

Surveys for Significant Plant Resources and Related Vegetation Types for the Missoula Field Office of the Bureau of Land Management in the Hoodoo Mountain and Flint Creek Watersheds

Unpublished Report to:

Bureau of Land Management
Missoula Field Office

Agreement Number:
ESA010009 - #27

By:
Scott Mincemoyer
and
Steve Cooper

Montana Natural Heritage Program
Helena, MT

March 2006

Hoodoo Mountain Watershed

Plant surveys were conducted by Montana Natural Heritage Program (MTNHP) staff in the eastern end of the Garnet Range in the Hoodoo Mountain/Fourth of July Ridge area during the weeks of June 20 and 27, and July 11, 2005. Surveys concentrated on the higher elevations of the Hoodoo Mountain watershed and were focused in non-forested areas that appeared to have the highest potential for occurrences of Species of Concern (SOC), as well as sites supporting high quality meadow/grassland communities. A few areas that were not surveyed in 2005 are recommended for future survey work including Wet Cottonwood Creek, Devil Mountain, and Gallagher Creek. Habitats of potential survey interest in these areas include open, rocky slopes that may support additional occurrences of *Polygonum douglasii* ssp. *austinae*, *Adoxa moschatellina* or rare *Lesquerella* spp. and riparian areas that may support any of several rare species or examples of high quality or unique riparian sites.

The majority of the Hoodoo Mountain watershed is composed of tertiary volcanic parent materials, which do not generally contain plant SOC as frequently as adjoining sedimentary or metamorphic parent materials. In contrast, the northwest corner of the watershed is composed of sedimentary belt series rocks, which may have a better potential of supporting plant SOC and thus be a higher priority for future surveys.

Following are descriptions of some of the specific areas surveyed along with the vegetation communities and plant SOC documented in the watershed. All data collected and referenced below are housed at MTNHP.

Vegetation Communities

Hoodoo Mountain Area: The Hoodoo Mountain area is predominantly forested from the lowest elevations to the highest ridges. Given that the area has typical rock substrates, mostly of the Belt Series, the extensive forest stands represent common plant associations or habitat types for western Montana. The most common forest types at lower elevations (montane zone) are Douglas-fir / common snowberry (*Pseudotsuga menziesii*/*Symphoricarpos albus*), Douglas-fir/pinegrass (*P. menziesii*/*Calamagrostis rubescens*) and Douglas-fir/white spiraea (*P. menziesii*/*Spiraea betulifolia*). The subalpine zone is characterized by the potential dominance of subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmannii*). However, most stands are seral expressions dominated by lodgepole pine (*Pinus contorta*) and Douglas-fir (*P. menziesii*), of which the most common plant association is lodgepole pine/grouse whortleberry (*P. contorta*/*Vaccinium scoparium*).



Some of the highest ridges include open parks characterized by herbaceous vegetation usually with graminoids dominating; these environments have been sampled to an unknown, most likely very limited, extent in the pioneering work of Mueggler and Stewart (1980) that focused on U.S. Forest Service lands and have not hitherto been visited by MTNHP staff. Several vegetation plots were inventoried in these parklands in order to compare their composition to the habitat types (climax plant associations) defined by Mueggler and Stewart (1980). A southwesterly-facing, moderately steep slope (25-35 %) plot on quartzite-derived, shallow soils technically keyed to the Idaho fescue – bluebunch wheatgrass (*Festuca idahoensis* – *Pseudoroegneria spicata*) Plant Association [NAD83, Z12, 357025E, 5180375N]. However, at an elevation of 7,000 plus ft. the plot was at the stated upper elevation limits of the type (Mueggler and Stewart 1980) and exhibited five forbs: umber pussytoes (*Antennaria umbrinella*), Rocky Mountain dwarf-primrose (*Douglasia montana*), silvery lupine (*Lupinus argenteus*), lambstongue ragwort (*Senecio integerrimus*) and Gordon's ivesia (*Ivesia gordonii*) not found in any of the 45 plots cited by Mueggler and Stewart (1980) as characteristic of the type. This plot (and community) most likely is representative of a cold-dry extreme of this plant association and evidences a clear similarity to the subalpine to alpine community, Idaho fescue/vari-leaf cinquefoil (*F. idahoensis*/*Potentilla diversifolia*, Cooper et al. 1997).

