

INVENTORY AND MAPPING OF PLANT COMMUNITIES IN THE
FERRIS MOUNTAIN WILDERNESS STUDY AREA,
CARBON COUNTY, WYOMING.

A Report Prepared for the Bureau of Land Management
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INTRODUCTION

In July 2000, the Bureau of Land Management and the Wyoming Natural Diversity Database (WYNDD) of the University of Wyoming entered into a cooperative project to characterize the vegetation and other features of four wilderness study areas (WSAs) in Wyoming, including the Ferris Mountains WSA in the Rawlins Field Office (Figure 1). The information gathered in this project will be used by BLM biologists and managers to evaluate the degree to which the Ferris Mountains WSA represents vegetation types and ecosystem types present on BLM-managed lands and to help set management practices in the WSA. The WYNDD will use the information in its efforts to describe the composition and distribution of the state's vegetation types and the distribution and abundance of Wyoming's rare plants.

This report is based mainly on information collected by G. Jones of WYNDD during field work in the Ferris Mountains WSA from August 19 through 21 and September 19 and 20, 2001, supplemented with information from an unpublished Wyoming Game and Fish Department habitat evaluation report (Stout and Cundy 1992). A complete field survey of the WSA was impossible, so the 2001 field work concentrated on the shrub vegetation at the lower elevations of the WSA.

METHODS

FIELD SURVEY

The boundary of the WSA (Figure 2) was provided by BLM Rawlins Field Office staff on paper USGS 1:24,000-scale topographic quads. Black-and-white aerial photographs (digital orthophotoquad quarters from the web site of the University of Wyoming's Geographic Information Sciences Center, <http://www.sdvc.uwyo.edu/doqq/>) were used to ascertain the variation in the vegetation of the area. The photographs and 1:24,000-scale topographic maps were used to select general areas of the WSA to be visited during field work. Those areas were in the foothills and on the lower slopes of the Ferris Mountains, because previous observations had suggested that the conifer forest at the higher elevations is homogeneous in terms of dominant overstory trees and because the Rawlins BLM staff was particularly interested in information on the herbaceous and shrub vegetation at lower elevations.

In the field, surveys were conducted on foot along subjectively selected routes through different vegetation types, to include a variety of aspects, slopes, and parent materials. Notes were taken on the species composition and the structure of the vegetation at observation points along those survey routes. At some locations along the survey routes, quantitative data were collected in 20 m x 50 m vegetation sampling plots: canopy cover of the most common plant species was recorded by cover ranges (Table 1); the UTM coordinates of one corner of the macroplot were determined with a global positioning system receiver (GPS 40, Garmin Corp., Lenaxa KS, USA) and recorded by hand on the data sheets; slope angle was measured with a clinometer and slope aspect was measured with a sighting compass; surface soil texture was determined by a single hand-texture; signs of disturbance were noted; the vegetation was described; and (in most cases) a photograph was taken.

Vascular plants were identified to species in the field when possible, using Dorn (1992). When that proved impossible, specimens were collected for later identification. Some specimens were also collected to verify the identifications made in the field.

Before field work, G. Jones reviewed specimens in the Rocky Mountain Herbarium of species on the State of Wyoming's list of designated noxious weeds, so that populations of any of these species observed in the WSA could be recorded during field work. Notes were made on miscellaneous biological features and signs of human impacts observed during field survey.

REPORT PREPARATION

The cooperative agreement governing this project requires that three classification systems be used to indicate the ecosystems present in the WSA: the classification of 41 landcover-types used in a state-wide landcover map, the landtypes from the federal Ecomap project, and the vegetation types from the National Vegetation Classification System.

For the 41 landcover-types, we are using the coverage produced in 1996 by the Wyoming Gap Analysis Project (Merrill *et al.* 1996) and distributed by the University of Wyoming's Geographic Information Science Center (Wyoming Gap Analysis 1996). A map of cover-types from this classification was produced in the ArcGIS 8.2 geographic information system (ESRI, Redlands CA, USA) by using the boundary of the WSA to clip the relevant portion of the state-wide layer.

For units from the Ecomap project, we are using the landtype associations delineated for Wyoming by Reiners *et al.* (1999). A *landtype association* is a unit of the National Hierarchical Framework of Ecological Units (used in the Ecomap project) one level higher than the *landtype*. A landtype association typically is mapped at a scale of 1:250,000 to 1:60,000, covers hundreds to thousands of acres, and includes a number of landtypes. The Ferris Mountains WSA lies on landtype associations delineated in two separate efforts, one for southwestern Wyoming and the second for southeastern Wyoming (Reiners *et al.* 1999), and the landtype associations were given names particular to those parts of the state. For this report, landtype associations of the same kind from the two mapping efforts were combined into a single landtype association. For example, the Ferris Mountains Foothills (north side) Landtype Association from southeastern Wyoming was combined with the Ferris Mountains Foothills (south side) Landtype Association from southwestern Wyoming into a single Foothills Landtype Association. Thus four landtype associations were identified in and around the WSA (Table 2).

The final indicator of ecosystem types, the National Vegetation Classification System, is a hierarchical classification of vegetation units (Grossman *et al.* 1998). Information from the field survey was used to place the vegetation of the WSA into alliances (units identified by the dominant or diagnostic plant species in the uppermost or dominant stratum) or associations (units within an alliance, identified by additional dominant or diagnostic species from any strata) in the current list of those types (NatureServe 2003).

Plant species names used in this report are from the USDA Natural Resources Conservation Service (2001).

RESULTS

ECOSYSTEMS IN THE WSA

Landtypes

Three landtype associations delineated by Reiners *et al.* (1999) occur in the Ferris Mountains WSA and a fourth surrounds it (Figure 3). The Ferris Mountains Isolated Mountain landtype association accounts for 80% of the WSA (Table 2). Foothills adjoining the mountains, especially on the north side, cover 14% of the WSA, and three multiple cuesta and valley complexes account for 6% of the WSA, in the western part. Two rolling plains landtype associations surround the WSA, the Great Divide Basin Rolling Plains to the south and the Granite Mountains Rolling Plains to the north.

Figures 4 through 6 show the distributions throughout Wyoming's central and south-central basins of the three landtype associations in the WSA. Isolated mountains (Figure 4) are uncommon and are largely restricted to south-central Wyoming, where they separate basins from one another. Foothills (Figure 5) are found along several of the isolated mountains in south-central Wyoming, but they are largely a feature of basin margins, particularly around the Bighorn Basin along the Bighorn, Owl Creek, and Absaroka Mountains; at the edge of the Wind River Basin along the Wind River Mountains; and at the edges of the Laramie and Medicine Bow Mountains and the Sierra Madre.

Multiple cuesta and valley complexes cover the least area in the WSA, but across the central and south-central basins, they are the most common and the largest of the three landtype associations (Figure 6).

Wyoming GAP cover-types

A brief explanation of how GAP mapped landcover is needed for a clear understanding of the estimated area of each type in the WSA. For most polygons in the state-wide landcover layer, GAP mapped a primary and a secondary cover-type and estimated the percentage of the polygon that is each type. If it were possible to use those percentages from the GAP layer, then the actual area of a cover-type in the WSA could be estimated as:

$$\sum_{\substack{\text{polygons} \\ \text{with that} \\ \text{type}}} [(\text{area of polygon})(\% \text{ as primary type}) + (\text{area of polygon})(\% \text{ as secondary type})]$$

But the boundaries of the WSA cut across GAP polygons, so when the land area of the WSA was clipped out of the state-wide layer, some of the polygons were split. There is no reason to assume that the percentage of a given cover-type in the resulting polygons is the same as its percentage in the original polygon, so the percentages from the GAP layer were not used in calculating the areas of cover-types in the WSA. Rather, the area shown in this report for a cover-type in the WSA is the sum of the areas of the polygons in which it is mapped as the primary cover-type. This method may result in an over-estimate of the amount of a cover-type in the WSA because the type occupies substantially less than 100% of the polygons in which it is the primary type. Or it may under-estimate the amount of the cover-type because it ignores the polygons in which that cover-type is the secondary type. This is the same method as Merrill *et al.* (1996) used for calculating the area of each cover-type in Wyoming.

The Wyoming Gap Analysis Project (Merrill *et al.* 1996) mapped five primary landcover-types in the WSA (Figure 7). As a result of the WSA boundary being drawn closely around the Ferris Mountains, the most common of these by far is the Lodgepole pine cover-type, which is mapped in 62% of the WSA (Table 3). This pine forest occupies the highest elevations of the Ferris Mountains and is mixed with two secondary forest cover-types, the Douglas fir cover-type and the Spruce-fir cover-type (Figure 8). A second cover-type on the mountains, Basin exposed rock and soil, is mapped in 14% of the WSA, on the steeply dipping limestone outcrops in the southeastern Ferris Mountains (Figure 7). The scattered stands of trees there are mapped as Lodgepole pine forest or Spruce-fir forest (Figure 8).

The remaining three cover-types are shrub vegetation around the fringes of the Ferris Mountains. Black sagebrush steppe (11% of the WSA) is mapped on the northwestern footslopes of the Ferris Mountains (Figure 7), where Mixed-grass prairie is the secondary type (Figure 8). Wyoming big sagebrush cover-type accounts for 8% of the WSA's surface and is mapped along the southern footslopes (Figure 7), mixed with Limber pine woodland or Mountain big sagebrush shrub vegetation (Figure 8). Mountain big sagebrush is mapped as the primary cover-type in only 5% of the WSA, mainly in a long strike valley at the western end where it is mixed with the Xeric upland shrub cover-type (mountain mahogany shrubland) as the secondary type. A small area on the northern footslopes also is primarily Mountain big sagebrush cover-type with Black sagebrush steppe as the secondary cover.

When the percentage of each cover-type in the WSA is compared to the percentage of BLM-managed lands it covers in Wyoming (Table 3), the Ferris Mountains WSA is seen to be unusual for BLM-managed lands in the large amounts of the Lodgepole pine cover-type and the Black sagebrush steppe cover-type and the small amount of the Wyoming big sagebrush cover-type that it contains. Lodgepole pine is mapped on only 1% of BLM-managed lands in the state, and the BLM lands contain only 4.3% of the lodgepole pine mapped in the state. The WSA contains nearly 8% of that BLM-managed Lodgepole pine type. Black sagebrush steppe is mapped as the primary cover-type on <1% of

Wyoming and of BLM-managed lands. The BLM manages over 60% of the Black sagebrush steppe in Wyoming, and the WSA accounts for 3% of the BLM's area.

In contrast, the Wyoming big sagebrush cover-type is mapped as the primary cover-type in nearly 1/3 of Wyoming (it is the most common primary cover-type in the state [Merrill *et al.* 1996, Table 2.2]) and on 57% of BLM-managed lands. The WSA includes < 1% of that BLM area.

Basin exposed rock and soil is a minor primary cover-type in the state (1.39% of lands) and on BLM-managed lands (2.57% of lands), and the WSA accounts for <1% of the BLM-managed area of this type. Mountain big sagebrush also is a minor primary cover-type in Wyoming (3.59%) and on BLM-managed lands (3.83%), and the Ferris Mountains WSA includes <1% of the BLM-managed area of this type as well.

Given that most of the WSA consists of an isolated mountain with only small areas of landtypes more common in Wyoming's basins, it is not surprising that the landcover also is mainly that of the mountains (that is, conifer forest), while shrub vegetation typical of the basins is only a minor component of the WSA.

National Vegetation Classification System types

Vegetation information from 34 vegetation sampling plots (Figure 9, Table 4, Appendix 1) and some 40 observation points (Appendix 2), and information from Stout and Cundy (1992), has been used to identify the alliances and plant associations from the national vegetation classification that seem to be present in the Ferris Mountains WSA (Table 5). An association is a vegetation type characterized by, usually, the dominant plants in each vegetation layer, and an alliance is a more general vegetation type that comprises associations with the same dominant plant in the tallest vegetation stratum. For some of the Ferris Mountains vegetation types, only the applicable alliance can be identified and the association is unknown, either because information from the Ferris Mountains was insufficiently detailed or because the likely associations are listed in the national classification but have not been described (NatureServe 2003). Each plant association in the national classification has been assigned a conservation rank based on its geographic range, its abundance within that range, and other factors. A rank of G1 indicates a very rare vegetation type, and a rank of G5 indicates a common and widespread type. Alliances have no conservation ranks.

The alliances and associations likely present in the Ferris Mountains are briefly described below. Sources of information on each in the Ferris Mountains are shown in Table 5.

-- *Pseudoroegneria spicata* - Cushion Plant Herbaceous Vegetation

Some areas within the shrub-steppe on the foothills and some of the openings in the conifer woodlands on the mountain slopes have little or no shrub cover, and the vegetation is a mix of graminoids and forbs, both of which contribute substantial cover. Common grasses are *Pseudoroegneria spicata*, *Festuca idahoensis*, and *Poa secunda*, and the most common forbs are *Antennaria microphylla* and *Arenaria hookeri*. *Leucopoa kingii*, *Koeleria macrantha*, and *Carex rossii* often are present in substantial amounts as well, as are a number of other forbs (*Arenaria congesta*, *Astragalus spathulatus*, *Stenotus armerioides*). *Selaginella densa* may provide a considerable amount of ground cover. The large amount of forb cover suggests that the *P. spicata* - Cushion Plant association listed in the National Vegetation Classification System may apply to this Ferris Mountain grass vegetation better than do the other associations listed in the national system, even though a number of the forbs in the Ferris Mountains are not cushion-form forbs.

Artemisia tripartita ssp. *tripartita* and *Artemisia nova* often are present in this herbaceous vegetation and, on the footslopes, it merges into the *A. tripartita* ssp. *tripartita* shrub-steppe and the *A. nova* shrub-steppe. On the lower mountain slopes, patches of this type are surrounded by conifer forest or woodland. Those patches are the mountain meadow/grassland communities described by Stout and Cundy (1992), who concluded that the conifer forests are encroaching on the herbaceous openings, and that grazing has markedly affected the composition and structure of the vegetation.

-- *Artemisia tripartita* ssp. *rupicola* Shrub Herbaceous Alliance

This short vegetation is widespread on the north footslopes of the Ferris Mountains and, with *Artemisia nova* shrub-steppe, constitutes the matrix there in which stands of other vegetation types occur. It also occurs in openings on the lower north slopes of the mountains. Grasses, forbs, and short shrubs all contribute substantial cover. *Artemisia tripartita* ssp. *rupicola* is common and *Chrysothamnus viscidiflorus* often is present. Common grasses are *Poa secunda*, *Koeleria macrantha*, *Pseudoroegneria spicata*, *Leucopoa kingii*, and *Festuca idahoensis*, and the common forbs are *Antennaria microphylla*, *Arenaria hookeri*, *Phlox multiflora*, and *Phlox hoodii*. *Selaginella densa* is a common ground-cover. *A. tripartita* ssp. *rupicola* vegetation has been described only from central and southeastern Wyoming and the classification of stands into associations is uncertain, but several of the Ferris Mountain plots seem to fall within the *A. tripartita* ssp. *rupicola* / *Festuca idahoensis* association (NatureServe 2003).

This vegetation type merges into *Artemisia nova* shrub-steppe, the other common vegetation type on the northern footslopes.

-- *Artemisia nova* Shrub Herbaceous Alliance

This is one of the two vegetation types composed of short shrubs, graminoids, and forbs that grows widely across the footslopes of the Ferris Mountains and forms the matrix in which other vegetation types are found. This black sagebrush type is found both north and south of the mountains, and it is joined on the north footslopes by *Artemisia tripartita* ssp. *rupicola* shrub-steppe.

Artemisia nova co-dominates the vegetation, and a number of other shrubs often are present, especially *Chrysothamnus viscidiflorus*, *Ericameria nauseosa*, *Purshia tridentata*, and *Tetradymia canescens*. *Artemisia tridentata* ssp. *vaseyana* and *Symphoricarpos oreophilus* are present in places. Graminoids and forbs often contribute as much cover as the low shrubs (or more). Common graminoids are *Carex rossii*, *Pseudoroegneria spicata*, *Koeleria macrantha*, and *Poa secunda*; common forbs are *Antennaria microphylla*, *Arenaria nuttallii*, and *Phlox* spp. (*P. hoodii*, *P. muscoides*, *P. multiflora*). Many other forbs may be present as well. Scattered *Pinus flexilis*, *Juniperus scopulorum*, and *Pseudotsuga menziesii* are present in places.

