

A Botanical Guide to Special Places in the Pryor Mountains

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Introduction:

The plant-life of the Pryor Mountains is a botanist's delight and a sadly undervalued part of Montana's natural landscape. The South Pryor Mountains alone offer 5,000 feet of vertical relief that supports more than 25 plant communities (interacting associations of plant species populations). These communities extend from alluvial fans that support varied shrublands to cushion plant grasslands above 8,000 feet. Several plant communities, (Utah Juniper/mountain mahogany; Nuttall's saltbush/Budsage; and Limber pine/Utah Juniper), are designated as globally rare by the Montana Natural Heritage Program (MNHP). And the North Pryor region, in the Punchbowl area, offers a beautiful example of aspen forest encompassing an understory of native shrubs and forbs. The aspen stands open onto sagebrush meadows with views of the rugged limestone cliffs of the Pryor's northern front.



The students (Flathers and Durney) quickly grew to love the Pryor Mountain range because of its spectacular topography, the diversity of plant species, and the unusual level of rare and endemic species and plant communities. When Dr. Lyman proposed that they use their studies to create a Botanical Guide to Special Places in the Pryor Mountains, they jumped at the opportunity. The purpose of the guide is to encourage exploration of the Pryor Mountains in much the same way that naturalists have observed the world around them for hundreds of years - to observe closely, to connect plant life to the environment in which it thrives, and to appreciate the variety of life that subsists in landscapes shaped and reshaped by millions of years of geologic change.

We have created this botanical guide using the MNHP plant community designations, because this ecological approach will help the user to look closely at plant associations, species abundance, diversity of species and life forms (tree, shrub, perennial and annual herbaceous forbs, and grasses). A keen observer will see and understand in what ways each species interacts with its abiotic environment including geology, soils, topography, elevation, aspect (cardinal direction a slope faces) and microclimate. Understanding the structure and function of a particular plant community at one site will help avid naturalists to locate the same community at other places with similar ecological conditions.

Happy plant hunting! You will want to bring along a hand lens for looking closely at flower structure, a GPS, plant identification books, and your camera.

Nine Special Places:

The nine Botanical Plant Communities are beautiful representatives of some of the plant communities of the Pryors. We hope our descriptions will help you to appreciate each community and to visit them in all seasons to understand their natural history and to contribute to your knowledge of the Pryor Mountains.

Directions for getting to each plant community are given below. The special Botanical Guide version of the **Pryor Mountain Map Set** will help follow those directions. It is available on the Botanical Guide page at www.PryorMountains.org, the same place this printed Guide was downloaded from.

Plant Communities:

Plant community: a group of plant populations that occur together and interact with one another directly or indirectly. Plant ecologists typically identify or name plant communities by two dominant plant life forms. By life forms of vascular plants is meant simply that they are trees, shrubs, forbs (annual or perennial broad-leaved herbaceous plant), or grasses. Typically there are dozens of other species in the community that are adapted to that habitat and community of plants. Introduction of non-native species can disrupt this ecological balance.

For example, one of the plant communities that we recommend that you explore and study is the *Artemisia pedatifida* (Birdfoot Sage)/*Agropyron spicatum* (Bluebunch wheatgrass) community. These two species have the most abundant populations where they occur along Gyp Springs Road. They associate closely in space and time with one another. And they likely interact through ecological processes such as soil retention, snow or precipitation interception, and root functions that may be competitive or possible cooperative.

We have named the botanical places that we describe by their plant community designations. While we have provided the directions to a particular example of each plant community, you will be able to find other examples once you observe closely the ecological conditions of aspect, elevation, soil type and structure, and the elements of the particular microclimate.

Focusing on landscapes using a plant community approach is important because plant communities are one of the clearest ways to assess ecosystem structure and function. Plants and animals depend on the environmental complexity of a particular plant community. DeVelice and Lesica suggest that “maintaining community diversity is the best insurance that small, difficult-to-inventory organisms that contribute the most to ecosystem function and biological diversity are not lost.” For that reason monitoring of a select subset of plant communities in the Pryor Mountains provides one more tool for effective ecosystem management and conservation. The plant community names that we use are those from the 2002 List of Ecological Communities for Montana prepared by the Montana Natural Heritage Program.

Plant Lists and Common Names:

For each plant community we have provided a plant list of all the species we found on our visits. The listed species were found within 50 to 100 meters of the GPS location given for the community. It is likely that additional species can be found at other times of year or other years.

Common names for plants are problematic. Often a species has several different common names. In some cases the same common name is used for several different species.

Important Plant Area:

The South Pryor Mountain and adjoining landscape is so botanically rich that the Montana Native Plant Society (MNPS) designated 114,950 acres as an Important Plant Area (IPA).

“The Goal of the Montana Native Plant Society’s Important Plant Areas Program is to identify the most important sites for plant conservation across Montana using consistent criteria. An Important Plant Area supports an exceptional population of one or more globally rare plants or an exceptional assemblage of plants rare or threatened in Montana.”

The boundaries of the Pryor Mountain IPA encompass nineteen vascular plant *species of concern*¹ and one lichen species of concern. Also included are five globally rare species *endemic*² to the north end of the Bighorn Basin in Montana and Wyoming.

See more information about this IPA at www.PryorMountains.org and the MNPS website.

Diverse Habitats:

How plant communities in the Pryor Mountains are distributed over the landscape results from the geologic history of the region, climate influences including rainfall, sunlight, and temperature, and the migratory pathways and mechanisms for seed dispersal from other places.

Geology:

The geology pages at www.PryorMountains.org provide an excellent overview of the geologic events that have created the soils that affect plant species occurrences. Nutrient availability and soil texture (the percentage of sands, silts, and clays) contribute greatly to the ability of particular plant species to persist. Soils derived from Madison limestone, for example, differ greatly in their nutrient and water-holding capacity from those of Chugwater origin. Erosion slopes will harbor species quite different from places where the soils have remained for long periods of time.

Topographic Effects:

Topographic position influences the amount of rainfall, sunlight, temperature extremes, and migratory pathways for seed dispersal. For example, the lower slopes on the south side of the Pryor Mountains receive only an average of 7 to 8 inches of precipitation per year, while the north-facing slopes collect about 18 to 20 inches of precipitation. The aspect, the cardinal direction of a slope face, determines the amount of sunlight and the temperature regime of the soil. There are dramatic differences in temperature, sunlight, precipitation, and wind exposure on the northern and southern slopes of the Pryors.

Microclimates:

Variability exists within the slope faces of the Pryor Mountains resulting from the canyons, water-carved gullies, and varieties of rock types. These small pockets of differing moisture, soil, sunlight, and temperature regimes also influence the distribution of plant communities.

Seed Dispersal Pathways:

Plant species on the southern slopes of the Pryor Mountains show affinities to Great Basin plant communities because of climate similarities. There are topographic connections linking the southern Pryors with the Wyoming Big Horn Basin and south into the Great Basin. Therefore we find species in the Pryors that represent the most northern extension of the Great Basin plant communities. Utah Juniper, scattered throughout the southern Pryors, is an excellent example of the Great Basin region.

¹ The phrase “*species of concern*” is used by the Montana Natural Heritage Program to refer to plant species that are rare or threatened to become rare by natural or human impacts and have declining numbers that could result in the loss of the species altogether.

² A species is called “*endemic*” to an area when it grows (naturally) ONLY in that area. This term is often mistakenly thought to mean “abundant” or even “epidemic.” An endemic species may be either rare or abundant, but it grows naturally only in that area - and nowhere else.

(1) Birdfoot Sagebrush/Bluebunch Wheatgrass Plant Community (*Artemisia pedatifida*/*Agropyron spicatum*)

Getting There:

The birdfoot sage community is about ten miles from Warren, Montana. It is on the northeast side of Gyp Springs Rd 2.6 miles southeast from the junction with Helt Rd. and 4.5 miles northwest from the junction with Crooked Creek Rd.