Further to the west and also associated with ridgeline habitats in the vicinity of 7,000 ft., but generally occurring immediately adjacent to the encircling forest and restricted to deeper, relatively rock free (< 10% rock in upper 2 dm) soil and not extending to the rockier exposures characterized by the above-described type is the rough fescue – Idaho fescue (*Festuca campestris* – *F. idahoensis*) Plant Association. Previously noted upper elevation range limits for this type are in the vicinity of 7,000 ft. making this occurrence notable for pressing the limits of the vegetation type. Testifying to the greater mesophicity of this site relative to that of *F. idahoensis* – *P. spicata* is the presence of rough fescue, two to three times greater grass cover (up to 60%), and a diverse forb complement that includes American bistort

(*Polygonum bistortoides*), silvery lupine (*Lupinus argenteus*), American thornwax (*Bupleurum americanum*), little larkspur (*Delphinium bicolor*), aspen fleabane (*Erigeron speciosus*) and meadow deathcamas (*Zigadenus venenosus*). All but the last two forbs cited were not reported by Mueggler and Stewart (1980) for their *F. campestris* – *F. idahoensis* Plant Association (27 plots) so this plot, which is representative of an extensive ridgeline complex, somewhat expands the known floristic complement of the type. Cattle grazing also occurs and is a complicating influence on the vegetation composition of this system; the rough fescue coverage increased to the west along the ridgeline while the intensity of cattle use appeared to decline based on amount of trampling and dung pat counts.



Hansen Park: Hanson Park, at just over 7,000 ft. elevation (NAD83, Z12, 360144E, 5176871N), is a gently tilted and rolling expanse along the edge of a steep escarpment with predominantly deep soils derived from fine-grained extrusive volcanics. Two rough fescue (*F. campestris*)-dominated communities (see Figure 1 for location) interdigitate, the controlling factor ostensibly being related to soil moisture; the rough fescue / sticky geranium (*F. campestris*/*Geranium viscosissimum*) Plant Association occupies the deeper soils and slight swales, whereas the rough fescue – Idaho fescue (*F. campestris* – *F. idahoensis*) Plant Association is found on rockier, thinner soils and well-drained positions. In addition to abundant bearded wheatgrass (*Elymus trachycaulus*), sticky geranium (*G. viscosissimum*), slender cinquefoil (*Potentilla gracilis*), tall cinquefoil (*Potentilla arguta*) and American bistort (*Polygonum bistortoides*) are present at one to two percent cover to distinguish the more mesic vegetation type. Though only several kilometers distant from the locations described above, the Hanson Park communities exhibited a less diverse flora and community composition that closely matched the Mueggler and Stewart (1980) descriptions. One source of explanation might rest with substrate differences, as Hanson Park soils developed on extrusive volcanics and the other communities occurred on soils derived from non-calcareous sedimentary rock.

The high-quality community occurrences portrayed above not only lack invasive weeds, but native species and non-native aggressive pasture grasses considered to be “increaser” species were insignificant as well; with improper grazing practices increaser species can easily fulfill their destiny. We also noted rough fescue (*F. campestris*) tussocks were robust, but not woolly with abundant thatch, further confirmation that these grasslands and dry meadows have been managed in a manner consonant with their highest values.

This area was initially considered prospective habitat for the following taxa: beautiful bladderpod (*Lesquerella pulchella*), Payson bladderpod (*L. paysonii*) and moonwort (or grapefern) species (*Botrychium* spp.). However, an overlay of a geological substrate map with that of the study area indicated a lack of calcareous substrates in this vicinity. No sensitive plants were encountered, ostensibly due to the lack of appropriate substrates in the case of the sensitive bladderpods, and for reasons purely speculative in the case of moonworts.

Brock Creek-Anderson Mine Vicinity: [NAD83, Z12, 359312E, 5169286N] This approximately five-acre meadow was found on terrain gently sloping (6%) to the southwest at 6,460 ft elevation on deep, fine-textured, rock-free Mollisols derived from quartzite. This small camas – western sweetroot

(*Camassia quamash* – *Osmorhiza occidentalis*) meadow is named for the two dominant forbs, the presence of which convey the impression that this is a very mesic site: Reinforcing this interpretation is the fact that sticky geranium (*Geranium viscosissimum*), lambstongue ragwort (*Senecio integerrimus*) and American bistort (*Polygonum bistortoides*) are very abundant, and the graminoids Hood's sedge (*Carex hoodii*), small-wing sedge (*C. microptera*), Liddon sedge (*C. petasata*) and mountain brome (*Bromus marginatus*) approach 30% total cover, for a combined cover far in excess of 100%. Past stock use has also introduced a minor amount of timothy



(*Phleum pratense*). A meadow type such as described above does not appear in the National Vegetation Classification System (NVCS) or the ecological literature but it is compositionally similar to the cow parsnip (*Heracleum maximum*) Herbaceous Vegetation Plant Association described for Glacier National Park. The author's are also familiar with an extensive (50 acre +) small camas-dominated meadow at Packer's Meadow on Lolo Pass. Forb-dominated communities have been poorly described in the NVCS, perhaps because, as the one referenced here, they occur as small patches in a matrix of a much more extensive vegetation type (as here, set in a Douglas-fir-dominated forest). The small camas was a significant dietary component of the Salish-Kootenai People of western Montana and they had identified many sites at which the bulbs had been harvested for generations. Unfortunately many of the occurrences, those set in prime agricultural locations, have been extirpated. Herbaceous communities of this type are relatively undocumented, may be fairly unique and their productive, mesic nature makes them prime habitat for invasion by exotic pasture grasses and noxious weeds.