This vegetation fits into the *Artemisia nova* Shrub-herbaceous Alliance of the national classification, but it is unclear which association (if any) can be applied to this vegetation. The *Artemisia nova* shrub-steppe merges into *Artemisia tridentata* ssp. *vaseyana* shrub stands on sites protected from the wind.

-- *Artemisia tridentata* ssp. *vaseyana* Shrubland Alliance

Shrub vegetation dominated by *Artemisia tridentata* ssp. *vaseyana* is common on the footslopes, in the cuesta-valley areas, and on the lower mountain slopes on both the north and south sides of the Ferris Mountains. On the footslopes, it grows in draws and on other sites protected from the wind, and it merges into the shrub-steppe vegetation on more exposed sites.

Symphoricarpos oreophilus often accompanies *A. tridentata* ssp. *vaseyana* in the shrub layer in the more protected sites and may co-dominate. In the western part of the mountains, *Purshia tridentata* also is often present and may codominate. (In the central part of the mountains, *Purshia* seems to be very rare.) Common graminoids are *Pseudoroegneria spicata*, *Achnatherum nelsonii* var. *dorei*, and *Carex rossii*. *Poa pratensis* is common in bottoms of draws. A number of forbs occur in this vegetation, of which *Arenaria congesta*, *Balsamorhiza sagittata*, and *Antennaria microphylla* seem to be the most common.

The more exposed is the site, then the sparser and lower is the shrub stratum, the more *Artemisia nova* or *Artemisia tripartita* ssp. *rupicola* are present in the stand, and the greater the proportion of *Pseudoroegneria spicata* in the undergrowth. (See Appendix 2, observation point 25.)

This mountain big sagebrush vegetation was included by Stout and Cundy (1992) in their mountain shrub community type. They concluded that fire suppression is allowing conifer woodlands

to advance into shrub stands and shifting the age structure of the shrubs to dominance by old and unproductive plants.

This shrub vegetation can be placed into the *Artemisia tridentata* ssp. *vaseyana* Shrub Vegetation Alliance from the national classification (NatureServe 2003), but it is unclear which of the associations within that alliance apply to the Ferris Mountains. The *A. tridentata* ssp. *vaseyana* / *Pseudoroegneria spicata* association has not been described, and the *A. tridentata* ssp. *vaseyana* - *Purshia tridentata* / *Pseudoroegneria spicata* association is poorly known.

-- *Cercocarpus montanus* Shrubland Alliance

Shrub stands in which *Cercocarpus montanus* dominates or co-dominates the shrub stratum grow on the western end of the Ferris Mountains, most of them on steep slopes. The shrub stratum usually contains a variety of shrub species but most contribute little cover. The undergrowth in most stands is dominated by graminoids, of which the common species are *Pseudoroegneria spicata*, *Koeleria macrantha*, *Carex rossii*, and *Leucopoa kingii*. Common forbs are *Cerastium arvense*, *Phlox multiflora*, *Erigeron caespitosus*, and *Eriogonum* spp. This vegetation probably fits into the *Cercocarpus montanus* / *Pseudoroegneria spicata* association from the national classification, but that association has not been described so its application to the Ferris Mountains vegetation is uncertain.

Stout and Cundy (1992) sampled at least one *Cercocarpus montanus* stand as part of their mountain shrub community type, and concluded that fire suppression has promoted the encroachment of conifers into the shrub stands and the dominance of the shrub stratum by old and unproductive plants.

-- *Purshia tridentata* Shrubland Alliance

Several stands of shrub vegetation dominated by *Purshia tridentata* were sampled on the south side of the western end of the Ferris Mountains. Many other shrubs were present but only in small amounts. The undergrowth was dominated by graminoids, chiefly *Leucopoa kingii*, *Pseudoroegneria spicata*, and *Carex rossii*. Forbs contributed less cover than graminoids but a number of species were recorded, the most common of which were *Castilleja* sp., *Erigeron* sp., and *Solidago velutina*.

The placement of these *Purshia* stands into the national vegetation classification is problematic. The *Purshia tridentata* / *Pseudoroegneria spicata* Shrub Herbaceous Vegetation Association might seem the likely place, but that vegetation type has been described from the Columbia River Basin. Further classification work in the Rocky Mountain Region may provide a framework for the Ferris Mountain stands.

Stout and Cundy (1992) apparently did not sample any stands dominated by *Purshia tridentata*, but this type probably would fit into their mountain shrub community type.

-- *Pinus flexilis* Woodland Alliance

Much of the conifer forest on the Ferris Mountains, particularly at the lower elevations and on south-facing slopes, is dominated by *Pinus flexilis*. The tree overstories in these woodlands usually are open, and often include *Juniperus scopulorum* and *Pseudotsuga menziesii*, either of which may co-dominate with the *P. flexilis*. The undergrowth in some stands consists of a sparse shrub layer, typically of some combination of *Artemisia nova*, *Artemisia tridentata* ssp. *vaseyana*, *Symphoricarpos oreophilus*, and *Ribes cereum*. Often, though, shrubs are widely scattered and the undergrowth is dominated by graminoids, especially *Pseudoroegneria spicata*, *Leucopoa kingii*, *Carex rossii*, or *Achnatherum nelsonii* var. *dorei*. Forbs contribute less cover, but a number of species often are present. The classification of *P. flexilis* stands in the national classification is incomplete, but there are two common associations into which the Ferris Mountains woodlands might fit, the *P. flexilis* / *Juniperus communis* Woodland association and the *P. flexilis* / *Pseudoroegneria spicata* Woodland association.

-- *Pseudotsuga menziesii* Forest Alliance

Much of the conifer forest and woodland on the Ferris Mountains is dominated by *Pseudotsuga menziesii*. The tree overstory often contains *Pinus flexilis*, which may co-dominate. In most places, the

undergrowth consists of *Juniperus communis*, *Mahonia repens*, *Leucopoa kingii*, and a variety of other shrubs, graminoids, and forbs. The description of the *Pseudotsuga menziesii* / *Juniperus communis* Forest association from the national vegetation classification matches most of this vegetation reasonably well, although forests in the national classification have at least moderately dense overstories (with most tree canopies touching), while many of the Ferris Mountains stands have very open canopies and so would qualify as woodlands in the national classification.

-- *Pinus contorta* Woodland Alliance

Very little information was collected in this project on the *Pinus contorta* stands that grow at higher elevation, especially on north-facing mountain slopes. The tree overstory can be seen even from a distance to vary in density and height, due to fires at different times that have produced a patchwork of even-aged stands, each dominated by *P. contorta* of a different size. *Abies lasiocarpa* saplings may be common in the understory. The undergrowth in these woodlands and forests is sparse (Stout and Cundy 1992, Appendix 2 of this report). The limited information from field work on this project indicates that *Juniperus communis* and several forbs are the principal species.

The *Pinus contorta* / *Juniperus communis* Woodland Association of the national vegetation classification is the likely type that applies to this Ferris Mountain vegetation. That vegetation type is common in Wyoming mountains (Alexander *et al.* 1986, Steele *et al.* 1983). Stout and Cundy (1992) apparently selected *Pinus contorta* stands to sample for their montane conifer community type.

-- *Populus tremuloides* Alliances

Most of the information about *Populus tremuloides* stands in the Ferris Mountains comes from Stout and Cundy (1992). The stands in which they collected data were primarily riparian stands that probably fit into the *Populus tremuloides* Temporarily Flooded Forest Alliance of the national classification. Some of those stands appear to fit into the *P. tremuloides* / *Betula occidentalis* Forest association, and others are described too generally to be placed into any association.

Upland stands with overstories composed mostly of *P. tremuloides* can be placed into the *Populus tremuloides* Forest Alliance, and the information from one plot from fieldwork in this project places that stand into the *P. tremuloides* / *Juniperus communis* association. Stout and Cundy (1992) showed that many of the aspen stands in the Ferris Mountains contain substantial amounts of conifers, and those stands may fit into the *Abies lasiocarpa* - *P. tremuloides* Forest Alliance.

-- *Betula occidentalis* Temporarily Flooded Shrubland Alliance

Betula occidentalis is a common species (and often the dominant species) in the riparian shrublands along creeks on the south side of the Ferris Mountains. A variety of other shrubs and trees may be present, especially *Populus tremuloides*, *Populus angustifolia*, and *Salix bebbiana*. These shrub stands often contain *Pinus flexilis* and *Pseudotsuga menziesii*, which dominate nearby upland forests. *Abies lasiocarpa* and *Picea engelmannii* were noted in places and may be more common in the riparian zones on the north side of the mountains.

These shrub stands seem to fit into the *Betula occidentalis* Shrubland association of the national classification.

-- *Carex nebrascensis* Seasonally Flooded Herbaceous Alliance

Wetter parts of the riparian meadows are dominated by *Carex nebrascensis*. These wet meadows merge into the mesic meadows of *Carex praegracilis* vegetation and are mixed with riparian shrublands (containing *Betula occidentalis*) and with some woodlands. This wet meadow vegetation appears to fit into the *C. nebrascensis* Herbaceous Vegetation association of the national classification.

-- *Carex praegracilis* Seasonally Flooded Herbaceous Alliance

Mesic meadows with substantial amounts of *Carex praegracilis* grow in bottoms of draws along streams. A number of additional graminoids and forbs are present. The exotic *Poa pratensis* is

common in these meadows and may co-dominate. These riparian meadows occur in a mosaic with riparian shrublands, and scattered *Betula occidentalis* and *Populus tremuloides* may be present.

Of the 16 plant associations from the national classification that may be present in the Ferris Mountains WSA, three have conservation ranks of G3 (Table 5), indicating that they are thought to be uncommon. The G3? rank for the *Pseudoroegneria spicata* - Cushion Plant vegetation is uncertain and the rank may be increased as more information becomes available about this association throughout the western U.S. The G3Q rank for the *Betula occidentalis* Shrubland Association indicates that substantial questions exist about the classification of this type. The *Artemisia tripartita* ssp. *tripartita* / *Festuca idahoensis* Shrub-herbaceous association has been assigned a G3 rank because it seems to be restricted to central and southeastern Wyoming but is moderately widespread within that range.

Ecosystem Summary

Vegetation features (represented by the GAP cover-types and the plant associations) and landscape features (represented by the landtype associations) show that the ecosystems of the Ferris Mountains WSA are those of the foothills and lower mountain slopes of Wyoming. This is to be expected, given the location of the WSA in an east-west trending belt of low mountains that lie between two of Wyoming's high basins, the Sweetwater Plateau to the north and the Great Divide Basin to the south.

FLORISTIC FEATURES OF THE WSA

Table 6 lists the 128 plant taxa noted in the WSA during the 2001 field work. The 2001 survey did not include a thorough floristic inventory and Table 6 is far from a complete flora of the WSA.

Rare Plants

Four plant species tracked by the Wyoming Natural Diversity Database have been reported from or documented in the Ferris Mountains WSA (Wyoming Natural Diversity Database 2004a):

-- *Achnatherum nevadense* (*Stipa nevadensis*), Nevada needlegrass, was collected in the vicinity of the WSA in 1898 but has not been documented since then. *A. nevadense* occurs from the eastern slopes of the Sierra Nevada across northern Nevada to southern Idaho (Cronquist *et al.* 1977) and plants in central Wyoming apparently are a disjunct population (Wyoming Natural Diversity Database, 2004b). The Wyoming Natural Diversity Database tracks this as a species of concern.

-- *Boechera pendulina* var. *russeola* (*Arabis pendulina* var. *russeola*), Daggett Rockcress, was collected in 1981 from the southwestern part of the WSA. This is an uncommon variety of a species common in the western U.S. and is tracked as a species of potential concern by the Wyoming Natural Diversity Database (2004b).

-- *Cryptantha stricta* (erect cryptantha) has been collected four times, at the eastern and western ends and in the center of the WSA. This species is known from central and southwestern Wyoming and is tracked by the Wyoming Natural Diversity Database (2004b) as a species of potential concern.

-- *Physaria eburniflora* (Devil's Gate Twinpod) has been collected in and near the eastern end and the center of the WSA. *P. eburniflora* is a Wyoming Natural Diversity Database species of potential concern and has been proposed by the BLM for designation as a sensitive species in Wyoming (Wyoming Natural Diversity Database, 2004b). It has been documented only from the Sweetwater and North Platte River Basins of central Wyoming (Fertig 2004).

Noxious Weeds

Two plant species on Wyoming's noxious weed list (Wyoming Weed and Pest Council, 2004) were documented in the WSA by G. Jones in the 2001 field work. *Actroptilon repens* (syn. *Centaurea repens*), Russian knapweed, was noted at Observation Points 1 and 2 along the southwestern boundary of the WSA, in the drainage of Indian Creek. Each patch of the plant covered less than 100 square meters and consisted of less than 50 stems. *Cirsium arvense*, Canada thistle, was noted at Observation Point 20, along Birch Creek in the southwestern part of the WSA.

Other Exotic Plant Species

Of the 128 taxa of vascular plants noted in the WSA during the 2001 field work (Table 6), only six are known to be introduced: the two noxious weed species mentioned above (Russian knapweed and Canada thistle), plus *Agrostis stolonifera* (carpet bentgrass, or redtop), *Alyssum desertorum* (desert madwort), *Poa pratensis* (Kentucky bluegrass), and *Tragopogon dubius* (yellow salsify). The origins of three additional taxa identified only to genus (*Poa* sp., *Taraxacum* sp., and *Trifolium* sp.) are unknown because all three genera contain both native and introduced species in Wyoming.

Throughout most of the WSA, exotic species appear to contribute little to the vegetation. *Agrostis stolonifera* was recorded at one riparian shrub observation point (26) and one *Pinus flexilis* observation point along a stream (19). *Alyssum desertorum* and *Tragopogon dubius* each contributed < 1% cover to a single black sagebrush plot (01FER02.01). *Poa pratensis* was more widespread and common, showing up in one *Pseudotsuga menziesii* observation point (21), one *Populus tremuloides* observation point (105), two *Artemisia tridentata* ssp. *vaseyana* observation points (24 and 25), one riparian shrub observation point (26), and two riparian meadow observation points (17 and 105). At some of those locations, *P. pratensis* was common. *Taraxacum* sp., too, seems to be relatively widespread and common. Dandelions co-dominated the herbaceous strata in *Populus tremuloides* woodland and drier riparian meadow vegetation at observation point 105, and Stout and Cundy (1992) listed dandelion as one of the most common plants in the aspen/riparian community on the north side of the Ferris Mountains.

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Walter Fertig, former botanist at the Wyoming Natural Diversity Database, identified plant specimens, and Ron Hartman and Ernie Nelson (curator and manager, respectively) made the facilities of the Rocky Mountain Herbarium available for that work. Assistance in administrative matters and in planning field work were rendered by Frank Blomquist of the BLM's Rawlins Field Office and by Jeff Carroll of the BLM State Office.

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Figure 1. Location of the Ferris Mountains WSA in Wyoming.