GPS Coordinates: N 45.0396°, W 108.5018° Elevation: about 5,040 feet.

At Warren MT (Look for the Montana Limestone Company sign on Highway 310.) turn east onto Helt or Quarry Road. After 2.7 miles continue straight on the smaller Helt Road. (The larger Quarry Rd curves left.) In 4.3 more miles curve right onto Gyp Springs Road and follow it for about 2.6 miles. The Birdfoot Sage Community is on the left side of the road looking up towards the Pryor Mountains.

The Plant Community:

According to Peter Lesica, Birdfoot Sagebrush is an unappreciated jewel among the 19 sage species found in Montana – thirteen of which are found in the Pryor Mountains. It is a subshrub (1-6 inches tall) that forms mats co-dominated by perennial Bluebunch Wheatgrass. This community covers several miles along the Gyp Springs road of the south Pryors and occurs in scattered sites along Crooked Creek road near Demijohn Flats. The soils where it is found are sandy or clayey and on open slopes and flats, typically at around 5,000 in elevation.

Birdfoot Sage. (D. Walton photo. May 2014)



Birdfoot Sage is caespitose (cushionlike), aromatic, with mostly basal gray-green persistent leaves, less than an inch long and divided into linear lobes that resemble a bird's foot. The flowering heads are composed of many female and bisexual yellow disk flowers. The fruits (achenes) are elliptic, brown, and very small (about 1 mm). Flowering occurs from late spring to mid-summer. The Montana State University Herbarium has one specimen from the foothills of the Bridger Mountains from 1951. Otherwise the Beartooth – Pryor Mountain locations are the only places where it occurs in Montana. The species also ranges south and west in the steppes of Colorado, Idaho, Utah and Wyoming.

Birdfoot sage was, until recently, placed in the subgenus *Dracunculus* because of its flower structure that has the outer female florets and central bisexual florets that are functionally male. Molecular studies completed in 2011 have concluded that it belongs in the subgenus *Tridentatae*, which is composed of New World endemic sagebrush species.

Twenty-five other plant species were recorded at the long-term study site established in 2012 within the Gyp Springs road population. The community is disturbed by windblown soil that creates a pedestalling effect. In addition, the plant community experiences full exposure to

the sun, drying the soil quickly after a rainstorm. It is not advisable to visit the area immediately after a heavy rain because the clay-rich soils become incredibly sticky.

No non-native plant species were recorded and with minimal human disturbance we hope it will remain that way.

It is worth the time to experience this community in the spring and fall to observe the plant community in flower and enjoy the stunning scenery.

PLANT LIST for Birdfoot Sagebrush/Bluebunch Wheatgrass Community

Shrubs:

Birdfoot Sagebrush (*Artemisia pedatifida*)
 Big Sagebrush (*Artemisia tridentata*)
 Shadscale (*Atriplex confertifolia*)
 Gardner's Saltbush (*Atriplex gardneri*)
 Broom Snakeweed (*Gutierrezia sarothrae*)
 Winterfat (*Krascheninnikovia lanata*)
 Hood's Phlox (*Phlox hoodii*)

Forbs

Hooker's Sandwort (*Arenaria hookeri*)
 Missouri Milkvetch (*Astragalus missouriensis*)
 Desert Indian Paintbrush (*Castilleja angustifolia*)
 Cocks-comb Cat's-eye (*Cryptantha celosioides*)
 Flatspine or Western Stickseed (*Lappula redowskii*)

Cous Biscuitroot (*Lomatium cous*)
 Wild Parsley (*Musineon divaricatum*)
 Evening Primrose (*Oenothera sp.*)
 Plains Prickly-Pear (*Opuntia polyacantha*)
 Fuzzy-tongue Penstemon (*Penstemon eriantherus*)
 Scarlet Globemallow (*Sphaeralcea coccinea*)
 Sword Townsend-daisy (*Townsendia spathulata*)
 Smooth Woody Aster (*Xylorhiza glabriuscula*)
 Rayless Tansy-aster (*Xanthisma grindelioides*)

Grasses:

Bluebunch Wheatgrass (*Agropyron spicatum*)
 Blue Grama (*Bouteloua gracilis*)
 Indian Ricegrass (*Oryzopsis hymenoides*)
 Sandberg's Bluegrass (*Poa secunda*)

Physaria sp.



Missouri Milkvetch. (D. Walton photos)



(2) Gardner's Saltbush/Bud Sage Plant Community (*Atriplex nuttallii*)/(*Artemisia spinescens*)

Getting There:

The bud sage community is west of Helt Road 0.4 miles from its intersection with Crooked Creek Road.

GPS Coordinates: N 45.0135°, W 108.4347°. Elevation: about 4735 feet.

If you have visited the birdfoot sagebrush community, continue southeast along Gyp Springs Road for 4.5 miles. Veer left onto Crooked Creek Road and stay on it for 0.25 miles. Veer left onto Helt Road for 0.4 miles. The bud sage community is on the left side of Helt Road.

The Plant Community:

Bud sage is the species of focus in this plant community because it is such an unusual and interesting sagebrush. The bud sage plants are infrequent so you may need to search for a bit. Many plants have just a few green leaves. In mid-May you will see the yellow buds that make small yellow clusters of flowers.

Bud Sage. (C. McCracken photo.)



The community itself is one described by DeVelice and Lesica as one of the most threatened plant community types in the Pryors. Bud sage is a dwarf shrub ranging in height between five to 15 centimeters with sprawling, twisted, woody branches that become somewhat spiny when dead. The bright green color of bud sage makes it unique from other sage species. Instead of flowering in late summer, like other sage species in Montana, bud sage flowers in the spring.

In the Pryor Mountains, bud sage occurs in the red soils characteristic of the Chugwater formation and in the sandy, clay soils in patches between the Crooked Creek road and Penney Peak. Bud sage occurs in all western states excluding Washington. In Montana, it only grows in valleys in Carbon and Beaverhead counties.

Bud Sage (*Artemisia spinescens*) was not even considered a member of the sagebrush genus *Artemisia* for a long time because it looks so different from other sagebrush, flowers earlier than most, and can undergo summer dormancy to reduce drought stress. Two visible effects of dormancy are the production of corky tissue that reduces water loss and the sluffing off of the previous season's bark. It was known as *Picrothamnus desertorum* until quite recent revisions of the taxonomy of the sagebrush group. It is referred to as *Picnothamnus desertorum* in a 2011 paper by Garcia et al. Recent molecular studies of the sagebrush group indicate that this species is in the subgenus *Tridentatae* along with *Artemisia pedatifida*. Lesica refers to it as *Artemisia spinescens*.

The long term monitoring site established in 2012 is near the intersection of Gyps Springs Road and Helt Road. This site has been disturbed recently by cattle and in the past by farming and grazing. There are what appear to be old irrigation trenches and plowing rows. A livestock loading area is near the community along Helt Road, which subjects the community to livestock grazing pressure. DeVelice and Lesica noted that this community type occurs in very arid, harsh environment where vegetation is sparse and not resistant to livestock grazing or invasion by exotics such as *Halogeton glomeratus*. They suggest that livestock activities should be minimized in this area.

We recorded thirty-one plant species in the bud sage community. Five species in this list are not native to Montana including Russian Thistle (*Salsola sp.*), Malcolmia (*Malcolmia africana*), Canada Bluegrass (*Poa compress*), Halogeton (*Halogeton glomerulatus*), and Crested Wheatgrass (*Agropyron cristatum*). The vegetation is sparse within the community and bare soil dominates the area. The importance of the baseline data at this site is that it shows that Bud Sage is not abundant and has likely suffered from human-caused disturbance. Future monitoring will help uncover trends that will help to determine effective management.

