trails is via unmarked foot trails and game trails.

Designation Text.

Introduction: Browns Peak is centrally located in the Medicine Bow Mountains, a landscape within the Medicine Bow Forest Reserve that was established on May 22, 1902. The land area of the original forest reserve originally spanned about two million acres, also extending into Colorado. In Wyoming, the east boundary was the Laramie Ranger District. The west boundary was the Brush Creek Ranger District. Subsequently, national forests in northern Colorado were separated from the Reserve and renamed as national forests. Other remote units of Medicine Bow Forest Reserve were added in Wyoming. Ultimately, the only changes to Forest boundaries in the Medicine Bow Mountains was in 1924 with elimination of select lands within contiguous portions of the reserve and addition of Sheep Mountain.

Browns Peak RNA was one of five research natural areas added to the MBNF – Final Environmental Impact Statement and Revised Land and Resource Management Plan, as represented in the December 2003 Record of Decision. Their incorporation in the forest plan amendment placed them under land management planning regulations (36 CFR 219.10(f) and FSM 1922.5) and treatment in the FEIS placed them under environmental analysis policy and procedures (FSM 1950 and FSH 1909.15).

The five research natural areas were added based on their providing relatively undisturbed areas representing important natural ecosystems and environments as well as special or unique scientifically important characteristics. Browns Peak in particular was cited as an outstanding example of alpine species and communities. Additional Browns Peak information was presented in Appendix F of the Final Environmental Impact Statement as selected within the National Forest Service system. Its selection was defended in a Supplemental Information Report in response (Roche 2009).

Browns Peak has long been recognized as harboring significant Wyoming biodiversity, first as part of a natural areas catalogue compiled by agencies and partners that treated it as part of an extensive Medicine Bow Peak Divide nominated area (Collins 1985), and ensuing botanical surveys of the large area (Fertig 1993). It was later referred to and mapped as an elongate Snowy Range Macrosite (Mills and Neighbors 1995, Welp et al. 2000) with “a rich assortment of 10 regionally endemic of state rare alpine species, and three regionally or state significant animal species”. The Snowy Range Macrosite did not have standing with MBNF but two smaller areas were designated within it: the Medicine Bow Peak Special Botanical Area and the Browns Peak RNA, as treated in the MBNF Plan Revision (U.S. Forest Service 2003).

Research Natural Area designation is to be supported by and Establishment Record with an Ecological Evaluation. The following document compiles pre-existing Forest records with an expanded literature review and more recent information as a contribution for finalizing an Ecological Evaluation for Browns Peak RNA.

Management: Browns Peak lies within that 5% of MBNF situated above 10,000 ft. elevation. This roughly corresponds to the extent of treeline. As such it was historically part of the Snowy Range Sheep Allotment. The grazing allotment has been vacant since 2003.

Its management status as a research natural area was recognized in the 2003 Forest Plan revision (U.S. Forest Service 2003). It also lies within a larger area of recognized wilderness qualities including the adjacent Glacial Lakes Ecological Experiment Site (GLEES; Musselman 1994) (Photograph 2) as maintaining high mountain wilderness ecosystems for research purposes. Both grazing and mining were discontinued in the 1990s and the permits and claims for these activities were vacated in the same Forest Plan revision.

b. Justification Section.

(1) Justification Statement.

Browns Peak is part of Snowy Range alpine habitat, with the most extensive alpine vegetation on the MBNF. It has a rich assortment of regional endemic and state rare plant and animal species. The plants include several at the northernmost extent of their Southern Rocky Mountains distribution. The alpine meadows, shrubland and cryogenic features are research sites for two benchmark alpine studies and destination for academic fieldtrips. It provides context for the rest of the Medicine Bow Peak Divide as well as a viewing vantage (Photograph 1).

4. Appendices.

APPENDIX 1. ECOLOGICAL EVALUATION

Physical Site Description and Climatic Conditions. The ecological evaluation provides the initial baseline information for the Research Natural Area, serves as a source of data for reports on the Research Natural Area program, and provides information to researchers seeking appropriate research sites or projects. At a minimum, the evaluation should include the following:

Location:

The Browns Peak Research Natural Area (RNA) is National Forest System land administered within the Laramie District of the Medicine Bow National Forest (MBNF), approximately 18 km (11.2 mi) northwest of the town of Centennial.

Browns Peak RNA is located approximately 55 km (34.2 mi) west of Laramie, WY, where the MBNF Supervisors Office is located. From the Office, take US Hwy 287 north to Interstate-80, going west. Take the first exit at the State Hwy 130 (Snowy Range Road) going west for 55 km. The highway passes through Centennial.

Size:

The current boundary delimits an area of 170 ha (420 ac).