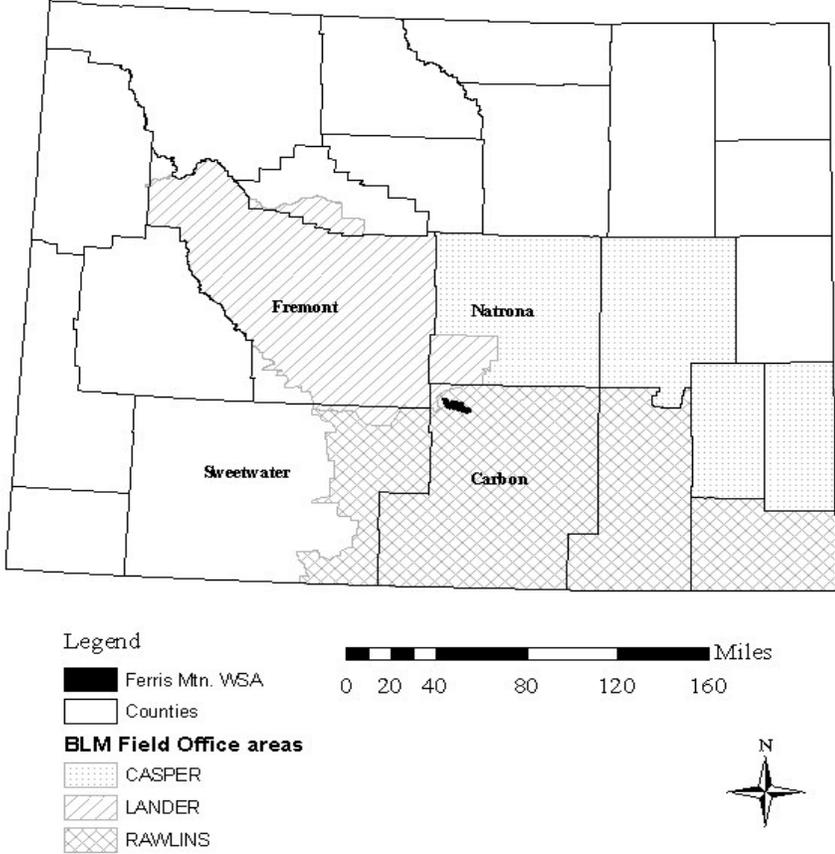


Figure 2. Location of the Ferris Mountains WSA on the Public Land Survey System Grid.

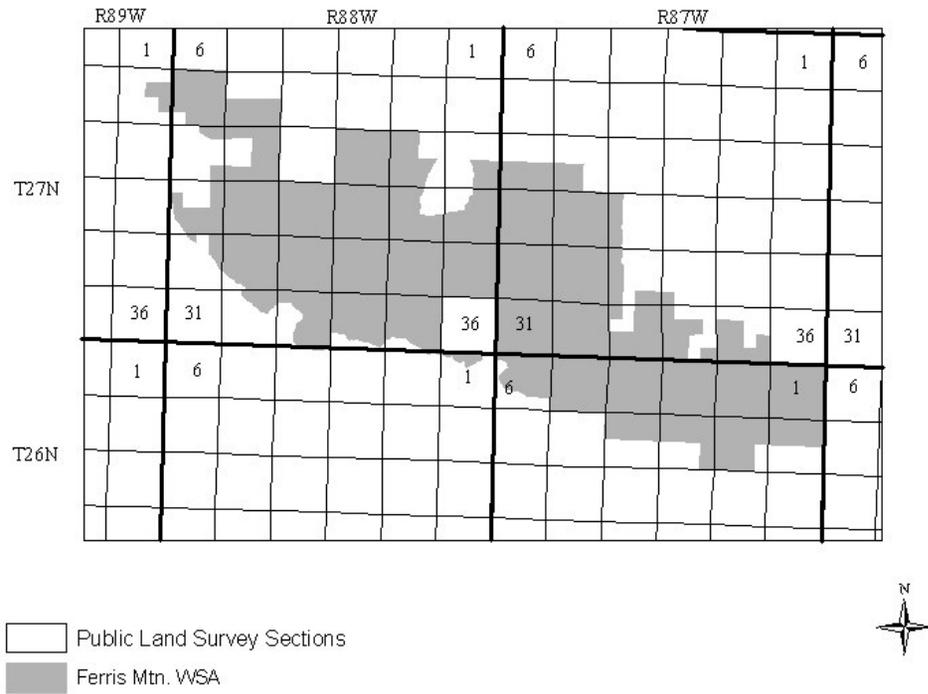


Figure 3. Landtype Associations in the area of the Ferris Mountains WSA

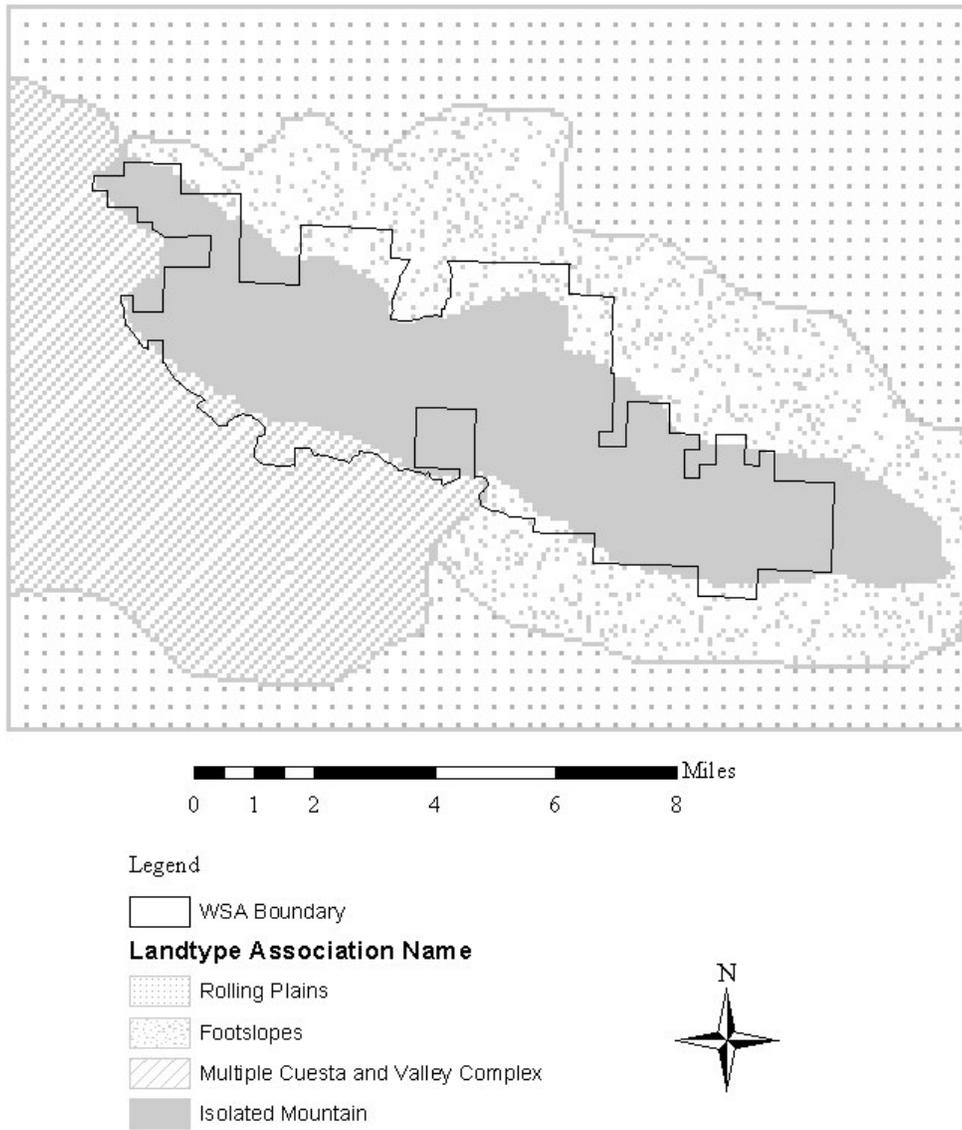


Figure 4. Isolated Mountain Landtype Associations in the Basins of Wyoming.

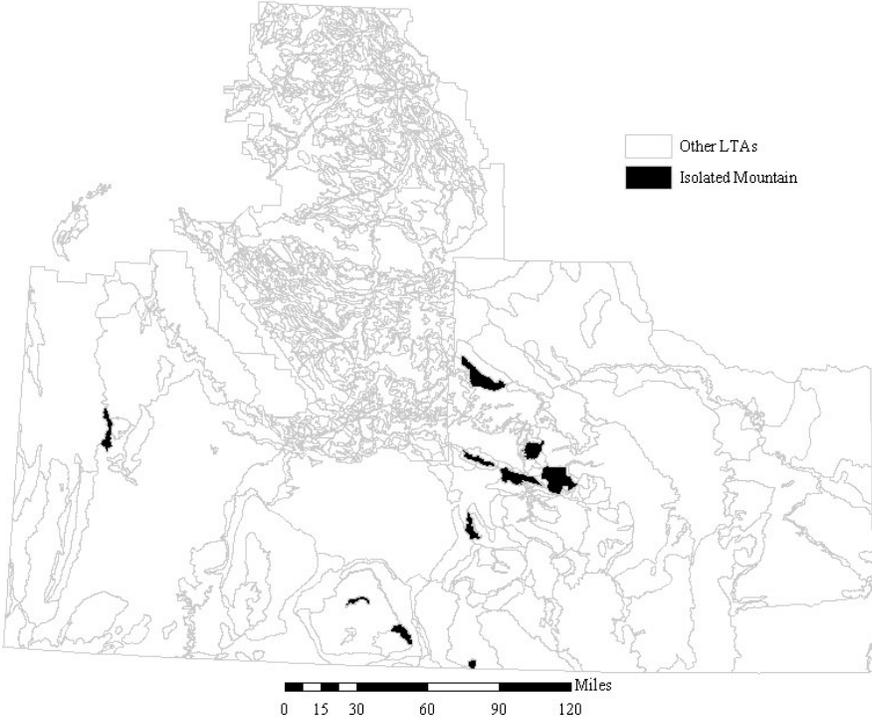


Figure 5. Footslope Landtype Associations in the Basins of Wyoming.

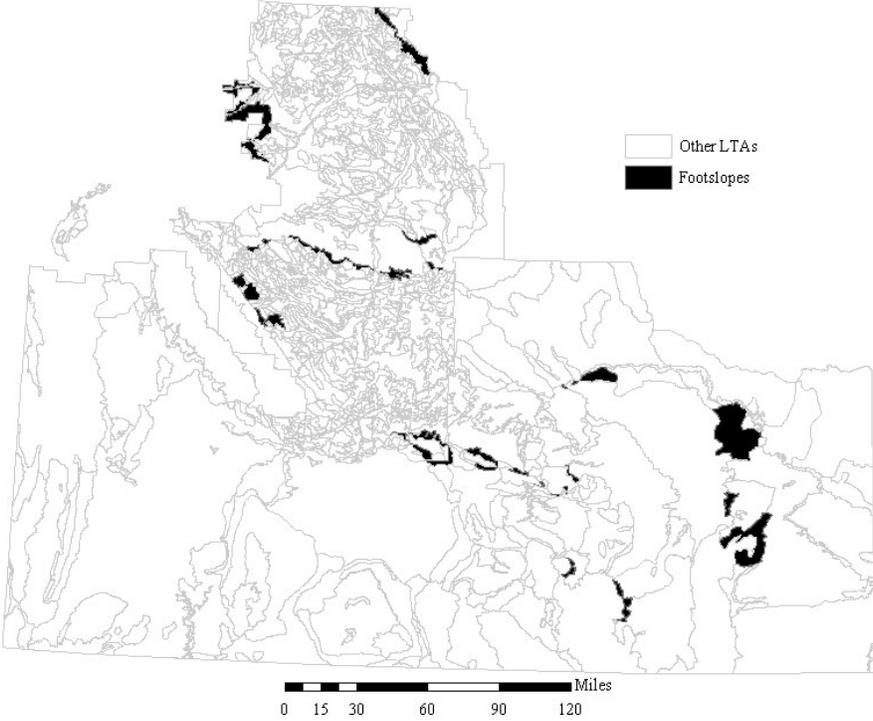


Figure 6. Multiple Cuesta and Valley Complex Landtype Associations in the Basins of Wyoming.

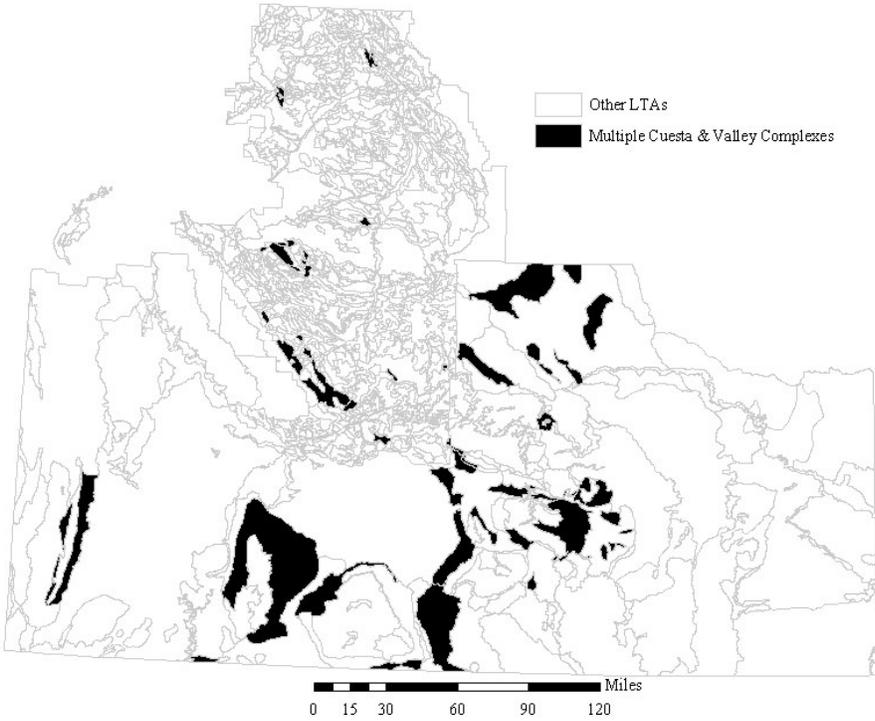
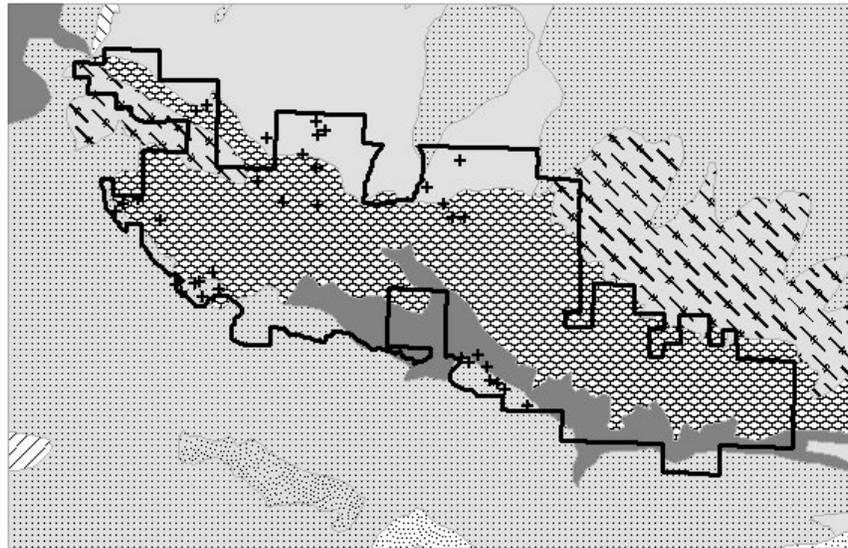


Figure 7. GAP Primary Cover-types In and Around the Ferris Mountains WSA.



Legend

-  Ferris Mtn. WSA
-  Vegetation plots

GAP Primary Cover-types

-  Basin Rock & Soil
-  Saltbush
-  Greasewood
-  Black Sage Steppe
-  Wyoming Big Sagebrush
-  Mountain Big Sage
-  Lodgepole Pine
-  Active Sand Dunes
-  Vegetated Dunes



Figure 8. GAP Secondary Cover-types In and Around the Ferris Mountains WSA.