PLANT LIST for Gardner’s Saltbush/Bud Sage Plant Community

* Non-Natives

Shrubs

Bud Sage (*Artemisia spinescens*)
 Big Sagebrush (*Artemisia tridentata*)
 Four-Wing Saltbush (*Atriplex canescens*)
 Shadscale (*Atriplex confertifolia*)
 Gardner’s Saltbush (*Atriplex gardneri*)
 Broom Snakeweed (*Gutierrezia sarothrae*)
 Winterfat (*Krascheninnikovia lanata*)
 Hood’s Phlox (*Phlox hoodii*)

Plains Prickly-Pear (*Opuntia polyacantha*)
 Flaxleaf Plainsmustard (*Schoenocrambe linifolia*)
 Scarlet Globemallow (*Sphaeralcea coccinea*)
 Stemless Four-nerve-daisy (*Tetaneuris acaulis*)
 * Halogeton (*Halogeton glomeratus*)
 * African Adder’s-mouth (*Malcolmia africana*)
 * Russian Thistle (*Salsola sp.*)

Forbs

Hooker’s Sandwort (*Arenaria hookeri*)
 Rattle Milkvetch (*Astragalus adsurgens*)
 Threelobed Milkvetch (*Astragalus gilviflorus*)
 Dusty-maiden (*Chaenactis douglasii*)
 Cocks-comb Cat’s-eye (*Cryptantha celosoides*)
 Flatspine Stickseed (*Lappula redowskii*)
 Wild Parsley (*Musineon divaricatum*)

Grasses

Purple (or Red) Three-awn (*Aristida purpurea*)
 Blue Grama (*Bouteloua gracilis*)
 Bottlebrush Squirrel-tail (*Elymus elymoides*)
 Indian Ricegrass (*Oryzopsis hymenoides*)
 Sandberg’s Bluegrass (*Poa secunda*)
 Needle-and-Thread (*Stipa comata*)
 * Crested Wheatgrass (*Agropyron cristatum*)
 * Cheatgrass (*Bromus tectorum*)
 * Canada Bluegrass (*Poa compressa*)

Gardner’s Saltbush/Bud Sage Plant Community. (S. Durney photo.)



(3) Rubber Rabbitbrush /Rabbit Buckwheat Plant Community (*Ericameria nauseosus*/*Eriogonum brevicaulle*)

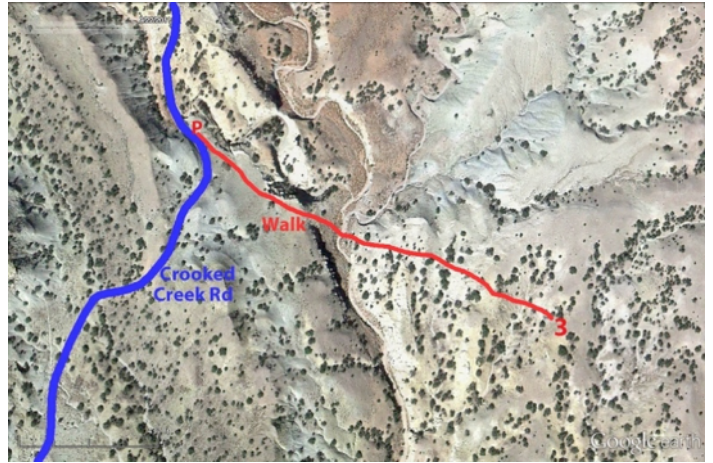
Getting There:

Parking for the rabbit buckwheat community (#3) is located beside Crooked Creek Rd about 2.5 miles north of its junction with Helt Rd. and 3.8 miles south of the USFS/BLM boundary fence Park on the east side of the road just south of an obvious small rocky canyon. (Parking for site #3 is about 2.0 miles south of plant community #4.)

Parking: GPS Coordinates: N 45.03976, W 108.41541



Parking area beside Crooked Creek Rd. for Rubber Rabbitbrush/Rabbit Buckwheat community #3.



Blue: Crooked Creek Rd. Red: Walking route.
"P": Parking area. "3": Plant community #3



It is about ¼ mile (straight line) 30 degrees south of east from the parking spot to the rabbit buckwheat community site. There is no trail. Either wind through the interesting canyon bottom, or walk a more straight path on top, south of the canyon. After a about 200 yards (350 yards in the winding canyon bottom) the route crosses a substantial north to south dry wash. Continue walking about 30 degrees south of east over rolling hills for another 250 yards.

Study site: GPS Coordinates: N 45.0381°, W 108.4108°.

Elevation: about 4,780 feet.

Photo to left: Canyon bottom walking route to Rubber Rabbitbrush/Rabbit Buckwheat community. (photo, S. Durney)

The Plant Community:

Our species of interest for this guide is the second one in this plant community. DeVelice and Lesica regard this plant community as one of the two most threatened in the Pryor Mountains. Rabbit Buckwheat is an unusual and overlooked cespitose (cushion-like) perennial that is quite striking and beautiful in color.

Rabbit Buckwheat. (S. Durney photo.)



Rabbit Buckwheat is a loose spreading woody-based perennial species of *Eriogonum* with an open umbel of yellow flowers on each stalk. Its flowering period is from June to September, but June is the best time to witness them flowering. Plants grow in rocky clay soils typical of badlands or on exposed ridges and slopes of valleys. Plants in Montana are of the *canum* variety and endemic to south-central Montana. The Pryor Mountains have the highest density of rabbit buckwheat in Montana. Rabbit buckwheat's distribution extends into Colorado, Idaho, Nebraska, Nevada, South Dakota, Utah and Wyoming.

The particular Rubber Rabbitbrush/Rabbit Buckwheat community that we used as a long-term monitoring site is on the south side of the Pryor Mountains between Crooked Creek Road on the west and Penney Peak on the east. The area is composed of rolling hills with seasonal drainages throughout. Flash flooding occurs during spring snowmelt. The community does not contain any roads or established trails and is only accessible by foot. Thirty-eight plant species were documented in the sampling community with one, Halogeton (*Halogeton glomeratus*), non-native to Montana.

DeVelle and Lesica warn that over-grazing by livestock on fragile lands occupied by this plant community may irreversibly harm its integrity and ecosystem structure and function.

PLANT LIST for Rubber Rabbitbrush /Rabbit Buckwheat Plant Community

* Non-Natives

Trees

Utah Juniper (*Juniperus osteosperma*)

Shrubs

Big Sagebrush (*Artemisia tridentata*)
 Rubber Rabbitbrush (*Ericameria nauseosa*)
 Broom Snakeweed (*Gutierrezia sarothrae*)
 Winterfat (*Krascheninnikovia lanata*)
 Hood's Phlox (*Phlox hoodii*)
 Moss Phlox (*Phlox muscoides*)
 Skunkbush Sumac (*Rhus aromatica*)

Forbs

Hooker's Sandwort (*Arenaria hookeri*)
 Summer Milkvetch (*Astragalus hyalinus*)
 Milkvetch (*Astragalus sp.*)
 Bastard Toadflax (*Comandra umbellata*)
 Cocks-comb Cat's-eye (*Cryptantha celosioides*)
 Rabbit Buckwheat (*Eriogonum brevicaule*)
 Imperfect Wild Buckwheat (*Eriogonum mancum*)
 Oval-leaved Buckwheat (*Eriogonum ovalifolium*)
 Common Woolly Sunflower (*Eriophyllum lanatum*)
 Boreal Sweet-vetch (*Hedysarum boreale*)