Elevation Range:

Elevations span approximately 3170-3536 m (10,400 – 11,600 ft), following an elongate ridge with convex slopes. The summit in the northwest corner is flat, and there are no major breaks in topography except for the southern cliff faces.

Access:

The RNA can be accessed from State Hwy 130 via the Forest Service road to Brooklyn Lake where there is the Sheep Mountain Trailhead (Trail 389) that runs east and north of the RNA, or via the Forest Service road to Lewis Lake where there is the Gap Lakes Trail (Trail 108) that runs west of the RNA. It is also bordered on the south by the Lost-Glacier Lakes Trail (Trail 395). Access into the RNA is via unmarked foot trails and game trails.

Climatic Data:

Climate data for Browns Peak RNA draws from Fox et al. (1994) describing the climate at the adjoining Glacial Lakes Ecosystem Experiment Site, as compiled from the Snowy Range Observatory meteorological sampling system throughout the Forest. Annual precipitation ranges from 66-137 cm (26-54 in) based on Little Brooklyn Lake data (calculated from those four years in the 1980s with no interruptions in complete monthly data). Almost all of that precipitation falls as snow, and snow can fall in all months of the year, though accumulations are least in July and August.

The harsh climatic conditions are highlighted by Roche (2009). Snow pack depth is commonly over 3 m (10 ft) in this part of the Snowy Range, with drifts extending 9 m (30 ft) or more in the lee of rock outcrops (MBNF LRMP FEIS Appendix C-110). Ice covers the lakes at the base of Browns Peak from mid-October to June, and spring snowmelt dominates hydrology (Nydick et al. 2004).

Wind reworks snow deposits and exaggerates the effects of temperature and precipitation. This part of the Snowy Range has the highest average wind speed in the continental United States (Roche 2009). Bare ground and deep snow are both found at the highest elevations (Oolman et al. 2008) and Browns Peak slopes are exposed to high winds on all sides.

Ecological Description. Eco-region (to the lowest level of detail currently available); detailed descriptions and approximate size in acres and hectares of the plant community types on the site, including potential climax types. Use an accepted regional or statewide classification system for the description and include a map of the plant communities using the same classification system. Also, provide descriptions and extent of plant communities following the National Vegetation Classification System published by the National Geographic Data Committee.

Ecoregion:

- ☐ Domain: Dry (300)
- ☐ Division: Temperate Steppe Mountains (M330)
- ☐ Province: Southern Rocky Mountain Steppe-Open Woodland-Coniferous Forest-Alpine meadow (M331)
- ☐ Section: Medicine Bow Mountains (M331B)
- ☐ Subsection: Metasedimentary (M331Bc)

Vegetation patterns of Browns Peak are generally oriented in vertical or diagonal swathes rather than horizontal bands (Photograph 3). This is taken to represent the influence of strong winds. Vegetation has not been mapped, which is further confounded by extensive rocky rubble, highly irregular patterns, small sizes of many vegetation features and subtle gradients between them. This is particularly true on the north slope of Browns Peak (Photograph 4) that comprises a greater extent of the RNA than the rest of other aspects combined.

Alpine meadows on the summit of Browns Peak RNA have been documented in more detail (Overly and Fowler, in progress) than other units. Provisional plant associations for the entire area were identified by Roche (2009). There are two information sources for addressing the full range of vegetation on Browns Peak. Eight of the vegetation types found on the Glacial Lakes Ecosystem Experiment Site (Simmons 1994) have also been observed on Browns Peak in 2026 field visits. There are five plant associations named by Roche (2009) that can be cross-referenced to those vegetation types as presented in the table below.

Table 1. Vegetation of Browns Peak RNA

Landscape/ Vegetation Type ²	Plant Association ³	Browns Peak Location	Comments
Meadow	Golden avens/American bistort (ACRO/BIBI2 – <i>Acomastylis rossii</i> - <i>Bistorta bistortoides</i>)	Extensive across north slope, especially lower elevations	Often in vertical or diagonal bands, extensive on lower north slopes
Krummholz conifer	Subalpine fir (ABLA)	All elevations and aspects	Mat-forming tree growth, with occasional or frequent flagged leader shoots rising above
Coniferous woods	Subalpine fir-spruce/moss (ABLA-PIEN/moss; <i>Abies lasiocarpa</i> - <i>Picea engelmannii</i> /moss)	Small stands at eastern end of main ridge	Short woodland stature, rather than forest stature as found in the GLEES
Cushion plants/stone pavement	Arctic willow/Golden avens (SAAR/ACRO – <i>Salix arctica</i> / <i>Acomastylis rossii</i>)	Summit and ridgetop	Summit and south-facing rim
Wet meadow/willow shrub	Marsh marigold/Red pod stonecrop (CALE/CLRH- <i>Caltha leptosepala</i> / <i>Clementsia rhodanthum</i>) Addition: <i>Salix glauca</i> (SAGL); also <i>Salix brachycarpa</i> (SABR)	Bands and benches throughout, usually small features with other veg types SAGL is north aspect, SABR is south aspect	Localized throughout, often an edge to other vegetation on the side with impeded drainage
Scree	Gooseberry currant/ Jacob's ladder (RIMO/POPU – <i>Ribes montigenum</i> / <i>Polemonium pucherrimum</i>)	All aspects, especially on steep slopes	Composition is highly variable so this plant association name is a placeholder, and is usually present as small patches
Rock outcrop	Lichens	Roche (2009) stated that about a third of Browns Peak has steep rocky rubble and talus	Sheer south cliffs and small outcrops elsewhere