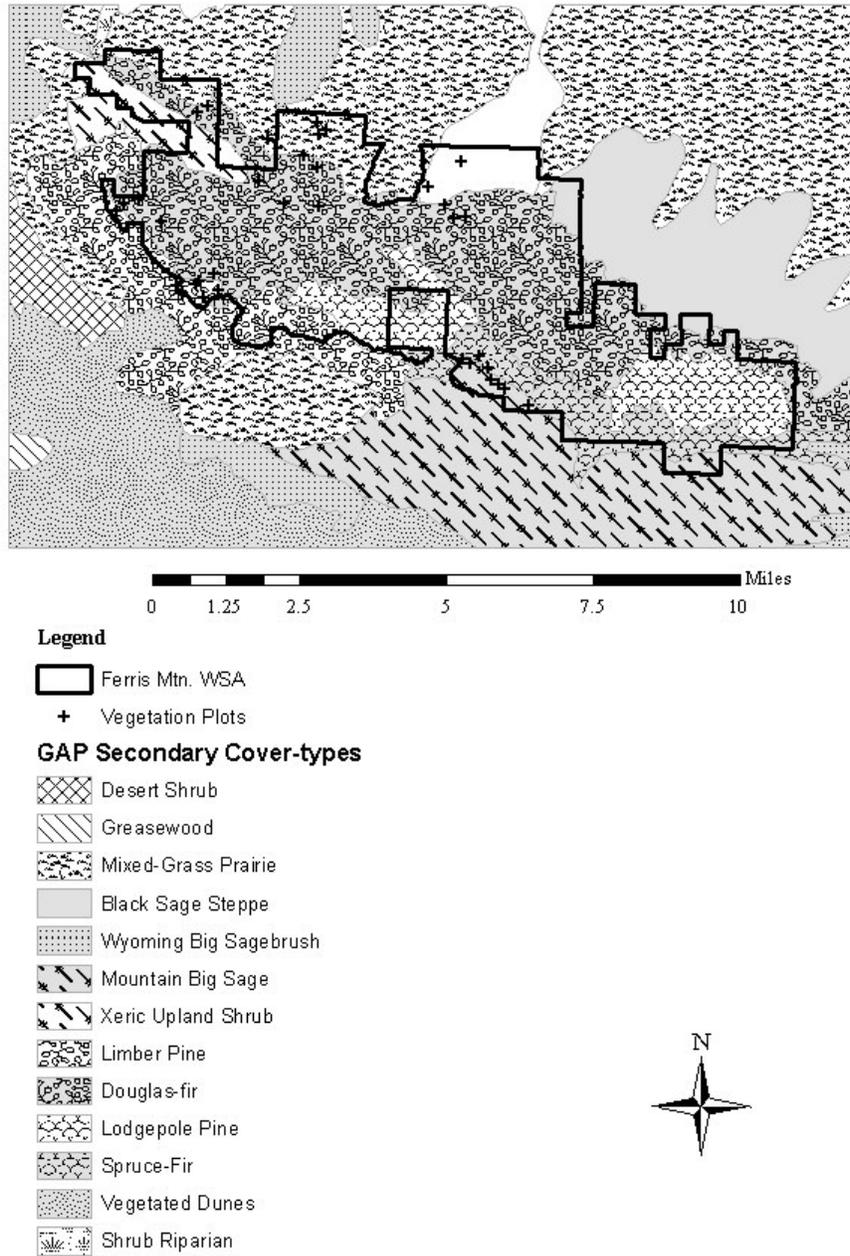


Figure 9. Locations of Vegetation Sampling Plots From 2001 Field Survey in the Ferris Mtns WSA. Plot descriptions and data are in Appendix 1.

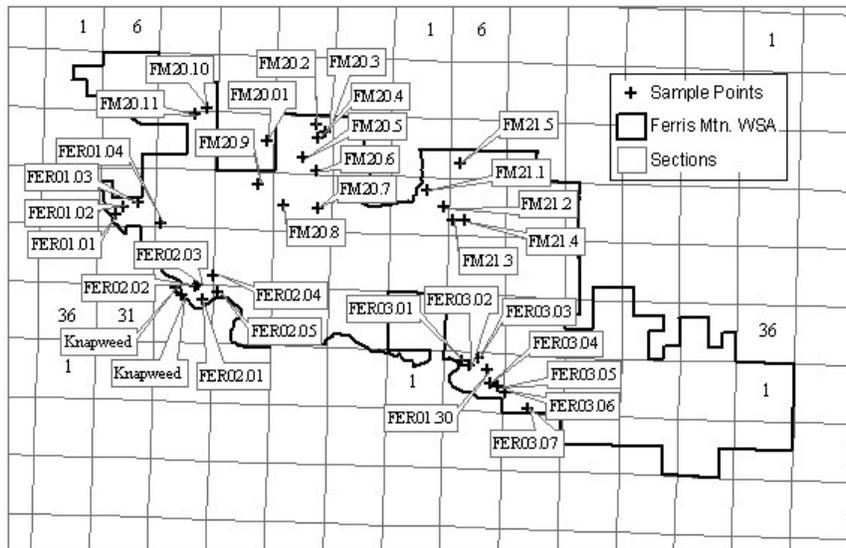


Table 1. Canopy Cover-Ranges and Mid-points.

% cover	>1	1-5	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	95-99	>99
Mid-point (value recorded)	1	3	10	20	30	40	50	60	70	80	90	98	100

Table 2. Landtype Associations In and Around the Ferris Mountains WSA.

Similar original landtype associations specific to southeastern and southwestern Wyoming (Reiners *et al.* 1999) were combined into a smaller number of landtype associations for this report.

Original Landtype Association Name (Reiners <i>et al.</i> 1999)	New Landtype Association			
	Name	Ha in WSA	Acres in WSA	% of WSA
Muddy Creek Multiple Cuesta and Valley Complex (sw Wyo)	Multiple Cuesta and Valley Complex	507	1252	6%
Muddy Gap Multiple Cuesta and Valley Complex (se Wyo)				
Ferris Mountains Multiple Cuesta and Valley Complex (sw Wyo.)				
Great Divide Basin Rolling Plains (sw Wyo)	Rolling Plains*	0	0	0
Granite Mountains Rolling Plains (main body) (se Wyo)				
Ferris Mountains Footslopes (South Side) (sw Wyo)	Footslopes	1272	3142	14%
Ferris Mountains Footslopes (north side) (se Wyo)				
Ferris Mountains Isolated Mountain (se Wyo)	Isolated Mountain	7111	17564	80%

*Rolling Plains surround the WSA (Figure 3) but are not found within its boundaries.

Table 3. Areas of GAP Landcover-types in Wyoming and in the Ferris Mountains WSA.

Note that the tables from Merrill *et al.* (1996) from which the values for Wyoming and for BLM-managed lands in Wyoming are taken show the areas of the polygons in which these are the primary cover-types, not the actual areas of these cover-types. Hence these values probably are over-estimates. See Merrill *et al.* (1996), Table 2.2, for an explanation. The values from the WSA also are for the polygons in which these cover-types were mapped as the primary types. See text for explanation.

	Basin Rock and Soil	Black Sage Steppe	Wyo. Big Sagebrush	Mountain Big Sagebrush	Lodgepole Pine
ALL WYOMING					
Hectares ⁽¹⁾	351,361	47,336	8,385,650	906,742	1,674,932
Acres	878,862	116,920	20,712,556	2,239,653	4,137,082
% of state ⁽²⁾	1.39%	0.19%	33.19%	3.59%	6.63%
BLM IN WYOMING					
Hectares ⁽¹⁾	184,288	29,192	4,129,989	275,198	71,956
Acres	455,191	72,104	10,201,073	679,739	177,731
% of BLM lands ⁽³⁾	2.57%	0.41%	57.51%	3.83%	1.00%
BLM as % of state	52.45%	61.67%	49.25%	30.35%	4.3%
FERRIS MTN. WSA					
Hectares	1237	945	704	470	5535
Acres	3055	2335	1738	1162	13672
% of WSA	14%	11%	8%	5%	62%
WSA as % of BLM type in state	0.67%	3.24%	0.02%	0.17%	7.69%

(1) Merrill *et al.* (1996), Appendix 5.1

(2) Area of Wyoming = 25,263,316 ha (62,400,391 ac); Merrill *et al.* (1996), Table 4.3

(3) Area of BLM-managed lands = 7,181,183 ha (17,737,522 ac); Merrill *et al.* (1996), Table 4.3

(4) From this report.

Table 4. Locations of Vegetation Sampling Plots in the Ferris Mountains WSA.

Plot	UTM Northing	UTM Easting	Township	Range	Section	1/4 Section	Map Name	Elev (feet)
01FER01.01	4684892	302149	27N	88W	19	SW	Muddy Gap	7220
01FER01.02	4685095	302382	27N	88W	19	SW	Muddy Gap	7400
01FER01.03	4685221	302778	27N	88W	19	SE	Muddy Gap	8250
01FER01.04	4684621	303398	27N	88W	20	SW	Muddy Gap	8300
01FER01.30			26N	87W	6	NE	Youngs Pass	8360
01FER02.01	4682530	304538	27N	88W	32	NE	Youngs Pass	7700
01FER02.02	4682893	304325	27N	88W	32	NE	Youngs Pass	7700
01FER02.03	4682950	304443	27N	88W	32	NE	Youngs Pass	8300
01FER02.04	4683173	304840	27N	88W	28	SW	Youngs Pass	8300
01FER02.05	4682740	304974	27N	88W	33	NW	Youngs Pass	7800
01FER03.01	4680840	311671	26N	87W	6	NW	Youngs Pass	8020
01FER03.02	4680715	311859	26N	87W	6	NW	Youngs Pass	8240
01FER03.03	4680927	312132	26N	87W	6	NE	Youngs Pass	8400
01FER03.04	4680248	312445	26N	87W	6	SE	Youngs Pass	8200
01FER03.05	4680139	312640	26N	87W	6	SE	Youngs Pass	8300
01FER03.06	4679997	312835	26N	87W	5	SW	Youngs Pass	8260
01FER03.07	4679538	313464	26N	87W	5	SW	Lamont NE	8350
01FER40			27N	88W	32	NE	Youngs Pass	7500
01FM20.01	4687246	306732	27N	88W	15	NW	Youngs Pass	7260
01FM20.02	4687344	307662	27N	88W	15	NE	Youngs Pass	7160
01FM20.10	6687783	304663	27N	88W	8	SE	Youngs Pass	7100
01FM20.11	4687631	304362	27N	88W	17	NE	Youngs Pass	7500
01FM20.3	4687122	307930	27N	88W	15	NE	Youngs Pass	7100
01FM20.4	4686997	307719	27N	88W	15	NE	Youngs Pass	7120
01FM20.5	4686433	307285	27N	88W	15	SW	Youngs Pass	7470
01FM20.6	4686086	307660	27N	88W	15	SE	Youngs Pass	7900
01FM20.7	4685020	307724	27N	88W	22	SE	Youngs Pass	8200
01FM20.8	4685126	306766	27N	88W	22	SE	Youngs Pass	7920
01FM20.9	4685715	306058	27N	88W	21	NE	Youngs Pass	7860
01FM21.1	4685556	310727	27N	88W	24	NE	Youngs Pass	7580
01FM21.2	4685077	311174	27N	88W	24	SE	Youngs Pass	8060
01FM21.3	4684714	311424	27N	87W	19	SW	Youngs Pass	8340
01FM21.4	4684723	311734	27N	87W	19	SW	Youngs Pass	8450
01FM21.5	4686280	311622	27N	87W	18	SW	Youngs Pass	7450

Table 5. Plant Alliances and Associations of the National Vegetation Classification System Likely Present in the Ferris Mountains WSA.

SAMPLE PLOTS AND OBSERVATION POINTS	ALLIANCE / ASSOCIATION	CLASSIFICATION CODE ¹	CONSERVATION RANK ²	IDENTIFICATION ³
Plots 01FER03.01, 01FER03.04, 01FM21.2, 01FM21.3, 01FM21.5. Obs. Pts. 113, 115 (?), 129 (?)	<i>Pseudoroegneria spicata</i> Herbaceous Alliance			Certain
	<i>Pseudoroegneria spicata</i> - Cushion Plant Herbaceous Vegetation Association	CEGL001666	G3?	Uncertain
Plots 01FM20.6., 01FM20.7, 01FM20.8, 01FM20.9, 01FM21.1, 01FM21.4. Obs. Pts. 110, 138	<i>Artemisia tripartita</i> ssp. <i>rupicola</i> Shrub-herbaceous Alliance			Certain
	<i>Artemisia tripartita</i> ssp. <i>rupicola</i> / <i>Festuca idahoensis</i> Shrub-herbaceous Vegetation Association	CEGL001540	G3	Certain (plots 01FM20.8, 01FM20.9, 01FM21.1)
Plots 01FER01.01, 01FER01.02, 01FER02.01, 01FER02.03, 01FER03.05, 01FER03.07, 01FM20.01, -1FM20.02, 01FM20.4. Obs. Pts. 25, 114, 138	<i>Artemisia nova</i> Shrub-herbaceous Alliance			Certain
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i> Shrubland Alliance			Certain
Obs. Pts. 17, 24, 25, 26, 114, 127, 129	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i> / <i>Pseudoroegneria spicata</i> Shrub Vegetation	CEGL001030	G5	Uncertain
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i> - <i>Purshia tridentata</i> / <i>Pseudoroegneria spicata</i> Shrub Vegetation	CEGL001032	G5?	Uncertain
Plots 01FM20.5, 01FM20.10, 01FM20.11. Obs. Pts. 103, 127	<i>Cercocarpus montanus</i> Shrubland Alliance			Certain
	<i>Cercocarpus montanus</i> / <i>Pseudoroegneria spicata</i> Shrubland Association	CEGL001090	G4	Probable
Plots 01FER01.03, 01FER01.04, 01FER02.02	<i>Purshia tridentata</i> Shrubland Alliance			Uncertain
	<i>Purshia tridentata</i> / <i>Pseudoroegneria spicata</i> Shrub Herbaceous Vegetation Association	CEGL001495	G3	Uncertain
Plots 01FER02.04, 01FER03.02, 01FER03.03. Obs. Pts. 19, 25, 102, 115, 124, 134, 136	<i>Pinus flexilis</i> Woodland Alliance			Certain
	<i>Pinus flexilis</i> / <i>Juniperus communis</i> Woodland Association	CEGL000807	G5	Probable
	<i>Pinus flexilis</i> / <i>Pseudoroegneria spicata</i> Woodland Association	CEGL000813	G5	Uncertain

Table 5 (continued).

	<i>Pseudotsuga menziesii</i> Forest Alliance			Uncertain
Obs. Pts. 14, 16, 20, 21, 23, 26, 109, 111, 113, 126, 129	<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> Forest Association	CEGL000439	G4	Probable
	<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos oreophilus</i> Forest Alliance	CEGL000462	G5	Probable
	<i>Pinus contorta</i> Woodland Alliance			Certain
Obs. Pts. 132, 134	<i>Pinus contorta</i> / <i>Juniperus communis</i> Woodland Association	CEGL000764	G5	Probable
Stout and Cundy (1992), stand no. 23, 25, 33 - 45, 48, 49, 55	<i>Populus tremuloides</i> Temporarily Flooded Forest Alliance			Probable
Obs. Pt. 105. Stout and Cundy (1992) stand no. 1 - 3, 5 - 7, 20 - 22, 26, 28 - 31, 57	<i>Populus tremuloides</i> / <i>Betula occidentalis</i> Forest Association	CEGL2650	G3	Probable
Stout and Cundy (1992) stand no. 24, 47	<i>Populus tremuloides</i> Forest Alliance			Probable
Plot 01FER01.30	<i>Populus tremuloides</i> / <i>Juniperus communis</i> Forest Association	CEGL000587	G4	Probable
Stout and Cundy (1992) stands no. 4, 8 - 19, 32, 46, 50 - 54, 56, 60, 61	<i>Abies lasiocarpa</i> - <i>Populus tremuloides</i> Forest Alliance			Certain
Obs. Pts. 17, 22, 16	<i>Betula occidentalis</i> Seasonally Flooded Shrubland Alliance			Certain
	<i>Betula occidentalis</i> Shrubland Association	CEGL001080	G3Q	Probable
Obs. Pt. 105	<i>Carex nebrascensis</i> Seasonally Flooded Herbaceous Alliance			Probable
	<i>Carex nebrascensis</i> Herbaceous Vegetation	CEGL001813	G4	Probable
Obs. Pt. 17	<i>Carex praegracilis</i> Seasonally Flooded Herbaceous Alliance			Probable
	<i>Carex praegracilis</i> Herbaceous Vegetation Association	CEGL002660	G3G4	Probable

1. A classification code is assigned to each association in the national classification. Alliances have no codes.
2. Conservation rank represents the commonness or rarity of an association. G1 associations are very rare and (usually) are threatened by introduction of exotics, habitat loss, or alteration of the ecological processes upon which they depend. G5 associations are common and unthreatened. See NatureServe (2003) for an explanation.
3. Degree of certainty that the plots belong to this alliance or association. Certainty depends on the description of vegetation and physical environment from a sample plot (see Appendix 1) matching reasonably well the description of an association or alliance from the national classification. Some types in the national classification are undescribed.