Immediately to the northeast of the camas meadow is an extensive old-growth stand of Douglas-fir, mostly occurring as Douglas-fir/pine grass (*P. menziesii*/*Calamagrostis rubescens*) and Douglas-fir/common snowberry (*P. menziesii*/*Symphoricarpos albus*) Plant Associations. This stand is an excellent example of these plant associations, and old-growth stands like these are uncommon, especially



in the general area, which has experienced extensive logging in the past. Unfortunately, the overall extent of the stand was not documented.

Invasive weeds are present and sometimes abundant along the road system, on old mining surfaces and in recent clearcuts in the vicinity. These invasive weeds include, but are not limited to, hound's tongue (*Cynoglossum officinale*), Canada thistle (*Cirsium arvense*), spotted knapweed (*Centaurea biebersteinii*), musk thistle (*Carduus nutans*), and common mullein (*Verbascum thapsus*).

Species of Concern Search Results

Two new locations of *Polygonum douglasii* ssp. *austinae* (Austin's knotweed), a Montana Plant Species of Concern, were found in the Hoodoo Mountain watershed on July 13 and 14, 2005. This plant is not currently listed as a BLM Sensitive species, though consideration as such may be warranted. Prior to the 2005 surveys in the Hoodoo Mountain area only one occurrence of the taxa on BLM-managed land was known, the nearest known locations of *P. douglasii* ssp. *austinae* to these new sites being approximately 50 miles east in the Big Belt Mountains and 50 miles north along the Rocky Mountain Front. Locations of the new occurrences are shown in Figures 1 and 2, population and habitat data are provided in Table 1 and a photo of the habitat for *P. douglasii* ssp. *austinae* EO #23 is pictured to the right. Both occurrences were moderate in size and in "good" habitat with no



invasive weeds present, leading to Element Occurrence ranks for both populations of "B – Good Long-term viability." Voucher specimens of *P. douglasii* ssp. *austinae* will be deposited at the University of Montana Herbarium (MONTU). No other vascular Plant Species of Concern were found in the area, nor were any other SOC occurrences known in the area prior to the 2005 surveys.

Though no other additional Plant Species of Concern were found in the area, this is not meant to imply the absence of other plant SOC in the watershed, and additional surveys may find new locations of SOC.

Table 1. Occurrence information for *Polygonum douglasii* ssp. *austinae* locations

Occurrence	Elevation (ft)	Population Estimate	EO Rank	Description
EO #22 Windy Rock	6890	300 plants	B	Rocky, gravelly site with approximately 20% vegetation cover. Dominant Species: <i>Poa secunda</i> , <i>Festuca idahoensis</i> , <i>Phlox longifolia</i> , <i>Sedum lanceolatum</i> , <i>Lomatium</i> spp. and <i>Polygonum</i> spp. No weed species present.
EO #23 Hoodoo Mtn	6880	400 plants	B	Level, gravelly site dominated by <i>Ivesia gordonii</i> , <i>Erigeron compositus</i> , <i>Douglasii montana</i> , <i>Sedum lanceolatum</i> , <i>Arenaria congesta</i> and <i>Selaginella densa</i> . No weed species present.

Figure 1. *Polygonum douglasii* ssp. *austinae* EO #22 and rough fescue community plot locations (Windy Rock Quad)

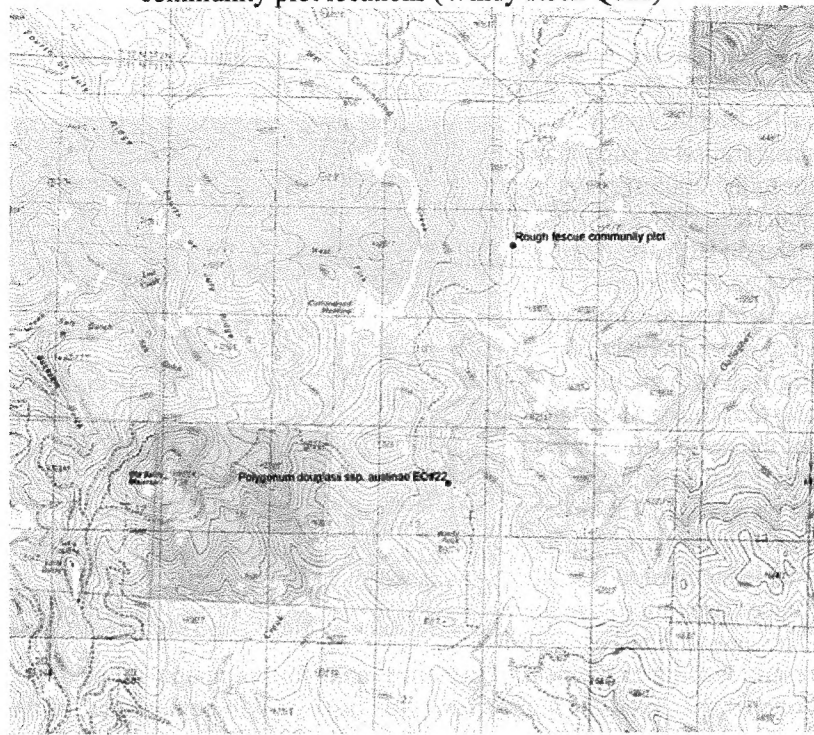


Figure 2. *Polygonum douglasii* ssp. *austinae* EO #23 and Idaho fescue-bluebunch wheatgrass plot locations (Helmville Quad)