Spiked Ipomopsis (*Ipomopsis spicata*)
 White-Stem stickleaf (*Mentzelia albicaulis*)
 Plains Prickly-Pear (*Opuntia polyacantha*)
 Low Nailwort (*Paronychia sessiliflora*)
 Common Twinpod (*Physaria didymocarpa*)
 Basin Daisy (*Platyschkuhria integrifolia*)
 Scarlet Globemallow (*Sphaeralcea coccinea*)
 Desert Princessplume (*Stanleya pinnata*
 var. *pinnata*)

Desert wirelettuce (*Stephanomeria runcinata*)
 Stemless Four-nerve-daisy (*Tetraneris acaulis*)
 Hooker's Townsend-daisy (*Townsendia hookeri*)
 Hoary Townsend-daisy (*Townsendia incana*)
 Sword Townsend-daisy (*Townsendia spatulata*)
 Rough Mule's Ears (*Wyethia scabra*)
 Rayless Tansy-aster (*Xanthisma grindelioides*)
 * Halogeton (*Halogeton glomeratus*)

Grasses

Bluebunch Wheatgrass (*Agropyron spicatum*)
 Purple (or Red) Three-awn (*Aristida purpurea*)
 Bottlebrush Squirrel-tail (*Elymus elymoides*)
 Indian Ricegrass (*Oryzopsis hymenoides*)

(4) Utah Juniper/Big Sagebrush Plant Community (*Juniperus osteosperma*/*Artemisia tridentata*)

Getting There:

Parking area east of Crooked Creek Rd. for Utah Juniper/Big Sagebrush Community.

This study community (#4) is west of Crooked Creek Road about 4.5 miles north of the junction with Helt Rd., and 1.8 miles south of the junction with Pryor Mountain Rd. There is a small turnout on the east side of the road to park.

GPS Coordinates: N 45.0655°, W 108.4162°. Elevation: about 5,375 feet.

(Site #4 is about 2.0 miles north of plant community #3, and 1.3 miles south of plant community #5.)



The Plant Community:

Utah Juniper is the dominant tree on the south side of the Pryors, which is also the northern limit of its range. They occur along a large portion of Crooked Creek Road. The plant community occurs on limestone or calcareous sandstone soils in the valley and montane zone. At higher elevations in the Pryors Utah Juniper is replaced by Rocky Mountain Juniper (*Juniperus scopulorum*). Utah Juniper is an erect shrub or small tree that often appears in a more rounded form than the more conical crown shape of Rocky Mountain Juniper. The bark of Utah Juniper is gray-brown and stringy and the branches tend to become ribbon-like with age and sprawl horizontally. This species produces a taproot that can use water at depth as well as shallow surface roots that take advantage of brief rainfall events. The trees are capable of living up to 650 years old. Utah Juniper populations are abundant in the semi-arid areas in the Great Basin and since the end of the Wisconsin ice age 11,500 years ago, the species has migrated north to southern Montana and adjacent Wyoming.

In the Pryor Mountains, the Utah Juniper/Big Sage community type occurs along Crooked Creek Road near Demijohn Flats flowing along the landscape like a sea of green. Utah Juniper also occurs at higher elevation in the Pryors with mountain mahogany (*Cercocarpus ledifolius*) as the dominant shrub.

There are stages in the juniper life history that make it vulnerable to disturbances such as herbivory, invasion from exotic species, and impacts that may change soil characteristics. Utah Junipers generally don't begin bearing fruit until they are 10-20 years old. It takes two growing seasons for the juniper fruit to mature on this monoecious tree (male and female cones are produced on the same tree). The ripe female fruits (modified cones) may remain on the tree for 2-3 years. There is extensive loss of potential seed production and seed maturation because many fruits fail to fill because of genetic or climatic factors or predation by insects and herbivores. Seed-caching rabbits and rodents are thought to be the primary seed dispersers of Utah Juniper.

In our study area along Crooked Creek the only observed disturbance on the vegetation community are tracks from motorized use. All twenty-three species we recorded in our plots are plants native to Montana, indicating that the Utah Juniper plant community is in excellent condition at this time.

Oval-leaved Buckwheat. (S. Durney photo.)



Potential negative impacts to the health of the Utah Juniper woodlands could result from loss of seed dispersers, a change in the level of insect damage and unusual impacts from other herbivore predators or an invasion by exotic plant species. Studies in the Great Basin show that invasion by annual cheat grass species, particularly *Bromus tectorum*, impact Utah Juniper communities by competing for surface water that the shallow root systems of Utah Juniper rely upon or by creating dangerous wild fire conditions. So far the Pryor Mountain Utah Juniper plant communities show little evidence of cheat grass invasion but ongoing monitoring is important for identifying changes and preventing habitat degradation.

PLANT LIST for Utah Juniper/Big Sagebrush Plant Community

Trees		Oval-leaved Buckwheat	<i>(Eriogonum ovalifolium)</i>
Utah Juniper	<i>(Juniperus osteosperma)</i>	Rabbit Buckwheat	<i>(Eriogonum brevicaulle var. canum)</i>
Shrubs		Spiked Ipomopsis	<i>(Ipomopsis spicata var. spicata)</i>
Black Sagebrush	<i>(Artemisia nova)</i>	Plains Prickly-Pear	<i>(Opuntia polyacantha)</i>
Big Sagebrush	<i>(Artemisia tridentata)</i>	Stiff-leaf Penstemon	<i>(Penstemon aridus)</i>
Broom Snakeweed	<i>(Gutierrezia sarothrae)</i>	Stemless Mock Goldenweed	<i>(Stenotus acaulis)</i>
Hood's Phlox	<i>(Phlox hoodii)</i>	Mountain Death-Camas	<i>(Zigadenus venenosus)</i>
Forbs		Grasses and Sedges	
Capitate Sandwort	<i>(Arenaria congesta)</i>	Bluebunch Wheatgrass	<i>(Agropyron spicatum)</i>
Hooker's Sandwort	<i>(Arenaria hookeri)</i>	Purple (or Red) Three-awn	<i>(Aristida purpurea)</i>
Tufted or Draba Milkvetch	<i>(Astragalus spatulatus)</i>	Canadian Single-Spike Sedge	<i>(Carex scirpoidea)</i>
Desert Indian Paintbrush	<i>(Castilleja angustifolia)</i>	Prairie Junegrass	<i>(Koeleria macrantha)</i>
Buff Fleabane	<i>(Erigeron ochroleucus)</i>	Sandberg's Bluegrass	<i>(Poa secunda)</i>
		Needle-and-Thread	<i>(Stipa comata)</i>

Utah Juniper, Demijohn Flat and Bighorn Mountains from Utah Juniper/Big Sagebrush Plant Community. (S. Durney photo.)



(5) Black Sagebrush/Bluebunch Wheatgrass Plant Community (*Artemisia nova*/*Agropyron spicatum*)

Getting There:

This study community is east of Crooked Creek Road about 5.8 miles north of the junction with Helt Rd., and 0.5 miles south of the USFS/BLM boundary fence. The site is on the edge of Demijohn Flat which extends to the east.

GPS Coordinates: N 45.0829°, W 108.4081°. Elevation: about 5,470 feet.

(Site #5 is about 1.3 miles north of site #4.)

The Plant Community:

Black sagebrush looks like big sage, but has a few defining characteristics that differentiate the two. Big sagebrush grows to be quite a bit larger than black sagebrush but when either bush is young it can be difficult to determine the species on size alone. The key feature of black sagebrush is the presence of green to amber resin dots on the underside of the leaves. Sagebrush species may interbreed to produce intermediate types, making identification difficult. Big sage and black sage both occur on the south side of the Pryor Mountains and are likely to produce some intermediate shrub forms. Black Sagebrush occurs on shallow, stony, calcareous soils of sagebrush steppe often near Utah Juniper in montane valleys while Big sagebrush occurs on adjacent sites with deeper soils.