Table 6. Vascular Plant Species Noted During 2001 Field Work in the Ferris Mountains WSA.

Scientific and Common Names (NRCS 2002)	Common synonyms	NRCS code	Growth Form	Origin
abies lasiocarpa, subalpine fir		abla	1. Tree	Native
achillea millefolium, common yarrow		acmi2	6. Forb	Native
achnatherum hymenoides, indian ricegrass	oryzopsis hymenoides	achy	5. Graminoid	Native
achnatherum nelsonii ssp. dorei, dore's needlegrass	stipa nelsonii var. dorei	acned	5. Graminoid	Native
achnatherum pinetorum, pinewoods needlegrass	stipa pinetorum	acpi2	5. Graminoid	Native
acroptilon repens, russian knapweed	centaurea repens	acre3	6. Forb	Introduced
agrostis stolonifera, carpet bentgrass		agst2	5. Graminoid	Introduced
alyssum desertorum, desert madwort		alde	6. Forb	Introduced
amelanchier alnifolia, saskatoon serviceberry		amal2	2. Shrub	Native
antennaria microphylla, littleleaf pussytoes		anmi3	6. Forb	Native
arabis sp., rockcress		arab12	6. Forb	Native
arenaria congesta, ballhead sandwort		arco5	6. Forb	Native
arenaria hookeri, hooker's sandwort		arho4	6. Forb	Native
arenaria nuttallii, nuttall's sandwort		arnu5	6. Forb	Native
arnica cordifolia, heartleaf arnica		arco9	6. Forb	Native
artemisia cana, silver sagebrush		arcac5	2. Shrub	Native
artemisia ludoviciana, louisiana sagewort		arlu	6. Forb	Native
artemisia nova, black sagebrush		arno4	2. Shrub	Native
artemisia tripartita ssp. rupicola, wyoming threetip sagebrush		artrr2	2. Shrub	Native
astragalus miser, timber milkvetch		asmi9	6. Forb	Native
astragalus spatulatus, tufted milkvetch		assp6	6. Forb	Native
balsamorhiza sagittata, arrowleaf balsamroot		basa3	6. Forb	Native
betula occidentalis, water birch		beoc2	2. Shrub	Native
bromus marginatus, mountain brome		brma4	5. Graminoid	Native
calochortus, mariposa lily		caloc	6. Forb	Native
carex duriuscula, needleleaf sedge	carex eleocharis, c. stenophylla	cadu6	5. Graminoid	Native
carex filifolia, threadleaf sedge		cafi	5. Graminoid	Native

Table 6 (continued).

Scientific and Common Names (NRCS 2002)	Common synonyms	NRCS code	Growth Form	Origin
carex geyeri, elk sedge		cage2	5. Graminoid	Native
carex nebrascensis, nebraska sedge		cane2	5. Graminoid	Native
carex praegracilis, clustered field sedge		capr5	5. Graminoid	Native
carex rossii, ross' sedge		caro5	5. Graminoid	Native
carex vallicola, valley sedge		cava3	5. Graminoid	Native
castilleja, indian paintbrush		casti2	6. Forb	Native
cerastium arvense, field chickweed		cear4	6. Forb	Native
cercocarpus montanus, true mountain mahogany		cemo2	2. Shrub	Native
chimaphila umbellata, common pipsissewa		chum	6. Forb	Native
chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush		chviv2	2. Shrub	Native
cirsium arvense, canada thistle		ciar4	6. Forb	Introduced
cirsium pulcherrimum, wyoming thistle		cipu3	6. Forb	Native
comandra umbellata, bastard toadflax		coum	6. Forb	Native
cordylanthus ramosus, bushy bird's beak		cora5	6. Forb	Native
crepis, hawksbeard		crepi	6. Forb	Native
cryptantha cana, mountain catseye		crca8	6. Forb	Native
cryptantha sp., cryptantha		crypt	6. Forb	Native
dasiphora floribunda, shrubby cinquefoil	pentaphylloides floribunda, potentilla fruticosa	daf13	2. Shrub	Native
delphinium sp., larkspur		delph	6. Forb	Native
deschampsia cespitosa, tufted hairgrass		deca18	5. Graminoid	Native
elymus elymoides, bottlebrush squirreltail		ele15	5. Graminoid	Native
elymus lanceolatus ssp. lanceolatus, thickspike wheatgrass		ellal	5. Graminoid	Native
elymus trachycaulus ssp. trachycaulus, slender wheatgrass		eltrt	5. Graminoid	Native
equisetum laevigatum, smooth horsetail		eqla	6. Forb	Native
ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	chrysothamnus nauseosus	ernan3	2. Shrub	Native
erigeron caespitosus, tufted fleabane		erca2	6. Forb	Native
erigeron, fleabane		erige2	6. Forb	Native

Table 6 (continued).

Scientific and Common Names (NRCS 2002)	Common synonyms	NRCS code	Growth Form	Origin
erigonum brevicaulis, shortstem buckwheat		erbr5	6. Forb	Native
erigonum flavum, yellow erigonum		erfl4	6. Forb	Native
erigonum ovalifolium, cushion buckwheat		erov	6. Forb	Native
erigonum umbellatum, sulphur wildbuckwheat		erum	6. Forb	Native
eurybia glauca, gray aster	aster glaucodes	eugl19	6. Forb	Native
festuca idahoensis, idaho fescue		feid	5. Graminoid	Native
frasera speciosa, green gentian		frsp	6. Forb	Native
galium boreale, northern bedstraw		gabo2	6. Forb	Native
geranium viscosissimum, sticky geranium		gevi2	6. Forb	Native
grindelia squarrosa, curleycup gumweed		grsq	6. Forb	Native
gutierrezia sarothrae, broom snakeweed		gusa2	3. Subshrub	Native
hesperostipa comata, needle and thread	stipa comata	heco26	5. Graminoid	Native
heterotheca villosa, hairy goldenaster		hevi4	6. Forb	Native
holodiscus dumosus, rockspirea		hodu	2. Shrub	Native
ipomopsis aggregata, skyrocket gilia		ipag	6. Forb	Native
juncus balticus, baltic rush		juba	5. Graminoid	Native
juniperus communis, common juniper		juco6	2. Shrub	Native
juniperus scopulorum, rocky mountain juniper		jusc2	1. Tree	Native
koeleria macrantha, prairie junegrass		koma	5. Graminoid	Native
leptodactylon pungens, granite pricklygilia		lepu	3. Subshrub	Native
leucopoa kingii, spike fescue		leki2	5. Graminoid	Native
leymus cinereus, basin wildrye	elymus cinereus	leci4	5. Graminoid	Native
linum lewisii, prairie flax		lile3	6. Forb	Native
lithospermum ruderales, western gromwell		liru4	6. Forb	Native
lupinus depressus, depressed lupine		lude3	6. Forb	Native
machaeranthera grindelioides, rayless aster		magr2	6. Forb	Native
mahonia repens, oregongrape		mare11	3. Subshrub	Native
maianthemum stellatum, starry false solomon's seal		mast4	6. Forb	Native

Table 6 (continued).

Scientific and Common Names (NRCS 2002)	Common synonyms	NRCS code	Growth Form	Origin
melica bulbosa, oniongrass		mebu	5. Graminoid	Native
mertensia, bluebells		merte	6. Forb	Native
muhlenbergia richardsonis, mat muhly		muri	5. Graminoid	Native
orobanche fasciculata, clustered broomrape		orfa	6. Forb	Native
orthilia secunda, sidebells wintergreen	pyrola secunda	orse	6. Forb	Native
packera cana, woolly groundsel	senecio canus	paca15	6. Forb	Native
paronychia depressa, spreading nailwort		pade4	6. Forb	Native
penstemon aridus, stiffleaf penstemon		pear2	6. Forb	Native
penstemon laricifolius, larchleaf beardtongue		pela9	6. Forb	Native
penstemon sp., penstemon		penst	6. Forb	Native
perideridia gairdneri, yampa		pega3	6. Forb	Native
phlox hoodii, hoods phlox		phho	6. Forb	Native
phlox multiflora, flowery phlox		phmu3	6. Forb	Native
phlox muscoides, musk phlox		phmu4	6. Forb	Native
picea engelmannii, engelmann spruce		pien	1. Tree	Native
pinus contorta var. latifolia, lodgepole pine		picol	1. Tree	Native
pinus flexilis, limber pine		pifl2	1. Tree	Native
poa cusickii, cusick's bluegrass		pocu3	5. Graminoid	Native
poa pratensis, kentucky bluegrass		popr	5. Graminoid	Introduced
poa secunda, sandberg bluegrass		pose	5. Graminoid	Native
poa sp., bluegrass		poa	5. Graminoid	Unknown
poa wheeleri, Wheeler's bluegrass	poa nervosa var. wheeleri	powh2	5. Graminoid	Native
populus angustifolia, narrowleaf cottonwood		poan3	1. Tree	Native
populus tremuloides, quaking aspen		potr5	1. Tree	Native
potentilla fissa, bigflower cinquefoil		pofi3	6. Forb	Native
potentilla ovina var. ovina, sheep cinquefoil		poovo	6. Forb	Native
pseudoroegneria spicata, bluebunch wheatgrass	elymus spicatus, agropyron spicatum	pssp6	5. Graminoid	Native

Table 6 (continued).

Scientific and Common Names (NRCS 2002)	Common synonyms	NRCS code	Growth Form	Origin
<i>pseudotsuga menziesii</i> , douglas fir		psme	1. Tree	Native
<i>pteryxia hendersonii</i> , henderson's wavewing	<i>cymopterus longilobus</i>	pthe	6. Forb	Native
<i>purshia tridentata</i> , antelope bitterbrush		putr2	2. Shrub	Native
<i>ribes cereum</i> , wax currant		rice	2. Shrub	Native
<i>ribes oxycanthoides</i> , canadian gooseberry		riox	2. Shrub	Native
<i>rubus idaeus</i> , american red raspberry		ruid	2. Shrub	Native
<i>salix bebbiana</i> , bebb willow		sabe2	2. Shrub	Native
<i>selaginella densa</i> , lesser spikemoss		sede2	6. Forb	Native
<i>solidago velutina</i> , threenerve goldenrod		sove6	6. Forb	Native
<i>stenotus armerioides</i> , thrift mock goldenweed	<i>haplopappus armerioides</i>	star10	6. Forb	Native
<i>symphoricarpos oreophilus</i> , whortleleaf snowberry		syor2	2. Shrub	Native
<i>taraxacum</i> sp, dandelion		tarax	6. Forb	Unknown
<i>tetradymia canescens</i> , spineless horsebrush		teca2	2. Shrub	Native
<i>tetraneuris acaulis</i> , stemless four-nerve daisy	<i>hymenoxys acaulis</i>	teac	6. Forb	Native
<i>thermopsis</i> , thermopsis		therm	6. Forb	Native
<i>tragopogon dubius</i> , yellow salsify		trdu	6. Forb	Introduced
<i>trifolium</i> , clover		trifo	6. Forb	Unknown
<i>trisetum spicatum</i> , spike trisetum		trsp2	5. Graminoid	Native
<i>viola</i> sp., violet		viola	6. Forb	Native

APPENDIX 1. VEGETATION SAMPLING PLOTS IN THE FERRIS MOUNTAINS WSA.

Plot: 01FER01.01 **LOCATION**

T 27 N, **R** 88W, **Sec** 19 , **SW 1/4 sec**

UTM Coordinates: 4,684,892 m N, 302,149 m E

Projection NAD 27 **Zone** 13N

Map name Muddy Gap

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris low shrub

Sampled on: 08/19/2001

Why was plot done? To illustrate the composition of the black sagebrush shrub-steppe at the foot of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short (to 15 cm) vegetation of *Carex filifolia*, *Poa secunda*, *Gutierrezia sarothrae*, *Comandra umbellata*, *Hesperostipa comata*, *Carex stenophylla*, and other grasses and forbs with *Artemisia nova* and other shrubs.

Disturbance signs

Cattle droppings

Notes Substrate is colluvium and alluvium over sandstone or siltstone of the Chugwater Fmtn.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER01.01	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia nova, black sagebrush	arno4	10	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
	ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	ernan3	1	Native
	purshia tridentata, antelope bitterbrush	putr2	1	Native
	tetradymia canescens, spineless horsebrush	teca2	1	Native
		<i>Total</i>	<i>14</i>	
	<i>3. Subshrub</i>			
	gutierrezia sarothrae, broom snakeweed	gusa2	1	Native
		<i>Total</i>	<i>1</i>	
	<i>5. Graminoid</i>			
	carex duriuscula, needleleaf sedge	cadu6	3	Native
	carex filifolia, threadleaf sedge	cafi	10	Native
	Pseudoroegneria spicata, bluebunch wheatgrass	elsp3	1	Native
	hesperostipa comata, needle and thread	heco26	10	Native
	poa secunda, sandberg bluegrass	pose	10	Native
		<i>Total</i>	<i>34</i>	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	1	Native
	arenaria nuttallii, nuttall's sandwort	arnu5	1	Native
	comandra umbellata, bastard toadflax	coum	1	Native
	phlox hoodii, hoods phlox	phho	1	Native
		<i>Total</i>	<i>4</i>	
		<i>Total for Plot</i>	<i>53</i>	

Plot: 01FER01.02

LOCATION

T 27 N, **R** 88W, **Sec** 19 , SW 1/4 sec

UTM Coordinates: 4,685,095 m N, 302,382 m E

Projection NAD 27 **Zone** 13N

Map name Muddy Gap

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris low shrub

Sampled on: 08/19/2001

Why was plot done? To illustrate the composition of the black sagebrush shrub-steppe vegetation at the foot of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short (< 25 cm tall) vegetation of *Pseudoroegneria spicata*, *Carex filifolia*, *Artemisia nova*, and various forbs.

Disturbance signs

Fresh pocket gopher mounds

Notes

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER01.02	CANOPY COVER		
	Scientific Name	NRCS Code	Cover Class	Origin
	<i>1. Tree</i>			
	juniperus scopulorum, rocky mountain juniper	jusc2	1	Native
		<i>Total</i>	<i>1</i>	
	<i>2. Shrub</i>			
	artemisia nova, black sagebrush	arno4	20	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
	ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	ernan3	1	Native
		<i>Total</i>	<i>22</i>	
	<i>3. Subshrub</i>			
	gutierrezia sarothrae, broom snakeweed	gusa2	1	Native
		<i>Total</i>	<i>1</i>	
	<i>5. Graminoid</i>			
	carex filifolia, threadleaf sedge	cafi	3	Native
	Pseudoroegneria spicata, bluebunch wheatgrass	elsp3	3	Native
	koeleria macrantha, prairie junegrass	koma	3	Native
	leucopoa kingii, spike fescue	leki2	1	Native
	poa secunda, sandberg bluegrass	pose	3	Native
		<i>Total</i>	<i>13</i>	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	3	Native
	arenaria nuttallii, nuttall's sandwort	arnu5	1	Native
	calochortus, mariposa lily	caloc	1	Native
	cryptantha cana, mountain catseye	crca8	1	Native
	eurybia glauca, gray aster	eugl19	1	Native
	haplopappus armerioides, thrift mock goldenweed	haar2	3	Native
	ipomopsis aggregata, skyrocket gilia	ipag	1	Native
	penstemon laricifolius, larchleaf beardtongue	pela9	1	Native
	penstemon sp., penstemon	penst	1	Native
	phlox hoodii, hoods phlox	phho	1	Native
		<i>Total</i>	<i>14</i>	
		<i>Total for Plot</i>	<i>51</i>	

Plot: 01FER01.03

LOCATION

T 27 N, **R** 88W, **Sec** 19 , **SE** 1/4 **sec**

UTM Coordinates: 4,685,221 m N, 302,778 m E

Projection NAD 27 **Zone** 13N

Map name Muddy Gap

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris tall shrubs

Sampled on: 08/19/2001

Why was plot done? To illustrate the composition of the mountain big sagebrush shrub vegetation at the foot of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short (< 50 cm tall) shrub layer of *Purshia tridentata* and *Artemisia tridentata* ssp. *vaseyana* above a herbaceous layer of grasses (*Elymus spicatus*, *Leucopoa kingii*, *Koeleria macrantha*) and forbs (*Crepis*, *Leptodactylon pungens*, *Penstemon* sp.). *Pseudotsuga menziesii* and *Pinus flexilis* are present in patches on the slope.