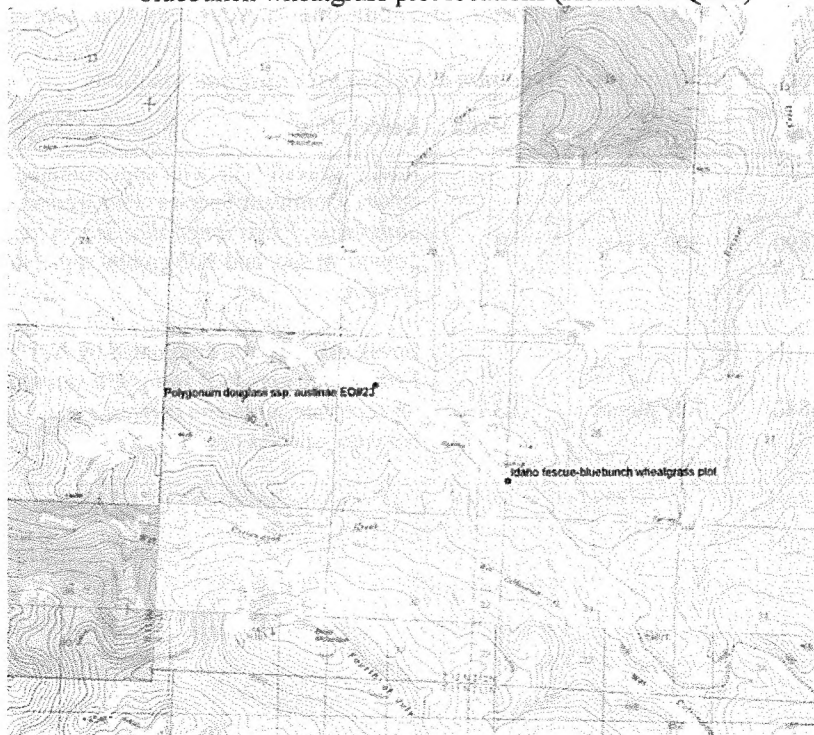
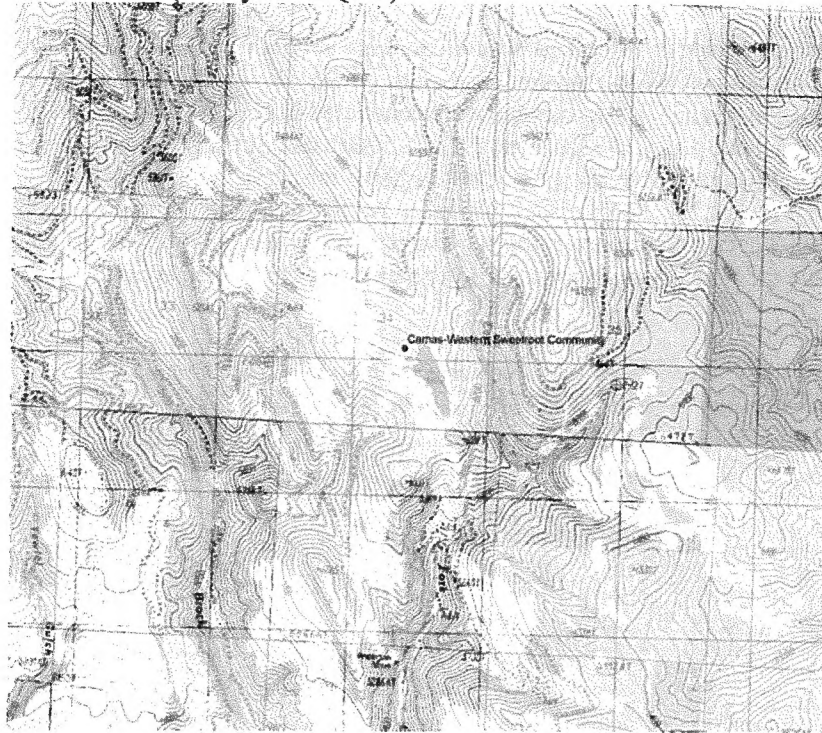