² From Simmons (1994)

³ From Roche (2009) with additions from 2026 fieldwork

(3) Description of the values of the Research Natural Area. Flora list, by both common and scientific names; fauna list (those species expected to occur), by both common and scientific names; geology; soils; topography; aquatic and riparian features; rare, threatened, endangered, or sensitive species; list of rare elements and rare plant communities.

Browns Peak RNA is an alpine island harboring regionally endemic plant and animal species at the northern extent of their continental distributions, a bellwether of species' response to climate conditions.

Geologically, it is formed from granite and gneiss, which are igneous and metamorphic rocks, respectively. They are older than 2.6 billion years old and overlain by metamorphosed sedimentary rocks including quartzite and schist (Rochette 1994). Dark mafic intrusions of greenschist are conspicuous dike features at the summit of Browns Peak summit and elsewhere along the Medicine Bow Peak Divide. During glaciation, ice in the vicinity of Browns Peak may have reached depths of 244-305 m (800-1000 ft) that transported and later strewed the landscape with blocky boulders. The highest part of the summit has polygonal patterned stone circles as product of freeze-thaw cycles, with cushion plant communities in each polygon (Photo 5). The north-facing slope of Browns Peak is more extensive than the other slopes combined and RNA boundaries encompass most of the north-facing slope, in addition to summit and small parts of other aspects of Browns Peak.

Soils of the Browns Peak area are poorly developed Entisols, with prevailing influence of cold temperatures. Description of the rockiest soils at GLEES (Hopper et al. 1994) apply to Browns Peak. Prevalent soils are Dystric Cryochrepts, sometimes forming complexes that include rock rubble or outcrops.

The Browns Peak flora was part of concerted botanical survey for rare plants (Fertig 1993). It has also been documented as part of floristics research across the Medicine Bow Range (Lukas et al. 2012). Dominant or common species are shown in Photographs 6-8, including moss campion, grayleaf willow and subalpine fir. More recently, it was destination for plant collecting conducted by a Rocky Mountain Herbarium floristics class in 2022 (Photograph 9). The summit of Browns Peak had been specifically targeted for alpine flora sampling (Kleinkopf et al, submitted) and the rare data table provided as it represents summit diversity (SUBMITTED SEPARATELY). Alpine vegetation sampling was also collected in tandem with meteorological data collecting (Overly and Fowler, in progress). Each of these studies generated voucher specimens that have been deposited at the Rocky Mountain Herbarium, and an online data query for collections made within the Browns Peak RNA boundaries yields a list of ? species and ? specimens.

Ten alpine plant species of Browns Peak have been regarded as biogeographically significant, including regional endemics of the Southern Rocky Mountains and other rare alpine plants. Some may be locally widespread; two species were documented as recurrent in 1993 from top to bottom of the southern slopes on Browns Peak (*Erigeron pinnatisectus* and *Paronychia pulvinata* in Fertig 1993). The *Chionophila jamesii* was found to be recurrent from top to bottom on north slopes in 2026 visits. While a few are no longer regarded as rare in Wyoming, this constellation of alpine obligates in population complexes are more important than any single species at any given point.

Table 2. Rare plants of Browns Peak RNA

Scientific name	Common name	Grank	Srank	WY SOC	Notes
<i>Campanula uniflora</i>	Arctic harebell			-	-
<i>Chionophila jamesii</i>	Rocky Mountain snowlover	G4?	S2S3	SOC	Regional endemic, only location in WY
<i>Draba globosa</i>	Beavertip draba	G3	S3	SOPC	-
<i>Erigeron melanocephalus</i>	Black-head fleabane			-	Regional endemic, ~only location in WY
<i>Erigeron pinnatisectus</i>	Pinnate fleabane	G4	S2S3	SOC	Regional endemic, ~only location in WY
<i>Gentianella tenella</i>	Dane's gentian			-	-
<i>Paronychia pulvinata</i>	Rocky Mountain nailwort	G3?	S2	SOC	Regional endemic, only location in WY
<i>Saxifraga chrysantha</i>	Golden saxifrage	G4	S2	SOC	-
<i>Tonestus pygmaeus</i>	Pygmy goldenweed	G4	S1	SOC	Regional endemic, only location in WY
<i>Veronica alpina</i> (Besseyia alpina)	Alpine kittentails	G4	S2	SOC	Regional endemic, only location in WY