Just north of the Utah Juniper community is a black sagebrush community at Demijohn Flats off of Crooked Creek Road. This community is primarily a low shrub community with scattered Utah Juniper. The terrain includes the benches and mid- slopes of the area east of Crooked Creek. Thirty-two species were observed in the community. All were native to Montana except for Goat's Beard (*Tragopogon dubius*). The plant community is in excellent condition for the most part. There is little sign of overgrazing or off road vehicle impacts but periodic monitoring is important for maintaining the site and mitigating small impacts before they become serious.

The plants are rather dense for a sagebrush community and leave little available bare ground for invasion. One of the best times to visit this community is at the end of May and beginning of June when the northwest paintbrush is in full bloom. The suite of native plants that occur with sagebrush are beautiful and worth exploring carefully.

This location of the Pryor Mountains has an excellent view of the Bighorn Mountains to the east and Bighorn Lake to the southeast.

PLANT LIST for Black Sagebrush/Bluebunch Wheatgrass Plant Community:

* Non-Natives

Trees

Utah Juniper (*Juniperus osteosperma*)

Shrubs

Black Sagebrush (*Artemisia nova*)
Big Sagebrush (*Artemisia tridentata*)
Broom Snakeweed (*Gutierrezia sarothrae*)
Winterfat (*Krascheninnikovia lanata*)
Hood's Phlox (*Phlox hoodii*)

Forbs

Low or Lotus Milkvetch (*Astragalus lotiflorus*)
Pursh's Milkvetch (*Astragalus purshii*)
Tufted or Draba Milkvetch (*Astragalus spatulatus*)
Hooker's Sandwort (*Arenaria hookeri*)
Mariposa or Sege Lily (*Calochortus nuttallii*)
Desert Indian Paintbrush (*Castilleja angustifolia*)
Bastard Toadflax (*Comandra umbellata*)
Siskiyow Hawksbeard (*Crepis modocensis*)
Buff Fleabane (*Erigeron ochroleucus*)

Oval-leaved Buckwheat (*Eriogonum ovalifolium*)
Bitterroot (*Lewisia rediviva*)
Prairie Flax Flax (*Linum lewisii*)
Carrotleaf Desert-Parsley (*Lomatium foeniculaceum*)
Oriental Desert-parsley (*Lomatium orientale*)
Sagebrush Bluebells (*Mertensia oblongifolia*)
Plains Prickly-Pear (*Opuntia polyacantha*)
Desert Groundsel (*Senecio eremophilus*)
Stemless Mock Goldenweed (*Stenotus acaulis*)
Stemless Four-nerve-daisy (*Tetranneuris acaulis*)
Sword Townsend-daisy (*Townsendia spathulata*)
Mountain Death Camas (*Zigadenus venenosus*)
* Alyssum sp. (*Alyssum sp.*)
* Meadow Goat's Beard (*Tragopogon dubius*)

Grasses

Bluebunch Wheatgrass (*Agropyron spicatum*)
Prairie Junegrass (*Koeleria macrantha*)
Sandberg's Bluegrass (*Poa secunda*)

(6) Riparian: Douglas Fir/Common Snowberry Plant Community (*Pseudotsuga menziesii*/*Symphoricarpos albus*)

Getting There:

Parking for this riparian plant community (#6) is 5.2 miles north of the USFS/BLM boundary fence, and 3.8 miles south of the junction of Crooked Creek Rd. and Pryor Mountain Rd. The wide parking area is on the west side of the road at the northwest “corner” of the road’s diversion around a major side drainage into Crooked Creek Canyon.



Blue: Road. **Red:** Walk. **“P”** Parking. **“6”** Riparian Community.



It is an interesting and easy hike about 1/3 mile down the drainage to Crooked Creek with an elevation gain of about 250 feet coming back to the road. There is no real trail. Start down the wide grassy bottom of the drainage. Eventually some primitive tracks should appear leading to Crooked Creek.

Parking area: GPS Coordinates: N 45.13543, W 108.43534

Study site: GPS Coordinates: N 45.1346°, W 108.4289°. Elevation: about 6,150

The Plant Community:

Crooked Creek and Sage Creek are the two main creeks in the Pryor Mountains. The vegetation near these creeks differs from other vegetation communities in the Pryors. Crooked Creek was chosen because of the magnitude and beauty of the canyon in which the creek lies. Compared to other semi-arid and arid communities on the south side of the Pryors, the Crooked Creek community is moist and lush, although the Douglas Fir represents the transitional area between upland and riparian. This tree provides the overstory shade that retains the moisture in the drainage. Of the sixty-three plant species that we observed in our sampling area along the creek, six are not native to Montana and include Canada thistle (*Cirsium ravenis*), common hound’s-tongue (*Cynoglossum officinal*), Kentucky bluegrass (*Poa pretenses*), meadow fescue (*Schedonorus pretenses*), common dandelion (*Taraxacum officinal*), and red clover (*Trifolium pratense*).

Livestock grazing is the cause of the introduction and spread of weed species alongside Crooked Creek road and in the riparian area of the creek itself. Management of the allotments should include weed management as part of the permit in order to minimize and mitigate for the current invasion of the noxious weeds Canada thistle and hound’s tongue. Off road vehicle use that strays from the main road also encourage the noxious weed invasion that we see in the Pryors.

The ideal time to enjoy this peaceful riparian place is in mid-June to early July when the wildflowers are in full display.

Western Meadowrue. (S. Durney photo.)



Plant List for Riparian: Douglas Fir/Common Snowberry Plant Community

* Non-Natives

Trees

Box-Elder (*Acer negundo*)
Common Chokecherry (*Prunus virginiana*)
Douglas-Fir (*Pseudotsuga menziesii*)

Shrubs

Western Serviceberry (*Amelanchier alnifolia*)

White Sagebrush (*Artemisia ludoviciana*)
Creeping Oregon-grape (*Berberis repens*)
Red-osier Dogwood (*Cornus stolonifera*)
Common Juniper (*Juniperus communis*)
Alpine Prickly Gooseberry (*Ribes montigenum*)
Canada Buffaloberry (*Shepherdia canadensis*)
White or Shiny-Leaf Spirea (*Spiraea betulifolia*)
Common Snowberry (*Symphoricarpos albus* var. *loevigatus*)

Forbs

Common Yarrow (*Achillea millefolium*)
Red Baneberry (*Actaea rubra*)
Short-stem Onion (*Allium brevistylum*)
Common Pearly Everlasting (*Anaphalis margaritacea*)
Pasque Flower (*Anemone patens*)
Spreading Dogbane (*Apocynum androsaemifolium*)
Heart-Leaf Arnica (*Arnica cordifolia*)
Field Chickweed (*Cerastium arvense*)
Fireweed (*Chamerion angustifolium*)
Purple Clematis (*Clematis occidentalis*)
Marsh Cinquefoil (*Comarum palustre*)
Conimitella (*Conimitella williamsii*)
Showy Aster (*Eurybia conspicua*)
Woods Strawberry (*Fragaria vesca*)
Virginia Strawberry (*Fragaria virginiana*)
Northern Bedstraw (*Galium boreale*)
Sweet-scented Bedstraw (*Galium triflorum*)

Richardson's Geranium (*Geranium richardsonii*)
Sticky Geranium (*Geranium viscosissimum*)
Cow-Parsnip (*Heracleum lanatum*)
Mint (*Lamiaceae*)
Fern-Leaved Biscuitroot (*Lomatium dissectum*)
Nine-Leaf Biscuitroot (*Lomatium triternatum* var. *triternatum*)

Sagebrush Bluebells (*Mertensia oblongifolia*)
Beebalm or Horsemint (*Monarda fistulosa* var. *menthifolia*)

Blunt-fruit Sweet-cicely (*Osmorhiza depauperata*)
Fanleaf Cinquefoil (*Potentilla gracilis* var. *flabelliformis*)