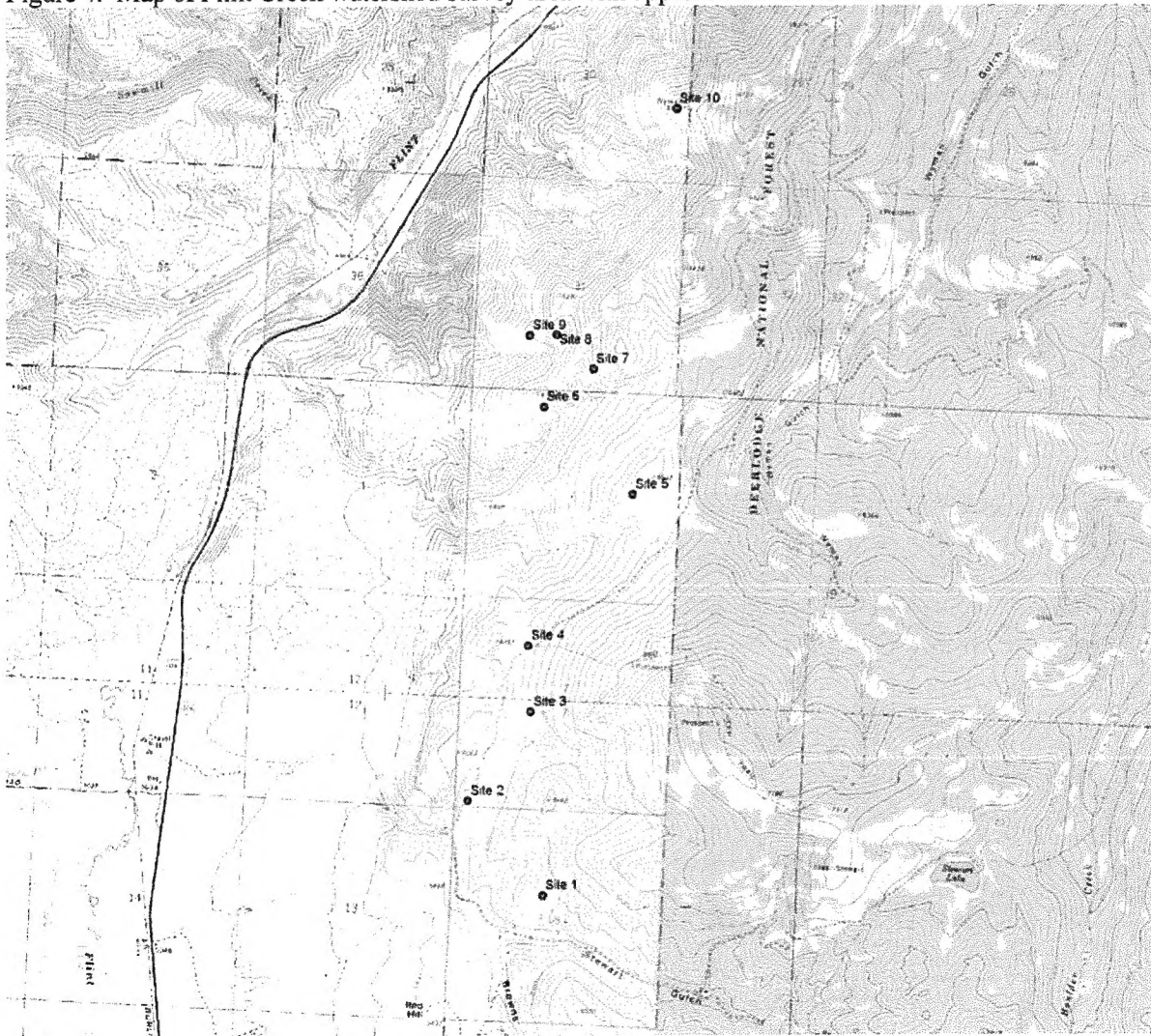
Figure 3. Camas-western sweetroot community location
(Windy Rock Quad)



Flint Creek Watershed

Plant surveys were conducted by Montana Natural Heritage Program (MTNHP) staff across an area of approximately six sections of BLM-managed land on the lower slopes of the Flint Creek Range directly north of Philipsburg, Montana. These surveys were conducted during the weeks of June 27 and July 11, 2005. No Montana Plant Species of Concern or BLM-designated Sensitive plants were found during the course of surveys in this area. Species specifically targeted for surveys included moonworts (*Botrychium* spp.), *Lesquerella paysonii* and *Lesquerella pulchella*. Additionally, no plant SOC were known in the area prior to the 2005 surveys. However, the surveys conducted during 2005 only spanned two weeks of the field season and did not survey all areas of potentially suitable habitat, so additional surveys may still be warranted.

Figure 4. Map of Flint Creek watershed survey area with approximate site locations



The following information describes meadows and grasslands that were specifically searched for plant SOC, and in many cases the higher quality grassland/meadow communities were documented by the establishment of a vegetation plot. Site locations are mapped in Figure 4.

Section 18

Site 1: [NAD83, Z12, 324912E, 5136742N] This open grassland near the center of the section occurs on calcareous parent material, probably limestone as indicated by a strong effervescence with 10% HCl.

This *Festuca idahoensis* –

Pseudoroegneria spicata Plant

Association at 6,000 ft. elevation, 185 ° aspect, 35-40 % slope, is very open with 75-90% exposed soil, gravel and rock.

Though the site appeared suitable for rare *Lesquerella* spp. only the common alpine bladderpod (*L. alpina*) was present.