Disturbance signs

Burned tree snags were in stand but outside of plot

Notes Vegetation grows on colluvium and talus

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER01.03	CANOPY COVER		
	Scientific Name	NRCS Code	Cover Class	Origin
	<i>1. Tree</i>			
	juniperus scopulorum, rocky mountain juniper	jusc2	1	Native
	pinus flexilis, limber pine	pifl2	1	Native
		<i>Total</i>	2	
	<i>2. Shrub</i>			
	cercocarpus montanus, true mountain mahogany	cemo2	1	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
	holodiscus dumosus, rockspirea	hodu	1	Native
	juniperus communis, common juniper	juco6	1	Native
	purshia tridentata, antelope bitterbrush	putr2	20	Native
		<i>Total</i>	24	
	<i>3. Subshrub</i>			
	leptodactylon pungens, granite pricklygilia	lepu	3	Native
		<i>Total</i>	3	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	10	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	koeleria macrantha, prairie junegrass	koma	10	Native
	leucopoa kingii, spike fescue	leki2	10	Native
		<i>Total</i>	33	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	3	Native
	castilleja, indian paintbrush	casti2	1	Native
	erigeron, fleabane	erige2	1	Native
	eurybia glauca, gray aster	eugl19	3	Native
	heterotheca villosa, hairy goldenaster	hevi4	1	Native
	senecio canus, woolly groundsel	seca2	1	Native
	solidago velutina, threenerve goldenrod	sove6	1	Native
		<i>Total</i>	11	
		<i>Total for Plot</i>	73	

Plot: 01FER01.04

LOCATION

T 27 N, **R** 88W, **Sec** 20 , SW 1/4 sec

UTM Coordinates: 4,684,621 m N, 303,398 m E

Projection NAD 27 **Zone** 13N

Map name Muddy Gap

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris tall shrubs

Sampled on: 08/19/2001

Why was plot done? To illustrate the composition of mountain mahogany stands in the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Artemisia tridentata ssp. vaseyana and Purshia tridentata form a shrub layer ca. 35 cm tall over a herbaceous layer of Leucopoa kingii, Elymus spicatus, Carex rossii, and many other species.

Disturbance signs

none reported

Notes

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER01.04	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	juniperus scopulorum, rocky mountain juniper	jusc2	1	Native
	pinus flexilis, limber pine	pifl2	1	Native
	pseudotsuga menziesii, douglas fir	psme	1	Native
		<i>Total</i>	<i>3</i>	
	<i>2. Shrub</i>			
	holodiscus dumosus, rockspirea	hodu	1	Native
	purshia tridentata, antelope bitterbrush	putr2	30	Native
		<i>Total</i>	<i>31</i>	
	<i>3. Subshrub</i>			
	leptodactylon pungens, granite pricklygilia	lepu	1	Native
		<i>Total</i>	<i>1</i>	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	10	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	10	Native
	koeleria macrantha, prairie junegrass	koma	1	Native
	leucopoa kingii, spike fescue	leki2	10	Native
	poa secunda, sandberg bluegrass	pose	1	Native
		<i>Total</i>	<i>32</i>	
	<i>6. Forb</i>			
	arabis sp.	arab12	1	Native
	calochortus, mariposa lily	caloc	1	Native
	castilleja, indian paintbrush	casti2	1	Native
	crepis, hawksbeard	crepi	1	Native
	erigeron, fleabane	erige2	1	Native
	penstemon sp., penstemon	penst	1	Native
	phlox multiflora, flowery phlox	phmu3	1	Native
	solidago velutina, threenerve goldenrod	sove6	1	Native
		<i>Total</i>	<i>8</i>	
		<i>Total for Plot</i>	<i>75</i>	

Plot: 01FER02.01 **LOCATION**

T 27 N, **R** 88W, **Sec** 32 , **NE 1/4 sec**

UTM Coordinates: 4,682,530 m N, 304,538 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris low shrub

Sampled on: 08/19/2001

Why was plot done? To illustrate the composition of mixed shrub vegetation.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Ericameria nauseosa forms a sparse taller shrub layer (ca. 50 cm) above an undergrowth of shorter shrub (especially *Artemisia nova*), grasses (*Hesperostipa comata*, *Elymus spicatus*), and scattered perennial forbs (*Aster* sp., *Leptodactylon pungens*, others). *Cercocarpus montanus* and *Achnatherum hymenoides* grow near a stream channel that runs through the stand.

Disturbance signs

none reported

Notes Surface deposit is alluvium, probably with some colluvium.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER02.01	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia cana ssp. cana, plains silver sagebrush	arcac5	1	Native
	artemisia nova, black sagebrush	arno4	20	Native
	cercocarpus montanus, true mountain mahogany	cemo2	1	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	3	Native
	ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	ernan3	10	Native
	purshia tridentata, antelope bitterbrush	putr2	3	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	1	Native
	tetradymia canescens, spineless horsebrush	teca2	3	Native
		<i>Total</i>	<i>42</i>	
	<i>5. Graminoid</i>			
	achnatherum hymenoides, indian ricegrass	achy	1	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	hesperostipa comata, needle and thread	heco26	10	Native
	koeleria macrantha, prairie junegrass	koma	1	Native
	poa secunda, sandberg bluegrass	pose	3	Native
		<i>Total</i>	<i>18</i>	
	<i>6. Forb</i>			
	alyssum desertorum, desert madwort	alde	1	Introduced
	antennaria microphylla, littleleaf pussytoes	anmi3	1	Native
	artemisia ludoviciana, louisiana sagewort	arlu	1	Native
	cirsium pulcherrimum, wyoming thistle	cipu3	1	Native
	comandra umbellata, bastard toadflax	coum	3	Native
	cryptantha sp., cryptantha	crypt	3	Native
	erigonum umbellatum, sulphur wildbuckwheat	erum	1	Native
	linum lewisii, prairie flax	lile3	1	Native
	lithospermum ruderales, western gromwell	liru4	1	Native
	lupinus depressus, depressed lupine	lude3	1	Native
	orobanche fasciculata, clustered broomrape	orfa	1	Native
	penstemon aridus, stiffleaf penstemon	pear2	1	Native
	tragopogon dubius, yellow salsify	trdu	1	Introduced
		<i>Total</i>	<i>17</i>	
		<i>Total for Plot</i>	<i>77</i>	

Plot: 01FER02.02 **LOCATION**

T 27 N, **R** 88W, **Sec** 32 , **NE 1/4 sec**

UTM Coordinates: 4,682,893 m N, 304,325 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris tall shrubs

Sampled on: 08/20/2001

Why was plot done? To illustrate the composition of mountain big sagebrush vegetation at the foot of the Ferris Mountains

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Artemisia tridentata ssp. *vaseyana* forms a moderately dense shrub layer above a herbaceous layer of *Elymus spicatus*, *Balsamorhiza sagittata*, *Poa secunda*, *Leucopoa kingii*, and other graminoids and forms. *Purshia tridentata* is present in the shrub layer. A few *Pinus flexilis* are present in the stand.

Disturbance signs

Elk and deer droppings and beds are present

Notes Surface deposit is residuum and colluvium.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER02.02	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	juniperus scopulorum, rocky mountain juniper	jusc2	1	Native
	pinus flexilis, limber pine	pifl2	1	Native
		<i>Total</i>	2	
	<i>2. Shrub</i>			
	purshia tridentata, antelope bitterbrush	putr2	10	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	1	Native
		<i>Total</i>	11	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	1	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	leucopoa kingii, spike fescue	leki2	3	Native
	poa secunda, sandberg bluegrass	pose	3	Native
		<i>Total</i>	10	
	<i>6. Forb</i>			
	balsamorhiza sagittata, arrowleaf balsamroot	basa3	3	Native
	cordylanthus ramosus, bushy bird's beak	cora5	1	Native
	lithospermum ruderales, western gromwell	liru4	1	Native
		<i>Total</i>	5	
		<i>Total for Plot</i>	28	

Plot: 01FER02.03

LOCATION

T 27 N, **R** 88W, **Sec** 32 , NE 1/4 sec

UTM Coordinates: 4,682,950 m N, 304,443 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris low shrub

Sampled on: 08/20/2001

Why was plot done? To illustrate the composition of the matrix low shrub and grass vegetation at the foot of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short (to 40 cm) vegetation of shrubs (mainly *Artemisia nova*) and graminoids (*Elymus spicatus*, *Koeleria macrantha*, *Carex rossii*) and forbs (*Haplopappus armerioides*, *Arenaria nuttallii*, *Antennaria microphylla*, *Balsamorhiza sagittata*, others) on a wind-blown slope.

Disturbance signs

none noted

Notes Surface deposit is residuum and colluvium

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER02.03	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	pinus flexilis, limber pine	pif12	1	Native
		<i>Total</i>	<i>1</i>	
	<i>2. Shrub</i>			
	artemisia nova, black sagebrush	arno4	20	Native
	ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	ernan3	1	Native
	purshia tridentata, antelope bitterbrush	putr2	10	Native
	tetradymia canescens, spineless horsebrush	teca2	1	Native
		<i>Total</i>	<i>32</i>	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	3	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	koeleria macrantha, prairie junegrass	koma	3	Native
		<i>Total</i>	<i>9</i>	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	3	Native
	arenaria nuttallii, nuttall's sandwort	arnu5	3	Native
	balsamorhiza sagittata, arrowleaf balsamroot	basa3	3	Native
	haplopappus armerioides, thrift mock goldenweed	haar2	3	Native
		<i>Total</i>	<i>12</i>	
		<i>Total for Plot</i>	<i>54</i>	

Plot: 01FER02.04

LOCATION

T 27 N, **R** 88W, **Sec** 28 , SW 1/4 sec

UTM Coordinates: 4,683,173 m N, 304,840 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris tall shrubs

Sampled on: 08/20/2001

Why was plot done? To illustrate the composition of mountain big sagebrush shrub vegetation at the foot of the Ferris Mountains

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Artemisia tridentata ssp. vaseyana dominates a dense to moderately dense shrub layer above an undergrowth of grasses (Elymus spicatus, Leucopoa kingii, Carex rossii) and forbs (Lithospermum ruderae, Solidago sp.). Shrubs are densest in the lower part of the stand where the slope is gentler. A small grove of Pseudotsuga menziesii grows in the center of the stand, and Pinus flexilis and Juniperus scopulorum are scattered throughout.

Disturbance signs

Burned wood on ground; ungulate trails and beds in stand

Notes

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER02.04	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	juniperus scopulorum, rocky mountain juniper	jusc2	1	Native
	pinus flexilis, limber pine	pifl2	3	Native
	pseudotsuga menziesii, douglas fir	psme	3	Native
		<i>Total</i>	7	
	<i>2. Shrub</i>			
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
	juniperus communis, common juniper	juco6	3	Native
	purshia tridentata, antelope bitterbrush	putr2	10	Native
		<i>Total</i>	14	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	10	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	10	Native
	hesperostipa comata, needle and thread	heco26	1	Native
	leucopoa kingii, spike fescue	leki2	10	Native
		<i>Total</i>	31	
	<i>6. Forb</i>			
	heterotheca villosa, hairy goldenaster	hevi4	1	Native
	lithospermum ruderales, western gromwell	liru4	3	Native
	mertensia, bluebells	merte	1	Native
	solidago velutina, threenerve goldenrod	sove6	1	Native
	thermopsis, thermopsis	therm	1	Native
		<i>Total</i>	7	
		<i>Total for Plot</i>	59	

Plot: 01FER02.05 **LOCATION**

T 27 N, **R** 88W, **Sec** 33 , **N** 1/4 **sec**

UTM Coordinates: 4,682,740 m N, 304,974 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris tall shrubs

Sampled on: 08/20/2001

Why was plot done? To illustrate the composition of dense mountain big sagebrush vegetation at the foot of the Ferris Mountains

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Artemisia tridentata ssp. *vaseyana* forms a tall (to 1.5 m), dense shrub layer with *Symphoricarpos oreophilus*, above an undergrowth of forbs (various species) and graminoids (*Poa pratensis* and others). A few *Pinus flexilis* are scattered throughout the stand.

Disturbance signs

Cattle and elk droppings and bed are present, and some grasses have been grazed.

Notes Vegetation grows in a draw.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER02.05	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	juniperus scopulorum, rocky mountain juniper	jusc2	1	Native
	pinus flexilis, limber pine	pifl2	3	Native
		<i>Total</i>	<i>4</i>	
	<i>2. Shrub</i>			
	amelanchier alnifolia, saskatoon serviceberry	amal2	1	Native
	ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	ernan3	1	Native
	purshia tridentata, antelope bitterbrush	putr2	1	Native
	ribes oxycanthoides, canadian gooseberry	riox	1	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	20	Native
		<i>Total</i>	<i>24</i>	
	<i>3. Subshrub</i>			
	mahonia repens, oregongrape	mare11	1	Native
		<i>Total</i>	<i>1</i>	
	<i>5. Graminoid</i>			
	achnatherum nelsonii ssp. dorei, dore's needlegrass	acned	1	Native
	carex rossii, ross' sedge	caro5	1	Native
	leymus cinereus, basin wildrye	leci4	10	Native
	poa pratensis, kentucky bluegrass	popr	3	Introduced
		<i>Total</i>	<i>15</i>	
	<i>6. Forb</i>			
	achillea millefolium, common yarrow	acmi2	1	Native
	balsamorhiza sagittata, arrowleaf balsamroot	basa3	3	Native
	equisetum laevigatum, smooth horsetail	eqla	1	Native
	eurybia glauca, gray aster	eugl19	3	Native
	geranium viscosissimum, sticky geranium	gevi2	1	Native
	lupinus depressus, depressed lupine	lude3	3	Native
	maianthemum stellatum, starry false solomon's seal	mast4	1	Native
	perideridia gairdneri, yampa	pega3	1	Native
		<i>Total</i>	<i>14</i>	
		<i>Total for Plot</i>	<i>58</i>	

Plot: 01FER03.01

LOCATION

T 26 N, **R** 87W, **Sec** 6, **N** 1/4 sec

UTM Coordinates: 4,680,840 m N, 311,671 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris tall shrubs

Sampled on: 08/21/2001

Why was plot done? To illustrate the composition of the mountain big sagebrush vegetation growing on the pediment at the foot of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

This is an open stand of short (< 50 cm tall) *Artemisia tridentata* ssp. *vaseyana* with a sparse undergrowth of various graminoids (*Carex rossii*, *Poa secunda*, *Elymus spicatus*) and forbs. Some small sagebrush plants are present. Ca. half of the big sagebrush has a noticeable amount of dead canopy, but most of the plants appear vigorous.