Rough-fruited Fairybells (*Prosartes trachycarpa*)
False Solomon's-seal (*Smilacina racemosa*)
Starry False Solomon's-seal (*Smilacina stellata*)
Stemless Four-nerve-daisy (*Tetranneuris acaulis*)
Western Meadowrue (*Thalictrum occidentale*)
Narrow-leaved Puccoon (*Lithospermum incisum*)
Cordilleran Valerian (*Valeriana acutiloba*)
American Speedwell (*Veronica americana*)
Sand or Hook Violet (*Viola adunca*)
Canada Violet (*Viola canadensis*)
Yellow Prairie Violet (*Viola nuttallii*)
Pine or Goosefoot Violet (*Viola purpurea*)
* Canada Thistle (*Cirsium arvense*)
* Common Hound's-Tongue (*Cynoglossum officinale*)
* Common Dandelion (*Taraxacum officinale*)
* Red Clover (*Trifolium pratense*)

Grasses, Sedges, Horsetails

Bluejoint Reedgrass (*Calamagrostis canadensis*)
Sedge sp. (*Carex* sp.)
Field Horsetail (*Equisetum arvense*)
Prairie Junegrass (*Koeleria macrantha*)
* Kentucky Bluegrass (*Poa pratensis*)
* Meadow Fescue (*Schedonorus pratensis*)

Sticky Geranium. (S. Durney photo.)



Red-osier Dogwood. (S. Durney photo.)



(7) Subalpine Meadow: Idaho Fescue/Threadleaf Sedge Cushion Plant Community (*Festuca idahoensis*/*Carex filifolia*)

Getting There:

There are two ways to get to the Subalpine Meadow Cushion Plant Community (#7).

GPS Coordinates: N 45.1475°, W 108.4666°. Elevation: about 8,500 feet.

Hiking: A great hike!

Download and print the hiking guide to the Crater Ice Cave / Big Pryor Mountain Trail, and the Pryor Mountain Road Driving Directions. (Both are found at www.PryorMountains.org)

The access road is drivable by any moderate clearance vehicle including many highway vehicles when dry. 4WD is not needed when the road is dry. The 6 miles across the Crow Reservation require slow and careful driving with highway vehicles, and can be impassible even with 4WD when wet.

Follow the Pryor Mountain Road driving directions for 29.7 miles to Tie Flat. Then follow the Crater Ice Cave / Big Pryor Mountain hiking guide.

The 1.7 mile hike (1,600 feet elevation gain) goes from Tie Flat to the highest point in the Pryors with an awesome view.

The “official” cushion plant community site is 0.9 miles south of the top of Big Pryor Mountain. But the entire area is similar subalpine meadow on the Big Pryor plateau. There is no need to walk to the “official” spot. But the walking is easy if you chose.

Driving:

Refer to the Pryor Mountain Map set and notes (see www.PryorMountains.org). You should also get a copy of the Motor Vehicle Use Map (MVUM) from the Forest Service.

This option requires a rugged, high clearance 4WD vehicle and a long rough drive.

From Warren MT follow Helt Rd to Red Pryor Mountain Road (12.4 miles from Warren). (See maps.) Then the road gets very rough.

Follow Red Pryor Mountain Road to the FS/BLM boundary fence. The road becomes FS 2091A. Then in sequence follow 2091G then 2091, to 2088. It is about 0.9 miles on 2088 to the “official” site #7, and another 0.9 miles to the top of Big Pryor Mtn.

We recommend the hike instead!

The Plant Community:

Cushion communities are dominated by cushion plants that are mat forming and of short stature like Phlox and Minuartia. When looking at these communities from afar they appear bare, but with a closer look at ground level you begin to see the high plant diversity below your feet. Flowering plants that you may see include: common yarrow, nodding onion, pasque flowers, wyoming kittentails, shooting stars, Howard’s alpine forget-me-not, mat buckwheat and sword townsendia. Sedges, like Carex, are also prevalent in a cushion community or subalpine meadow.

Cushion Plant Community. (S. Durney photo.)

The cushion plant meadow that we recommend occurs between the peaks of Red Pryor and Big Pryor on the west side of the Pryor Mountains. As you walk along the community the ground is slightly bouncy below each step because the top four inches of the soil horizon consists of organic matter, much of it still not completely decomposed. We observed forty-seven plant species in our sampling area. Mat buckwheat is a species of concern in the state.

We found signs of rabbits and cattle in the community but we noted minimal soil or ground disturbance.

Since this community is higher in elevation it is best to wait till late spring early summer to visit when all the snow has melted. This site is accessible by hiking from Pryor Mountain Road. (See directions



for “Getting There above.) It is also possible to drive to this site with a high clearance and four-wheel drive vehicle, but it is a long hard drive. Please stay on the two-track road to avoid disturbing native habitat. We did notice that, unfortunately, motor vehicles were impacting habitat by avoiding large mudholes in wet areas.

PLANT LIST for Subalpine Meadow: Idaho Fescue/Threadleaf Sedge Cushion Plant Community

Shrubs

Hood’s Phlox (*Phlox hoodii*)

Forbs

Common Yarrow (*Achillea millefolium*)
 Nodding Onion (*Allium cernuum*)
 Pasque Flower (*Anemone patens*)
 Low Pussy-Toes (*Antennaria dimorpha*)
 Fringed Sage (*Artemisia frigida*)
 Milkvetch sp. (*Astragalus sp.*)
 Wyoming Kittenail (*Besseyia wyomingensis*)
 American Thorowax (*Bupleurum americanum*)
 Field Chickweed (*Cerastium arvense*)
 Naked-stem Hawksbeard (*Crepis runcinata*)
 Bonneville Shooting Star (*Dodecatheon conjugens*)
 Few-Seed Whitlow-grass (*Draba oligosperma*)
 Woods Whitlow-grass (*Draba nemorosa*)
 Spreading Fleabane (*Erigeron divergens*)
 Mat Buckwheat (*Eriogonum caespitosum*)
 Yellow Wild Buckwheat (*Eriogonum flavum*)
 Howard’s Alpine Forget-Me-Not (*Eritrichium howardii*)
 Green Gentian (*Frasera speciosa*)
 Prairie Gentian (*Gentiana affinis*)
 Prairie Smoke (*Geum triflorum*)
 Spiked Ipomopsis (*Ipomopsis spicata*)

Cous Biscuitroot (*Lomatium cous*)
 Sagebrush Bluebells (*Mertensia oblongifolia*)
 Diamondleaf Saxifrage (*Micranthes rhomboidea*)
 Nuttall’s Sandwort (*Minuartia nuttallii*)
 Alpine or Arctic Sandwort (*Minuartia obtusiloba*)
 Wild Parsley (*Musineon divaricatum*)
 White Locoweed (*Oxytropis sericea*)
 Fern-leaved Lousewort (*Pedicularis cystopteridifolia*)
 Curved Bladderpod (*Physaria curvipes*)
 American Bistort (*Polygonum bistortoides*)
 Sheep Cinquefoil (*Potentilla ovina*)
 Stemless Four-nerve-daisy (*Tetranneuris acaulis*)
 Sword Townsend-daisy (*Townsendia spathulata*)
 Hairy or Edible Valerian (*Valeriana edulis*)

Grasses/Sedges/Clubmoss

Bluebunch Wheatgrass (*Agropyron spicatum*)
 California or Mountain Brome (*Bromus carinatus*)
 Thread-leaved Sedge (*Carex filifolia*)
 Rock or Curly Sedge (*Carex rupestris*)
 Idaho Fescue (*Festuca idahoensis*)
 Prairie Junegrass (*Koeleria macrantha*)
 Sandberg’s Bluegrass (*Poa secunda*)
 Dense Spikemoss (*Selaginella densa*)

Sword Townsendia. (S. Durney photo.)