Spotted knapweed (*Centaurea maculosa* = *C. biebersteinii*) is scattered across the open slope and is especially abundant on the old roadcuts at the slope bottom.



Section 7

Site 2: [NAD83, Z12, 324328E, 5137452N] This grassland in the sw ¼ of section 7 and the nw ¼ of section 18 is a very high-quality (excellent range condition) rough fescue/sticky geranium (*F. campestris*/*Geranium viscosissimum*) community at an elevation of 5,700 ft. with a southwest to west aspect and a slope of 28 to 40%. Sticky geranium is locally conspicuous, though the forbs best conveying the mesic nature of the community are slender cinquefoil (*Potentilla gracilis*), tall cinquefoil (*P. arguta*), and Liddon sedge (*Carex petasata*), all of which approach 5% cover; the aggregate cover of the dominant grasses rough fescue, Idaho fescue and Kentucky bluegrass (*Poa pratensis*) usually exceeds 80% and in conjunction with the forb component result in a virtually continuous vegetative cover. Soils are classed as a Mollisol with a deep mollic epipedon having developed from quartzite parent

material. Exposed soil is minimal with more than 80% of the ground surface blanketed by mosses and the remainder by litter and basal vegetation. This is an extensive grassland surrounded by mature Douglas-fir forest and is an excellent example of the rough fescue/sticky geranium association (rough fescue–Idaho fescue h.t./sticky geranium phase of Mueggler and Stewart 1980). Slightly less mesic areas of the



grassland key to rough fescue – Idaho fescue (*F. campestris* – *F. idahoensis*). This grassland was intensively and unsuccessfully searched for moonwort (*Botrychium*) species. Though a few scattered plants of spotted knapweed (*Centaurea biebersteinii*) were noted, along with several patches of timothy (*Phleum pratense*) and the generally distributed Kentucky bluegrass (*Poa pratensis*), this should still be considered an exemplary site with the potential to be considered a botanical interest area or in some way recognized and preserved. Encroaching weeds and evident off-road ATV use appear to be the main threats to maintaining the characteristics of this high quality grassland. In the general vicinity, rough fescue grasslands have been largely degraded or converted to non-native species. On both BLM and US Forest Service lands we have noted examples of vegetation conversions from rough fescue-dominated communities to those dominated by introduced pasture grasses, weeds and in more extreme cases it is believed that rough fescue has been locally extirpated. This grassland, in conjunction with the largely contiguous grassland described in the following section, should be considered for management actions that maintain their high quality characteristics.

Site 3: [NAD 83, Z12, 324794E, 5138134N] This site represents the upper and northern end of the montane grassland discussed above. The site occurs at approximately 6,040 ft. on a southwest to west aspect and 18-22 % slope on quartzite soils, which are less developed than the preceding site, but probably still classed as Mollisols. This site has been heavily worked by pocket gophers (*Thomomys talpoides*) and ruderal species such as cheatgrass (*Bromus tectorum*), timothy (*Phleum pratense*), pepper grass (*Lepidium* spp.), plains mustard (*Schoenocrambe linifolia*), tumble mustard (*Sisymbrium altissimum*), and slender phlox (*Microsteris gracilis*) are conspicuous. This site is much like the preceding community but the mesic grassland portion (rough fescue/sticky geranium association) comprises less of the total grassland. ATV off-road use is impacting the site and the invasive species spotted knapweed occurs along the adjacent gravel road and is spreading into the grassland. The quantity of spotted knapweed in the area is still small enough that control or eradication measures would be possible. This site, as mentioned above, would provide an excellent opportunity for effective management aimed at maintaining and improving grassland condition.



Site 4: [NAD 83, Z12, 324767E; 5138634N] This site contains a small, very mesic grassland at 6,040 ft., westerly aspect and 10-12% slope on Mollisols derived from quartzite. The forb component, including sticky geranium, tall and slender cinquefoils, is very lush (in the range of 60 to 80% canopy cover) and approaching the graminoid component in cover-based importance; however, Kentucky bluegrass (*P. pratensis*), with more than 80% canopy cover, is the dominant graminoid in place of rough fescue (*F. campestris*) which comprises not more than 5% cover. This dominance by Kentucky bluegrass over rough fescue is likely the result of a long history of grazing at the site.