Disturbance signs

Cattle droppings

Notes Vegetation grows on the pediment at the foot of the mountain, and the surface deposit probably is a mix of alluvium and colluvium.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER03.01	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	pinus flexilis, limber pine	pifl2	1	Native
		<i>Total</i>	<i>1</i>	
	<i>2. Shrub</i>			
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
	ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	ernan3	1	Native
	purshia tridentata, antelope bitterbrush	putr2	1	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	1	Native
		<i>Total</i>	<i>4</i>	
	<i>5. Graminoid</i>			
	achnatherum nelsonii ssp. dorei, dore's needlegrass	acned	3	Native
	carex rossii, ross' sedge	caro5	10	Native
	elymus lanceolatus ssp. lanceolatus, thickspike wheatgrass	ellal	3	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	leucopoa kingii, spike fescue	leki2	10	Native
	poa secunda, sandberg bluegrass	pose	10	Native
		<i>Total</i>	<i>39</i>	
	<i>6. Forb</i>			
	arenaria congesta, ballhead sandwort	arco5	3	Native
	balsamorhiza sagittata, arrowleaf balsamroot	basa3	3	Native
	crepis, hawksbeard	crepi	1	Native
	delphinium sp., larkspur	delph	1	Native
	erigonum umbellatum, sulphur wildbuckwheat	erum	3	Native
	lithospermum ruderales, western gromwell	liru4	1	Native
	mertensia, bluebells	merte	1	Native
	perideridia gairdneri, yampa	pega3	1	Native
	phlox multiflora, flowery phlox	phmu3	1	Native
		<i>Total</i>	<i>15</i>	
		<i>Total for Plot</i>	<i>59</i>	

Plot: 01FER03.02

LOCATION

T 26 N, **R** 87W, **Sec** 6, **N** 1/4 sec

UTM Coordinates: 4,680,715 m N, 311,859 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris tall shrubs

Sampled on: 08/21/2001

Why was plot done? To illustrate the composition of the mountain big sagebrush vegetation growing in draws on the pediment at the foot of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Tall (to 1 m) mountain big sagebrush canopy over a herbaceous undergrowth of *Achnatherum nelsonii*. var. *dorei*, *Leucopoa kingii*, *Lupinus* sp., *Eriogonum* sp., and other species. Scattered *Pinus flexilis* are present.

Disturbance signs

None reported

Notes

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER03.02	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	pinus flexilis, limber pine	pifl2	3	Native
		<i>Total</i>	3	
	<i>2. Shrub</i>			
	juniperus communis, common juniper	juco6	1	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	1	Native
		<i>Total</i>	2	
	<i>5. Graminoid</i>			
	achnatherum nelsonii ssp. dorei, dore's needlegrass	acned	10	Native
	bromus marginatus, mountain brome	brma4	1	Native
	carex rossii, ross' sedge	caro5	1	Native
	carex vallicola, valley sedge	cava3	1	Native
	elymus trachycaulus ssp. trachycaulus, slender wheatgrass	eltrt	10	Native
	leucopoa kingii, spike fescue	leki2	10	Native
	melica bulbosa, oniongrass	mebu	1	Native
	poa pratensis, kentucky bluegrass	popr	10	Introduced
		<i>Total</i>	44	
	<i>6. Forb</i>			
	arenaria congesta, ballhead sandwort	arco5	1	Native
	erigonum umbellatum, sulphur wildbuckwheat	erum	3	Native
	lupinus depressus, depressed lupine	lude3	3	Native
	mertensia, bluebells	merte	1	Native
	perideridia gairdneri, yampa	pega3	1	Native
		<i>Total</i>	9	
		<i>Total for Plot</i>	58	

Plot: 01FER03.03 **LOCATION**

T 26 N, **R** 87W, **Sec** 6 , NE 1/4 sec

UTM Coordinates: 4,680,927 m N, 312,132 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris sparse woodland

Sampled on: 08/21/2001

Why was plot done? Illustrate the composition of the sparse mountain big sagebrush and limber pine - Douglas-fir vegetation on the steep south face of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Open woodland of *Pinus flexilis* and *Pseudotsuga menziesii* with an open shrub layer of *Artemisia tridentata* ssp. *vaseyana* and a sparse herbaceous undergrowth of *Mahonia repens*, *Elymus spicatus*, and other species.

Disturbance signs

none recorded

Notes Surface deposit is a mix of residuum and colluvium

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER03.03	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	juniperus scopulorum, rocky mountain juniper	jusc2	3	Native
	pinus flexilis, limber pine	pifl2	3	Native
	pseudotsuga menziesii, douglas fir	psme	3	Native
		<i>Total</i>	9	
	<i>2. Shrub</i>			
	purshia tridentata, antelope bitterbrush	putr2	1	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	1	Native
		<i>Total</i>	2	
	<i>3. Subshrub</i>			
	mahonia repens, oregongrape	mare11	3	Native
		<i>Total</i>	3	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	3	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	leucopoa kingii, spike fescue	leki2	3	Native
	poa secunda, sandberg bluegrass	pose	1	Native
		<i>Total</i>	10	
	<i>6. Forb</i>			
	balsamorhiza sagittata, arrowleaf balsamroot	basa3	3	Native
	eurybia glauca, gray aster	eugl19	1	Native
	heterotheca villosa, hairy goldenaster	hevi4	1	Native
	ipomopsis aggregata, skyrocket gilia	ipag	1	Native
	mertensia, bluebells	merte	1	Native
		<i>Total</i>	7	
		<i>Total for Plot</i>	31	

Plot: 01FER03.04

LOCATION

T 26 N, **R** 87W, **Sec** 6, **SE** 1/4 **sec**

UTM Coordinates: 4,680,248 m N, 312,445 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris herbaceous

Sampled on: 08/21/2001

Why was plot done? To illustrate the composition of grassland vegetation in the Ferris Mountains

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Open bunchgrass vegetation of *Elymus spicatus* with several forbs.

Disturbance signs

none recorded

Notes Substrate is Chugwater Fmtn sandstone, dipping nearly 90 degrees. This bunchgrass vegetation is bordered on the north and south by mountain big sagebrush shrub vegetation.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER03.04	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia nova, black sagebrush	arno4	1	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
		<i>Total</i>	2	
	<i>5. Graminoid</i>			
	elymus spicatus, bluebunch wheatgrass	elsp3	10	Native
	poa secunda, sandberg bluegrass	pose	3	Native
		<i>Total</i>	13	
	<i>6. Forb</i>			
	arenaria hookeri, hooker's sandwort	arho4	10	Native
	astragalus spatulatus, tufted milkvetch	assp6	1	Native
	cryptantha cana, mountain catseye	crca8	1	Native
	haplopappus armerioides, thrift mock goldenweed	haar2	10	Native
	machaeranthera grindelioides, rayless aster	magr2	1	Native
	penstemon laricifolius, larchleaf beardtongue	pela9	1	Native
	phlox hoodii, hoods phlox	phho	3	Native
		<i>Total</i>	27	
		<i>Total for Plot</i>	42	

Plot: 01FER03.05 **LOCATION**

T 26 N, **R** 87W, **Sec** 6 , **SE** 1/4 **sec**

UTM Coordinates: 4,680,139 m N, 312,640 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris low shrub

Sampled on: 08/21/2001

Why was plot done? Illustrate the composition of the low, black sagebrush shrub-steppe vegetation at the foot of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short (to 40 cm) shrub-steppe vegetation with *Artemisia tridentata* ssp. *vaseyana* and *Artemisia nova* in the shrub layer, surrounded by taller mountain big sagebrush vegetation.

Disturbance signs

none recorded

Notes This patch of vegetation grows on the upper part of a gentle, broadly convex, south-facing slope.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER03.05	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	pinus flexilis, limber pine	pif12	1	Native
		<i>Total</i>	<i>1</i>	
	<i>2. Shrub</i>			
	artemisia nova, black sagebrush	arno4	10	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
		<i>Total</i>	<i>11</i>	
	<i>5. Graminoid</i>			
	elymus spicatus, bluebunch wheatgrass	elsp3	10	Native
	poa cusickii, cusick`s bluegrass	pocu3	1	Native
	poa secunda, sandberg bluegrass	pose	10	Native
		<i>Total</i>	<i>21</i>	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	1	Native
	haplopappus armerioides, thrift mock goldenweed	haar2	10	Native
	penstemon laricifolius, larchleaf beardtongue	pela9	1	Native
	penstemon sp., penstemon	penst	1	Native
		<i>Total</i>	<i>13</i>	
		<i>Total for Plot</i>	<i>46</i>	

Plot: 01FER03.06

LOCATION

T 26 N, **R** 87W, **Sec** 5 , SW 1/4 sec

UTM Coordinates: 4,679,997 m N, 312,835 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris tall shrubs

Sampled on: 08/21/2001

Why was plot done? To illustrate the composition of mixed mountain big sagebrush - antelope bitterbrush shrub vegetation at the foot of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Artemisia tridentata ssp. vaseyana dominates an open shrub layer to 50 cm tall that contains a substantial amount of Purshia tridentata. The herbaceous undergrowth consists of Elymus spicatus, Balsamorhiza sagittata, and other species and is rather sparse. Pinus flexilis saplings grow in the shrub stand.

Disturbance signs

none reported

Notes This stand of vegetation grows on a very slightly concave, south-facing slope.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER03.06	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	pinus flexilis, limber pine	pifl2	1	Native
		<i>Total</i>	<i>1</i>	
	<i>2. Shrub</i>			
	purshia tridentata, antelope bitterbrush	putr2	3	Native
		<i>Total</i>	<i>3</i>	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	3	Native
	elymus lanceolatus ssp. lanceolatus, thickspike wheatgrass	ellal	1	Native
	festuca idahoensis, idaho fescue	feid	1	Native
	leucopoa kingii, spike fescue	leki2	1	Native
	melica bulbosa, oniongrass	mebu	1	Native
	poa pratensis, kentucky bluegrass	popr	1	Introduced
	poa secunda, sandberg bluegrass	pose	3	Native
		<i>Total</i>	<i>11</i>	
	<i>6. Forb</i>			
	arenaria congesta, ballhead sandwort	arco5	3	Native
	balsamorhiza sagittata, arrowleaf balsamroot	basa3	10	Native
	phlox multiflora, flowery phlox	phmu3	1	Native
		<i>Total</i>	<i>14</i>	
		<i>Total for Plot</i>	<i>29</i>	

Plot: 01FER03.07

LOCATION

T 26 N, **R** 87W, **Sec** 5, SW 1/4 sec

UTM Coordinates: 4,679,538 m N, 313,464 m E

Projection NAD 27 **Zone** 13N

Map name Lamont NE

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris low shrub

Sampled on: 08/21/2001

Why was plot done? To illustrate the composition of short shrub (*Artemisia nova*) steppe vegetation at the foot of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short (to 25 cm tall) vegetation of *Artemisia nova*, and grasses (*Poa secunda*, *Koeleria macrantha*, *Elymus spicatus*) and forbs (*Antennaria microphylla*, *Arenaria congesta*) on a wind-blown pediment.

Disturbance signs

None reported

Notes This vegetation grows on wind-blown pediments. The substrate is alluvium and colluvium veneer over the bedrock.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FER03.07	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia nova, black sagebrush	arno4	20	Native
		<i>Total</i>	<i>20</i>	
	<i>5. Graminoid</i>			
	elymus spicatus, bluebunch wheatgrass	elsp3	10	Native
	koeleria macrantha, prairie junegrass	koma	10	Native
	poa cusickii, cusick`s bluegrass	pocu3	1	Native
	poa secunda, sandberg bluegrass	pose	10	Native
		<i>Total</i>	<i>31</i>	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	10	Native
	arenaria congesta, ballhead sandwort	arco5	10	Native
	phlox multiflora, flowery phlox	phmu3	1	Native
		<i>Total</i>	<i>21</i>	
		<i>Total for Plot</i>	<i>72</i>	

Plot: 01FM20.01 **LOCATION**

T 27 N, **R** 88W, **Sec** 15 , **N** 1/4 **sec**

UTM Coordinates: 4,687,246 m N, 306,732 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris tall shrubs

Sampled on: 08/20/2001

Why was plot done? To describe patch of tall shrubs on lee slope.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded. This is not a complete description.

Describe vegetation

This is a patch of open shrub vegetation, ca. 50 cm tall. A shrub layer of *Purshia tridentata* and *Artemisia tridentata* ssp. *vaseyana* (with some *Symphoricarpos oreophilus* var. *utahensis*) grows above a layer of short shrubs (dominated by *Artemisia nova*) and a herbaceous layer of *Koeleria macrantha*, *Carex filifolia*, *Elymus spicatus*, *Poa secunda*, and *Leptodactylon pungens*.

Disturbance signs

Cattle droppings.

Notes

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM20.01	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia nova, black sagebrush	arno4	10	Native
	purshia tridentata, antelope bitterbrush	putr2	10	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	3	Native
		<i>Total</i>	<i>23</i>	
	<i>3. Subshrub</i>			
	leptodactylon pungens, granite pricklygilia	lepu	1	Native
		<i>Total</i>	<i>1</i>	
	<i>5. Graminoid</i>			
	carex filifolia, threadleaf sedge	cafi	3	Native
	carex rossii, ross' sedge	caro5	3	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	koeleria macrantha, prairie junegrass	koma	3	Native
	leucopoa kingii, spike fescue	leki2	3	Native
	poa secunda, sandberg bluegrass	pose	3	Native
		<i>Total</i>	<i>18</i>	
	<i>6. Forb</i>			
	cryptantha cana, mountain catseye	crca8	1	Native
	erigeron, fleabane	erige2	1	Native
	erigonum umbellatum, sulphur wildbuckwheat	erum	1	Native
	lithospermum ruderales, western gromwell	liru4	1	Native
	mertensia, bluebells	merte	1	Native
		<i>Total</i>	<i>5</i>	
		<i>Total for Plot</i>	<i>47</i>	

Plot: 01FM20.02 **LOCATION**

T 27 N, **R** 88W, **Sec** 15 , **NE 1/4 sec**

UTM Coordinates: 4,687,344 m N, 307,662 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris herbaceous

Sampled on: 08/20/2001

Why was plot done? Describe matrix vegetation on narrow, windy ridge

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short herbaceous vegetation (< 10 cm tall) of forbs and grasses with scattered, wind-shaped *Artemisia nova* and 2 or 3 *Pinus flexilis* ca. 1 m tall.

Disturbance signs

Cattle droppings present, some plants grazed

Notes Plot is on narrow, NE-sloping ridge with the upper parts of the slopes on both sides.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM20.02	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia nova, black sagebrush	arno4	20	Native
	ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	ernan3	1	Native
	tetradymia canescens, spineless horsebrush	teca2	1	Native
		<i>Total</i>	22	
	<i>5. Graminoid</i>			
	carex filifolia, threadleaf sedge	cafi	3	Native
	carex rossii, ross' sedge	caro5	3	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	koeleria macrantha, prairie junegrass	koma	3	Native
		<i>Total</i>	12	
	<i>6. Forb</i>			
	cryptantha sp., cryptantha	crypt	1	Native
	erigeron, fleabane	erige2	1	Native
	erigonum brevicaule, shortstem buckwheat	erbr5	3	Native
	haplopappus armerioides, thrift mock goldenweed	haar2	1	Native
	linum lewisii, prairie flax	lile3	1	Native
	machaeranthera grindelioides, rayless aster	magr2	1	Native
	paronychia depressa, spreading nailwort	pade4	3	Native
	phlox muscoides, musk phlox	phmu4	1	Native
	selaginella densa, lesser spikemoss	sede2	1	Native
	senecio canus, woolly groundsel	seca2	1	Native
		<i>Total</i>	14	
		<i>Total for Plot</i>	48	

Plot: 01FM20.10 **LOCATION**

T 27 N, **R** 88W, **Sec** 8 , **SE** 1/4 **sec**

UTM Coordinates: 6,687,783 m N, 304,663 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris mountain mahogany

Sampled on: 08/20/2001

Why was plot done? To illustrate the composition of mountain mahogany stands in the Ferris Mountains WSA

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

A dense shrub layer of *Cercocarpus montanus* and *Artemisia tridentata* ssp. *vaseyana* ca. 1 m tall grows above a herbaceous layer of *Elymus spicatus*, *Carex rossii*, *Eriogonum* sp., *Antennaria microphylla*, and other forbs.