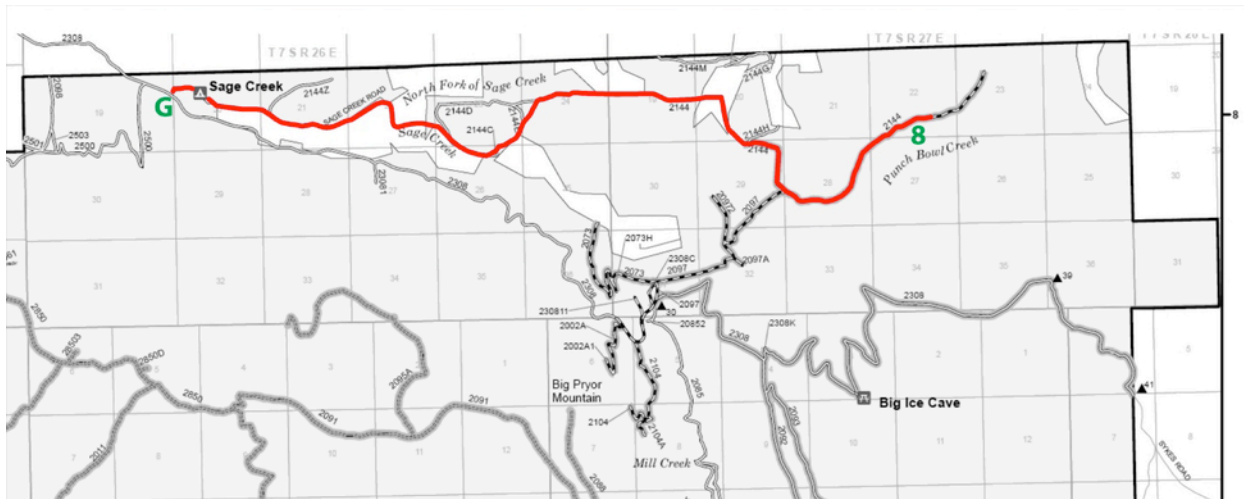
(8) Quaking Aspen/Tall Forbs Plant Community *Populus tremuloides*

Getting There:

Download and print the Pryor Mountain Road Driving Directions available at www.PryorMountains.org.

Follow the directions for Pryor Mountain Road for 22.6 miles to point “G”. At that point turn left and continue past Sage Creek Campground on Sage Creek Road #2144. (See Pryor Mountain Map Set available at www.PryorMountains.org)

Continue on Sage Creek Rd #2144 (ignore side routes such as #21442, #2144D, and #2144H). The USFS Motor Vehicle Use Map (MVUM) may help. About 9 miles east from point “G” (the turn from Pryor Mountain Rd toward Sage Creek Campground) route #2144 has a junction with route #2097. At that point #2144 is heading south and turns left (east). Continue east on #2144. (#2097 heads southwest.)



Red: Sage Creek Rd. #2144.

8: Quaking Aspen Community

From the junction of route #2144 and #2097 it is about 2.2 miles northeast on #2144 to the Punchbowl site (#8). A high clearance vehicle is required and 4WD is strongly recommended.

Alternatively the final 2.2 miles could be an enjoyable hike or mountain bike ride.

GPS Coordinates: N 45.2074°, W 108.3863°. Elevation: about 6,800 feet.

The Plant Community:

Quaking aspen trees occur on cooler slopes where there is sufficient soil moisture. The aspen trees in the Pryor Mountains generally occur on the north side of the range and in riparian corridors. The aspens in the Pryors occur in patches rather than in forests and ecologists have found that individual aspen stems in these patches are likely to be clones that sprouted vegetatively from the buds on the roots or lower stems of a single individual. In fact the entire patch is really one plant.

Punchbowl is an informal name given to a location on the north side of the Pryors where moisture and soil conditions provide ideal conditions for aspen growth. We observed two large stands of aspen along the USFS road into the area. Trees in the first stand were largely infected with a disease or insect invasion but the smaller stand close to the end of the road was healthy. The aspen grove itself was shady, moist and at the height of wildflower blooms in the understory. The margins of the stands open onto mountain meadows with stunning views and wildflowers.



(S. Durney photo)

The Punchbowl aspen area has the highest diversity out of the nine sites that we observed in the Pryor Mountains. We recorded eighty-three species in the aspen community. Only five of these are not native and include common Timothy, Kentucky bluegrass, sheep sorrel, and common dandelion. There was little disturbance observed in the area. There were signs of cattle, minimal grazing and motorized use.

The quaking aspen punchbowl area is staggering contrast to the vegetation communities found on the south side of the Pryor Mountains. This area is peaceful, beautiful and simulates the mountain meadows of Austria in the popular film the Sound of Music.

PLANT LIST for Quaking Aspen/Tall Forbs Plant Community:

* Non-Natives

Trees

Lodgepole Pine (*Pinus contorta*)
Limber Pine (*Pinus flexilis*)
Quaking Aspen (*Populus tremuloides*)
Douglas-Fir (*Pseudotsuga menziesii*)

Shrubs

Saskatoon Serviceberry (*Amelanchier alnifolia*)
Kinnikinnick (*Arctostaphylos uva-ursi*)
Big Sagebrush (*Artemisia tridentata*)
Creeping Oregon-grape (*Berberis repens*)
Small-flowered Blue-eyed Mary (*Collinsia parviflora*)
Common Juniper (*Juniperus communis*)
Missoula Phlox (*Phlox kelseyi*
var. missoulensis)
Shrubby Cinquefoil (*Potentilla fruticosa*)
Alpine Prickly Gooseberry (*Ribes montigenum*)
Common Snowberry (*Symphoricarpos albus*)
Woods Rose (*Rosa woodsii*)

Forbs

Common Yarrow (*Achillea millefolium*)
Common Pearly-Everlasting (*Anaphalis margaritacea*)
Pasque Flower (*Anemone patens*)
Littleleaf Pussytoes (*Antennaria microphylla*)
Pussytoes (*Antennaria sp.*)
Nuttall's Rockcress (*Arabis nuttallii*)
Sharptip Sandwort (*Arenaria congesta*
var. cephalalaidea)
Heart-Leaf Arnica (*Arnica cordifolia*)
Hillside Arnica (*Arnica fulgens*)
Hoary Balsamroot (*Balsamorhiza incana*)
Wyoming Kittenail (*Besseya wyomingensis*)
Field Chickweed (*Cerastium arvense*)
Slender Hawksbeard (*Crepis atriebarta*)
Naked-stem Hawksbeard (*Crepis runcinata*)
Little Larkspur (*Delphinium bicolor*)
Bonneville Shooting Star (*Dodecatheon conjugens*)
Glacier Lily (*Erythronium grandiflorum*)
Woods Strawberry (*Fragaria vesca*)
Virginia Strawberry (*Fragaria virginiana*)
Green Gentian (*Frasera speciosa*)
Bedstraw sp. (*Galium sp.*)
Northern Bedstraw (*Galium boreale*)
Sweet-scented Bedstraw (*Galium triflorum*)
Richard's Geranium (*Geranium richardsonii*)