Section 6

Site 5: [NAD83, Z12, 325549E; 5139793N] This site at 6,289 ft. with 20-30% slopes on southerly aspects occurs on Mollisols developed from Belt Series argillite and quartzite. It was inventoried to demonstrate an example of a grassland site exhibiting site characteristics capable of supporting a rough

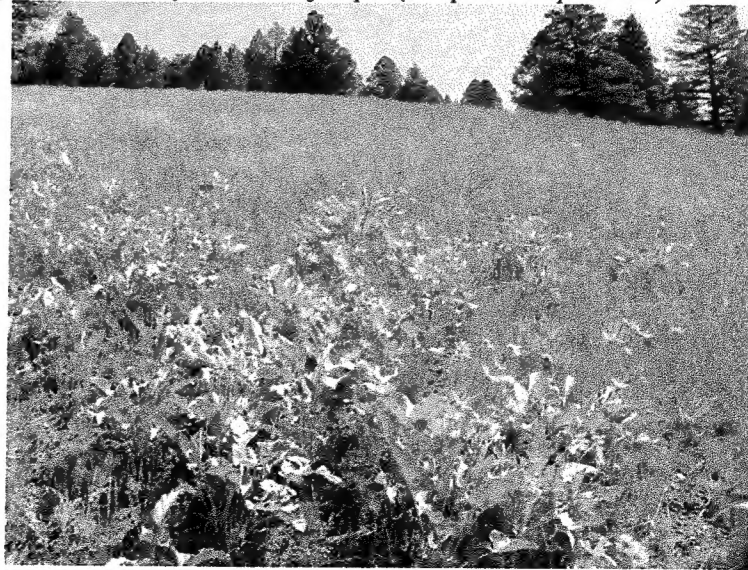


fescue-dominated grassland, yet due to grazing impacts rough fescue has been extirpated or rendered so rare as to escape an intensive focused search). This pasture is now dominated by Kentucky bluegrass (*P. pratensis*), Canada bluegrass (*P. compressa*), and timothy (*Phleum pratense*) with minor amounts of native Idaho fescue (*F. idahoensis*) and bluebunch wheatgrass (*Pseudoroegneria spicata*). Forbs typical of mesic grasslands are abundant including sticky geranium (*G. viscosissimum*) and both slender and tall cinquefoils (*P. gracilis* and *P. arguta*). Bare ground is common with up to 80% bare soil even in areas where Kentucky bluegrass is relatively dense.

Significant populations of noxious weeds are also present including spotted knapweed (*C. biebersteinii*) and hound's tongue (*Cynoglossum officinale*). Searches for moonwort (*Botrychium*) species were negative.

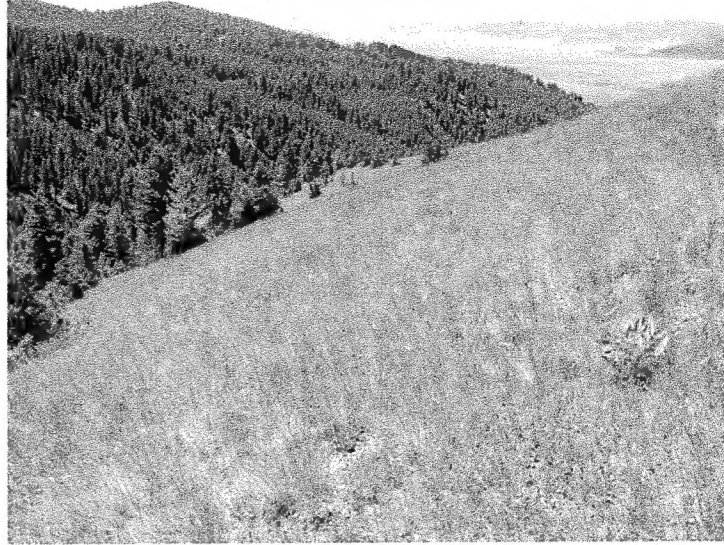
Site 6: [NAD83, Z12, 324855E, 5140445N] This site at 6,120 ft. with slopes 35-40 (50)% on primarily 140-150° aspects occurs on thin soils derived from grey-tan limestone with 30-50% exposed gravels and 40-50 % exposed soil surface. The plant community is a high quality Idaho fescue – bluebunch wheatgrass (established vegetation plot) with Rocky Mountain juniper (*Juniperus scopulorum*) and Douglas-fir (*Pseudotsuga*

menziesii) encroaching from below and to lesser extent from forested stands above the grassland. Cattle grazing is evident and the site appears by pellet density to be prime elk winter range. Disturbance (compacted trail and incipient erosion patches) by off-road ATV use is evident and spotted knapweed is establishing directly on the trail established by ATV use.



Section 31

Site 7: [NAD83, Z12, 325231E, 5140742N] This site supports a relatively good example of an Idaho fescue – bluebunch wheatgrass association at 6,280 ft., 240° aspect, on a 28-32% convex slope with thin soils derived from limestone which contain more than 50% exposed soil and gravel. On this moderately xeric site, both cheatgrass (*Bromus tectorum*) and Kentucky bluegrass (*P. pratensis*) were the major responders on disturbed patches within the grassland. Spotted knapweed (*C. biebersteinii*) has developed significant populations in the immediate vicinity, the spread likely facilitated by logging-associated ground disturbance, cattle grazing and off-trail/road ATV use in the area. No sensitive *Lesquerella* species were found on what appears to be very appropriate habitat.