The Browns Peak fauna includes breeding numbers of brown-capped rosy finch (*Leucosticte australis*) a Southern Rocky Mountains endemic at the northern end of its range. Its Wyoming distribution is restricted to cliffs in the alpine zones of the Medicine Bow Peak area. This area has also been documented as supporting the southern white-tailed ptarmigan (*Lagopus leucura altipetens*) in the past. Critical evaluation and renewed survey efforts now treat it as extirpated from the Medicine Bow Mountains, and from Wyoming in general (Braun and Wann 2017, U.S. Fish and Wildlife Service 2020) though continued survey efforts were still recommended.

Browns Mountain also harbors year-round populations of American pika (*Ochotona princeps*) as restricted to alpine and subalpine elevations. The species has been petitioned twice for listing under the Endangered Species Act, but denied. The area also supports dwarf shrew (*Sorex nanus*) which occupies rocky habitats over a wide range of mountain elevations. There are also nearby records of western pygmy shrew (*Sorex eximus*) but they are inferred to be outside RNA boundaries because the wetland habitat required by this shrew species is below the boundary. Of all plant and animal species discussed in this section, only western pygmy shrew is designated Sensitive by the U.S. Forest Service.

(4) Resource Information. Describe in detail known information about the applicable resources, especially from the vantage of potentially conflicting uses, such as minerals, grazing, plants (including timber and special forest products), watershed values, recreation use, wildlife, transportation and road system, adjacent lands, fences and protective barriers.

Mining claim markers on Browns Peak no longer represent active mining claims. Recreational use is light foot traffic in summer. However, winter recreation in the form of motorized use may cause snow compaction, affecting the environment beneath the snow and the early season growing conditions for plants underneath the snow (reviewed in Roche 2009).

(5) Historical Information. Include, in this section, known information regarding the following: history of establishment, research and education use and interest, cultural and heritage, disturbance history, occurrence of exotic species.

In 2000, biologists referred to Browns Peak as part of a large Medicine Snowy Range Macrosite and a conservation priority (Welp et al. 2000). The MBNF recognized two discrete management areas within the larger area that included the Medicine Bow Peak Special Interest Area, and the separate Browns Peak RNA in the Forest Plan Revision (USDA Forest Service 2003). The latter designation required an Establishment Report that was not on file in MBNF records (Roche 2009).

These two alpine areas rise directly above glacial lakes recognized in the Glacial Lakes Ecosystem Experimental Site. There is also a nearby forested area called the Snowy Range Research Natural Area as a montane landscape made official as an RNA in 1936 although the establishment report for it was not completed until 1966.

There were no exotic species documented in the Browns Peak flora as documented among Rocky Mountain Herbarium specimens or observed in the field.

(6) Management Recommendations on the Research Natural Area. Evaluate specific management recommendations such as principal management issues; potential or existing conflicts; and special management area if the Research Natural Area is within one.

(7) Other Information. Include any permanent research plots and/or photo points, potential research topics, and administration records and protection.

A centroid for alpine flora documentation was established as part of a western North America alpine project (Kleinkopf et al., submitted) as conducted by Ben Legler and Josh Matson (Rocky Mountain Herbarium, University of Wyoming). Endpoints for alpine vegetation documentation were established for a Southern Rocky Mountains analysis of correlation between meteorological data and alpine vegetation (Overly and Fowler, in progress) with data available from James Fowler (U.S. Forest Service, ret.).

(8) Bibliography. Include journal articles or publications that have resulted from study conducted on the site and all literature cited in the report. Cite any important reports which describe the various aspects of the area (flora, fauna, geology, history, soils, and so forth).

SUBMITTED AS A SEPARATE FILE

(9) Photographs. Photographs may be included and embedded within the body of text. However, ensure that each photograph is clearly labeled. The location of the digital copy or negative should be noted, also.

SUBMITTED AS A SEPARATE FILE

b. Appendix 2 - A written NEPA environmental assessment shall be included based on FSM 1950 and FSH 1909.15

c. Appendix 3 - A copy of the relevant sections in the Forest Land Management Plan or Amendment pertaining to the establishment and management of the Research Natural Area.

ADDITIONALLY, THE RAW DATA COLLECTED ON THE SUMMIT OF BROWNS PEAK
IS SUBMITTED AS A SEPARATE FILE TO REPRESENT THE ALPINE ELEMENTS