Prairie Smoke (*Geum triflorum*)
Sweet-vetch (*Hedysarum sp.*)
Yellow Sweet-vetch (*Hedysarum sulphurescens*)
Hairy Goldenaster (*Heterotheca villosa*)
Sweet Pea (*Lathyrus sp.*)
Small-flower Woodland-star (*Lithophragma parviflorum*)
Western Gromwell (*Lithospermum ruderale*)
Cous Biscuitroot (*Lomatium cous*)
Nineleaf Biscuitroot (*Lomatium triternatum*)
Silvery Lupine (*Lupinus argenteus*)
Sagebrush Bluebells (*Mertensia oblongifolia*)
Yellowstone Saxifrage (*Micranthes hieraciifolia*)
Beebalm or Horsemint (*Monarda fistulosa*)
Blunt-fruit Sweet-cicely (*Osmorhiza depauperata*)
Crazyweed (*Oxytropis sp.*)
American Bistort (*Polygonum bistortoides*)
Elegant or Early Cinquefoil (*Potentilla concinna*)
Fanleaf or Slender Cinquefoil (*Potentilla gracilis*)
Sheep Cinquefoil (*Potentilla ovina*)
Sagebrush Buttercup (*Ranunculus glaberrimus*)
Woodland Buttercup (*Ranunculus uncinatus*)
Lanceleaf Stonecrop (*Sedum lanceolatum*)
False Solomon's-seal (*Smilacina racemosa*)
White or Showy-Leaf Spirea (*Spiraea betulifolia*)
Longleaf Stitchwort (*Stellaria longifolia*)
Western Meadowrue (*Thalictrum occidentale*)
Cordilleran Valerian (*Valeriana acutiloba*)
Speedwell (*Veronica sp.*)
Sand or Hook Violet (*Viola adunca*)
Canada Violet (*Viola canadensis*)
Nuttall's or Yellow Violet (*Viola nuttallii*)
Glaucous Zigadenus (*Zigadenus elegans*)
Mountain Deathcamas (*Zigadenus venenosus*)
* Sheep Sorrel (*Rumex acetosella*)
* Common Dandelion (*Taraxacum officinale*)
* Red Clover (*Trifolium pratense*)

Grasses

Sedge sp. (*Carex sp.*)
Geyer's or Elk Sedge (*Carex geyeri*)
Idaho Fescue (*Festuca idahoensis*)
Colorado Rush (*Juncus confusus*)
Parry's Rush (*Juncus parryi*)
Spike-Fescue (*Leucopoa kingii*)
* Meadow Timothy (*Phleum pratense*)
* Kentucky Bluegrass (*Poa pratensis*)

(9) Douglas Fir/Juniper Woodland Plant Community with Shoshone Carrot (*Pseudotsuga menziesii*/*Juniperus scopulorum*) with (*Shoshonea pulvinata*)

Getting There:

Download and print the Pryor Mountain Road Driving Directions available at www.PryorMountains.org.

Follow the Pryor Mountain Road (#2308) driving directions for 38.7 miles (from the turnoff from highway 310 south of Bridger MT) to Dry Head Vista (point "J"). There is no sign at Dryhead Vista, but there are several jackleg fence barricades to discourage driving on unauthorized tracks to the overlook. Please walk if you go there.

From Dry Head Vista continue southeast on route #2308 for 2.9 miles to a junction. Continue straight ahead (southeast) on Sykes Ridge Road. Burnt Timber Ridge Road turns to the right (southwest).

Follow Sykes Ridge Road for 3.0 miles to the Douglas Fir/Juniper Woodland (and Shoshone Carrot) plant community which is on the right side of the road.

(Dry Head Vista is 8.4 miles from the Crooked Creek Rd junction, and 4.3 miles from Big Ice Cave. Sykes Ridge Rd. begins 7.2 miles from Big Ice Cave, and 11.3 miles from Crooked Creek Rd.)

GPS Coordinates: N 45.1191°, W 108.3122°. Elevation: about 7,600 feet.

Important Notes:

A high clearance, 4WD vehicle is required to get to this plant community.

Warning: Do not drive farther down Sykes Ridge Rd., or more than a mile down Burnt Timber Ridge Rd. unless you have a rugged 4WD vehicle and are willing to drive it on very challenging roads.

The road above the Crooked Creek junction is seasonally closed until May 22. Beyond Dryhead Vista the road is seasonally closed until June 15. Depending on spring melt these closures are sometimes extended by the Forest Service.

The Plant Community:

The Douglas fir/Rocky Mountain Juniper plant community occurs as a woodland, which is a forested area with very open canopy. Sunlight can easily reach the ground in most places so the understory plant species receive ample sunlight for photosynthesis. *Shoshonea pulvinata*, or Shoshone carrot, is a common cushion perennial on limestone on several of these woodland sites. Although Utah juniper is a common woodland tree on the south side of the Pryors, Rocky Mountain juniper is more likely to occur in open Douglas fir woodlands.

Shoshone carrot is a mat-forming perennial with stems so short stems that the leaves appear to be basal. The green parsley-like leaves and vibrant yellow flowers are striking against the stony soils and limestone cliffs. Shoshone carrot occurs in small populations and are found in montane and lower subalpine Douglas fir woodlands. This species is an iconic plant species in Montana because it is a species of concern. Its entire distribution is limited to Carbon County in Montana, and just a few populations in Wyoming.



Shoshone Carrot. (S. Durney photos.)



Shoshone carrot can be found along cliffs and Douglas fir forests on the drive from Dry Head Vista south to Mystery Cave in the Pryor Mountains. We observed minimal disturbances to the populations, although increasing ORV use of the Sykes Ridge road and migration use of the area by feral horses are potential threats. All thirty-one species found among the plant community are native to Montana.

The Mystery Cave populations of Shoshone are part of the South Pryor Mountains Important Plant Area (IPA). Lesica states that the population trend for *Shoshonea pulvinata*, the only plant for which there is monitoring data, is declining at the Mystery Cave populations. He lists threats as ORV use, trampling by livestock and horses, weed invasion, mineral exploration, and climate change.

We found that while it took us some time to find Shoshonea because its occurrences are so localized, once we stumbled on our first plant its unique shiny dark green herbage and bright yellow umbels of flowers were unmistakable and truly stood out among the limestone substrate. The best time to visit would be after the snow melts so late June to early July.

PLANT LIST for Douglas Fir/Juniper Woodland Plant Community:

Trees

Rocky Mountain Juniper (*Juniperus scopulorum*)
Limber Pine (*Pinus flexilis*)
Douglas-Fir (*Pseudotsuga menziesii*)

Shrubs

Hood's Phlox (*Phlox hoodii*)

Wax Currant (*Ribes cereum*)
Sticky Currant (*Ribes viscosissimum*)
Canada Buffaloberry (*Shepherdia canadensis*)
Common Snowberry (*Symphoricarpos albus*)

Forbs

Nodding Onion (*Allium cernuum*)
Pasque Flower (*Anemone patens*)
Littleleaf or Rosy Pussytoes (*Antennaria microphylla*)
Timber or Weedy Milkvetch (*Astragalus miser*)
Rockcress (*Boechera sp.*)
Columbia Clematis (*Clematis columbiana*)

Few-Seeded Draba (*Draba oligosperma*)
Buff Fleabane (*Erigeron ochroleucus*)
Howard's Alpine Forget-Me-Not (*Eritrichium howardii*)
Littleleaf Alumroot (*Heuchera parvifolia*)
Spiked Ipomopsis (*Ipomopsis spicata*)
Nineleaf Biscuitroot (*Lomatium triternatum*)
Nuttall's Sandwort (*Minuartia nuttallii*)
Rydberg's Parsley (*Musineon vaginatum*)
Curved Bladderpod (*Physaria curvipes*)
Sheep Cinquefoil (*Potentilla ovina*)
Lanceleaf Stonecrop (*Sedum lanceolatum*)
Woolly Groundsel (*Senecio canus*)
Shoshone Carrot (*Shoshonea pulvinata*)
Stemless Four-nerve-daisy (*Tetraneuris acaulis*)
Mountain Death-Camas (*Zigadenus venenosus*)

Grasses and Sedges

Rock or Curly Sedge (*Carex rupestris*)
Spike-Fescue (*Leucopoa kingii*)

Howard's Alpine Forget-Me-Not. (S. Durney photo.)



A Botanical Guide to the Pryor Mountains
Lyman, Flathers and Durney