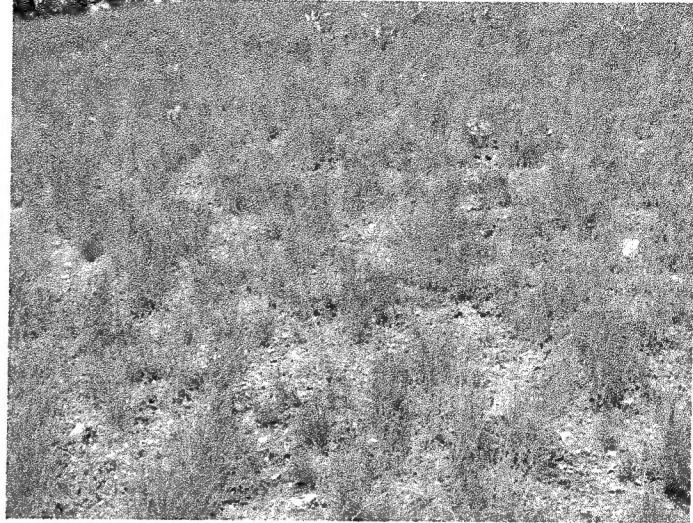


Site 8: [NAD83, Z12, 324943E, 5140996N] This site at 6,200 ft., aspect 180-190° and 12-16% slope is in a swale or depression, with deep silt-loam, quartzite-derived Mollisols. This grassland/meadow community has been highly altered by cattle grazing; what was once a rough fescue/sticky geranium association has been converted to Kentucky bluegrass (*P. pratensis*) dominance with rough fescue reduced to a few scattered individuals. Western needlegrass (*Achnatherum occidentale*), a less palatable



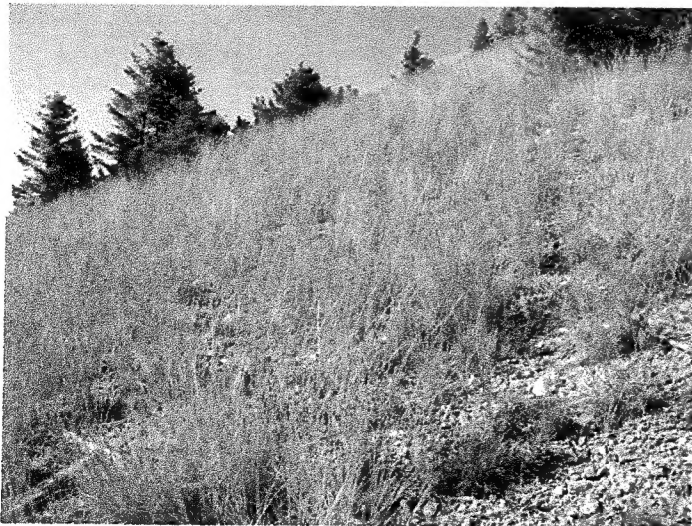
grass than rough fescue (Mueggler and Stewart 1980), is the second leading graminoid. This site is notable for having an abundance (15-30% canopy cover) of largeflower triteleia (*Triteleia grandiflora* var. *grandiflora*), which combined with the high cover of sticky geranium (*G. viscosissimum*) and *Potentilla* species gives this site a decided meadow aspect. Though this site is potentially suitable habitat for moonworts (*Botrychium* spp.), none were found.

Site 9: [NAD82, Z12, 324740E, 5140988N] This site supports a good to excellent example of an Idaho fescue – bluebunch wheatgrass association on steep (40-44% slope), southerly-facing (200-210°) limestone slopes at 6,030 ft. Especially conducive to sensitive bladderpod species (*Lesquerella* spp.) is the high percentage of exposed gravels (40-50 %) and soil (40-60 %); however, only the common alpine bladderpod (*L. alpina*) was found. This open slope condition also favors weedy species of which only five specimens of spotted knapweed (*C. biebersteinii*) were found and pulled. As with the other sites in section 31, it is important elk winter range while in the summer cattle grazing is a primary use. The high canopy cover of prairie junegrass (*Koeleria macrantha*) relative to that of Idaho fescue may be due to cattle grazing, Idaho fescue being considerably preferred over prairie junegrass.



Section 30

Site 10: [NAD83, Z12, 325832E, 5142723N] This site is a steep (35-45%) slope with a southerly exposure (210-220°[230°]) with much exposed limestone-derived gravel and rock (80-95%). The lack of a soil mantle may be attributable to a severe fire which consumed this slope many years ago and was



possibly followed by a significant precipitation event causing massive erosion. These events have created an ideal habitat, an open slope characterized by the Idaho fescue – bluebunch wheatgrass (*F. idahoensis* – *P. spicata*) community, for sensitive bladderpod species, but only trace amounts of the common alpine bladderpod were found.

Literature Cited

Cooper, S.V., P. Lesica and D. Page-Dumrose. 1997. Plant community classification for alpine vegetation on the Beaverhead National Forest, Montana. Gen. Tech. Rep. INT-362. USDA Forest Service Intermountain Research Station, Ogden, UT. 61 pp.

Muegller W.F. and W.L. Stewart. 1980. Grassland and shrubland habitat types of western Montana. USDA Forest Service. Gen. Tech. Rep. INT-66. 154 pp.