Disturbance signs

none reported

Notes

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM20.10	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	juniperus scopulorum, rocky mountain juniper	jusc2	1	Native
	pseudotsuga menziesii, douglas fir	psme	1	Native
		<i>Total</i>	2	
	<i>2. Shrub</i>			
	amelanchier alnifolia, saskatoon serviceberry	amal2	3	Native
	artemisia nova, black sagebrush	arno4	1	Native
	cercocarpus montanus, true mountain mahogany	cemo2	20	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	3	Native
	ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	ernan3	3	Native
	purshia tridentata, antelope bitterbrush	putr2	3	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	3	Native
		<i>Total</i>	36	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	3	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	leucopoa kingii, spike fescue	leki2	3	Native
		<i>Total</i>	9	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	3	Native
	erigeron caespitosus, tufted fleabane	erca2	3	Native
	erigonum umbellatum, sulphur wildbuckwheat	erum	3	Native
	phlox multiflora, flowery phlox	phmu3	3	Native
		<i>Total</i>	12	
		<i>Total for Plot</i>	59	

Plot: 01FM20.11 **LOCATION**

T 27 N, **R** 88W, **Sec** 17 , **NE 1/4 sec**

UTM Coordinates: 4,687,631 m N, 304,362 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris mountain mahogany

Sampled on: 08/20/2001

Why was plot done? To illustrate the composition of mountain mahogany stands in the Ferris Mountains WSA

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

A moderately dense shrub layer dominated by *Cercocarpus montanus* grows above a scattering of shorter shrubs and a herbaceous layer of *Elymus spicatus*, *Carex rossii*, *Phlox multiflora*, and other forbs.

Disturbance signs

none reported

Notes

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM20.11	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	amelanchier alnifolia, saskatoon serviceberry	amal2	1	Native
	artemisia nova, black sagebrush	arno4	1	Native
	cercocarpus montanus, true mountain mahogany	cemo2	20	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	1	Native
	tetradymia canescens, spineless horsebrush	teca2	1	Native
		<i>Total</i>	25	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	20	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	20	Native
		<i>Total</i>	40	
	<i>6. Forb</i>			
	cerastium arvense, field chickweed	cear4	3	Native
	erigeron caespitosus, tufted fleabane	erca2	3	Native
	erigonum brevicaule, shortstem buckwheat	erbr5	3	Native
	hymenoxys acaulis, stemless four-nerve daisy	hyac4	3	Native
	phlox multiflora, flowery phlox	phmu3	3	Native
		<i>Total</i>	15	
		<i>Total for Plot</i>	80	

Plot: 01FM20.4

LOCATION

T 27 N, **R** 88W, **Sec** 15 , **NE 1/4 sec**

UTM Coordinates: 4,686,997 m N, 307,719 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris herbaceous

Sampled on: 08/20/2001

Why was plot done? Illustrate variation in the matrix vegetation

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short (< 15 cm) mix of forbs (*Antennaria microphylla*, *Haplopappus armerioides*, *Phlox muscoides*, *Arenaria hookeri*, *Paronychia depressa*) and graminoids (*Koeleria macrantha*, *Elymus spicatus*, *Carex rossii*, *Poa secunda*), with dwarf-shrubs (*Artemisia nova*, *Purshia tridentata*) forming the matrix vegetation at the foot of the mountains.

Disturbance signs

None recorded

Notes

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM20.4	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia nova, black sagebrush	arno4	20	Native
	purshia tridentata, antelope bitterbrush	putr2	1	Native
		<i>Total</i>	<i>21</i>	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	3	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	koeleria macrantha, prairie junegrass	koma	10	Native
	poa secunda, sandberg bluegrass	pose	3	Native
		<i>Total</i>	<i>19</i>	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	3	Native
	arenaria hookeri, hooker's sandwort	arho4	3	Native
	haplopappus armerioides, thrift mock goldenweed	haar2	1	Native
	paronychia depressa, spreading nailwort	pade4	1	Native
	phlox muscoides, musk phlox	phmu4	1	Native
	selaginella densa, lesser spikemoss	sede2	3	Native
		<i>Total</i>	<i>12</i>	
		<i>Total for Plot</i>	<i>52</i>	

Plot: 01FM20.5

LOCATION

T 27 N, **R** 88W, **Sec** 15 , SW 1/4 sec

UTM Coordinates: 4,686,433 m N, 307,285 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris mountain mahogany

Sampled on: 08/20/2001

Why was plot done? To illustrate the composition and structure of mountain mahogany vegetation

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Open patch of short shrubs (< 1 m tall). *Cercocarpus montanus* forms the shrub canopy in most of the stand, with *Artemisia tridentata* ssp. *vaseyana* common in the part of the stand low on the slope. A few *Pinus flexilis* to ca. 3 m tall are present. The herbaceous undergrowth is a mixture of forbs and graminoids.

Disturbance signs

None noted

Notes Surface deposit is both bedrock and colluvium

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM20.5	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	pinus flexilis, limber pine	pifl2	1	Native
	pseudotsuga menziesii, douglas fir	psme	1	Native
		<i>Total</i>	2	
	<i>2. Shrub</i>			
	amelanchier alnifolia, saskatoon serviceberry	amal2	1	Native
	artemisia tripartita ssp. rupicola, wyoming threetip sagebrush	artrr2	3	Native
	cercocarpus montanus, true mountain mahogany	cemo2	20	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
	juniperus communis, common juniper	juco6	1	Native
	purshia tridentata, antelope bitterbrush	putr2	1	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	1	Native
		<i>Total</i>	28	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	3	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	10	Native
	festuca idahoensis, idaho fescue	feid	3	Native
	hesperostipa comata, needle and thread	heco26	3	Native
	koeleria macrantha, prairie junegrass	koma	10	Native
	leucopoa kingii, spike fescue	leki2	3	Native
		<i>Total</i>	32	
	<i>6. Forb</i>			
	arenaria congesta, ballhead sandwort	arco5	3	Native
	cerastium arvense, field chickweed	cear4	1	Native
	galium boreale, northern bedstraw	gabo2	3	Native
	phlox multiflora, flowery phlox	phmu3	3	Native
	selaginella densa, lesser spikemoss	sede2	1	Native
		<i>Total</i>	11	
		<i>Total for Plot</i>	73	

Plot: 01FM20.6

LOCATION

T 27 N, **R** 88W, **Sec** 15 , **SE** 1/4 **sec**

UTM Coordinates: 4,686,086 m N, 307,660 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris three-tip

Sampled on: 08/20/2001

Why was plot done? Illustrate the three-tip sagebrush and grass vegetation on the footslopes of the Ferris Mountains

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

This is a dry meadow with dwarf-shrubs.

Disturbance signs

None noted

Notes

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM20.6	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia tripartita ssp. rupicola, wyoming threetip sagebrush	artrr2	20	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
	dasiphora floribunda, shrubby cinquefoil	daf13	1	Native
		<i>Total</i>	22	
	<i>5. Graminoid</i>			
	elymus spicatus, bluebunch wheatgrass	elsp3	10	Native
	koeleria macrantha, prairie junegrass	koma	10	Native
	leucopoa kingii, spike fescue	leki2	3	Native
		<i>Total</i>	23	
	<i>6. Forb</i>			
	arenaria hookeri, hooker's sandwort	arho4	3	Native
	astragalus spatulatus, tufted milkvetch	assp6	3	Native
	erigeron caespitosus, tufted fleabane	erca2	3	Native
	erigonum flavum, yellow erigonum	erfl4	3	Native
	erigonum ovalifolium, cushion buckwheat	erov	3	Native
	mertensia, bluebells	merte	1	Native
	phlox multiflora, flowery phlox	phmu3	3	Native
	selaginella densa, lesser spikemoss	sede2	3	Native
	trifolium, clover	trifo	3	Unknown
		<i>Total</i>	25	
		<i>Total for Plot</i>	70	

Plot: 01FM20.8

LOCATION

T 27 N, **R** 88W, **Sec** 22 , **SE** 1/4 **sec**

UTM Coordinates: 4,685,126 m N, 306,766 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris three-tip

Sampled on: 08/20/2001

Why was plot done? To illustrate the three-tip sagebrush vegetation around the Ferris Mountains

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

This is a dry meadow in the conifer forest, dominated by graminoids, forbs, and dwarf-shrubs.

Disturbance signs

none recorded

Notes

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM20.8	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia tripartita ssp. rupicola, wyoming threetip sagebrush	artrr2	10	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
		<i>Total</i>	<i>11</i>	
	<i>5. Graminoid</i>			
	elymus spicatus, bluebunch wheatgrass	elsp3	10	Native
	festuca idahoensis, idaho fescue	feid	10	Native
	koeleria macrantha, prairie junegrass	koma	10	Native
	poa secunda, sandberg bluegrass	pose	10	Native
		<i>Total</i>	<i>40</i>	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	3	Native
	cerastium arvense, field chickweed	cear4	3	Native
	comandra umbellata, bastard toadflax	coum	3	Native
	lupinus depressus, depressed lupine	lude3	3	Native
	mertensia, bluebells	merte	3	Native
	selaginella densa, lesser spikemoss	sede2	3	Native
	thermopsis, thermopsis	therm	3	Native
		<i>Total</i>	<i>21</i>	
		<i>Total for Plot</i>	<i>72</i>	

Plot: 01FM20.9

LOCATION

T 27 N, **R** 88W, **Sec**21 , **NE 1/4 sec**

UTM Coordinates: 4,685,715 m N, 306,058 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris three-tip

Sampled on: 08/20/2001

Why was plot done? To illustrate the three-tip sagebrush vegetation in the Ferris Mountains

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short (15 cm tall) vegetation of graminoids, forbs, and dwarf-shrubs

Disturbance signs

Cattle droppings are present

Notes Surface deposit probably is a mixture of residuum, colluvium, and alluvium

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM20.9	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia tripartita ssp. rupicola, wyoming threetip sagebrush	artrr2	20	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
		<i>Total</i>	<i>21</i>	
	<i>5. Graminoid</i>			
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	festuca idahoensis, idaho fescue	feid	3	Native
	koeleria macrantha, prairie junegrass	koma	10	Native
	leucopoa kingii, spike fescue	leki2	10	Native
	poa secunda, sandberg bluegrass	pose	10	Native
		<i>Total</i>	<i>36</i>	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	10	Native
	erigeron caespitosus, tufted fleabane	erca2	3	Native
	heterotheca villosa, hairy goldenaster	hevi4	3	Native
	phlox hoodii, hoods phlox	phho	3	Native
	phlox multiflora, flowery phlox	phmu3	10	Native
		<i>Total</i>	<i>29</i>	
		<i>Total for Plot</i>	<i>86</i>	

Plot: 01FM21.1

LOCATION

T 27 N, **R** 88W, **Sec** 24 , NE 1/4 sec

UTM Coordinates: 4,685,556 m N, 301,727 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris three-tip

Sampled on: 08/20/2001

Why was plot done? To illustrate the composition of the grass vegetation at the foot of the Ferris Mountains

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short herbaceous vegetation with dwarf-shrubs. Common species are *Koeleria macrantha*, *Poa secunda*, *Antennaria microphylla*, *Arenaria hookeri*, *Artemisia tripartita* ssp. *tripartita*

Disturbance signs

None reported

Notes Surface deposit probably is a mix of alluvium and colluvium

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM21.1	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia tripartita ssp. rupicola, wyoming threetip sagebrush	artrr2	10	Native
	ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	ernan3	1	Native
		<i>Total</i>	<i>11</i>	
	<i>5. Graminoid</i>			
	festuca idahoensis, idaho fescue	feid	3	Native
	koeleria macrantha, prairie junegrass	koma	10	Native
	poa secunda, sandberg bluegrass	pose	10	Native
		<i>Total</i>	<i>23</i>	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	3	Native
	arenaria hookeri, hooker's sandwort	arho4	10	Native
	cerastium arvense, field chickweed	cear4	3	Native
	mertensia, bluebells	merte	3	Native
	selaginella densa, lesser spikemoss	sede2	10	Native
		<i>Total</i>	<i>29</i>	
		<i>Total for Plot</i>	<i>63</i>	

Plot: 01FM21.2

LOCATION

T 27 N, **R** 88W, **Sec** 24 , **SE** 1/4 **sec**

UTM Coordinates: 4,685,077 m N, 311,174 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris herbaceous

Sampled on: 08/20/2001

Why was plot done? To illustrate the composition of open woodlands, or grasslands with scattered trees, at the foot of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Sparse to moderately dense bunchgrass vegetation with scattered shrubs and pine trees. Common species are *Elymus spicatus*, *Leucopoa kingii*, *Antennaria* sp., *Phlox multiflora*, *Artemisia tripartita* ssp. *tripartita*, and *Pinus flexilis*.

Disturbance signs

None reported

Notes Surface deposit probably is a mixture of residuum and colluvium

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM21.2	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	pinus flexilis, limber pine	pifl2	3	Native
		<i>Total</i>	3	
	<i>2. Shrub</i>			
	artemisia tripartita ssp. rupicola, wyoming threetip sagebrush	artrr2	3	Native
	ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	ernan3	1	Native
	juniperus communis, common juniper	juco6	1	Native
	ribes cereum, wax currant	rice	1	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	1	Native
		<i>Total</i>	7	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	3	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	10	Native
	festuca idahoensis, idaho fescue	feid	3	Native
	leucopoa kingii, spike fescue	leki2	10	Native
		<i>Total</i>	26	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	3	Native
	arenaria nuttallii, nuttall's sandwort	arnu5	3	Native
	mertensia, bluebells	merte	3	Native
	phlox multiflora, flowery phlox	phmu3	3	Native
	selaginella densa, lesser spikemoss	sede2	3	Native
		<i>Total</i>	15	
		<i>Total for Plot</i>	51	

Plot: 01FM21.3

LOCATION

T 27 N, **R** 87W, **Sec** 19 , SW 1/4 sec

UTM Coordinates: 4,684,714 m N, 311,424 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris herbaceous

Sampled on: 08/20/2001

Why was plot done? To illustrate the composition of the vegetation in herbaceous patches within the forests of the Ferris Mountains.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short, wind-blown herbaceous vegetation with some dwarf-shrubs. *Elymus spicatus* dominates the herbaceous layer in the saddle and on the west-facing slopes, and *Festuca idahoensis* dominates on the north- and east-facing slopes.

Disturbance signs

None recorded

Notes Substrate is mostly granitic with some mafic Pre-Cambrian rock.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM21.3	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	pinus flexilis, limber pine	pifl2	1	Native
		<i>Total</i>	<i>1</i>	
	<i>2. Shrub</i>			
	artemisia tripartita ssp. rupicola, wyoming threetip sagebrush	artrr2	3	Native
		<i>Total</i>	<i>3</i>	
	<i>5. Graminoid</i>			
	elymus spicatus, bluebunch wheatgrass	elsp3	10	Native
	festuca idahoensis, idaho fescue	feid	3	Native
	koeleria macrantha, prairie junegrass	koma	3	Native
	poa secunda, sandberg bluegrass	pose	3	Native
		<i>Total</i>	<i>19</i>	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	3	Native
	arenaria congesta, ballhead sandwort	arco5	3	Native
	arenaria hookeri, hooker's sandwort	arho4	3	Native
	astragalus spatulatus, tufted milkvetch	assp6	3	Native
	erigonum ovalifolium, cushion buckwheat	erov	3	Native
	selaginella densa, lesser spikemoss	sede2	10	Native
		<i>Total</i>	<i>25</i>	
		<i>Total for Plot</i>	<i>48</i>	

Plot: 01FM21.4

LOCATION

T 27 N, **R** 87W, **Sec** 19 , SW 1/4 sec

UTM Coordinates: 4,684,723 m N, 311,734 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris herbaceous

Sampled on: 08/20/2001

Why was plot done? To illustrate the herbaceous vegetation with scattered trees growing on steep, west-facing slopes of spur ridges in the Ferris Mountains

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Bunchgrasses and forbs with lots of *Selaginella densa* and scattered trees. *Elymus spicatus*, Apiaceae, Phlox multiflora, *Holodiscus dumosus*, *Symphoricarpos oreophilus*, and others are common species.

Disturbance signs

Fallen trees (*Pinus flexilis*?), very old.

Notes Substrate is a mix of granitic and mafic Pre-Cambrian rocks.

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM21.4	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>1. Tree</i>			
	pinus flexilis, limber pine	pifl2	1	Native
	pseudotsuga menziesii, douglas fir	psme	1	Native
		<i>Total</i>	<i>2</i>	
	<i>2. Shrub</i>			
	artemisia tripartita ssp. rupicola, wyoming threetip sagebrush	artrr2	3	Native
	holodiscus dumosus, rockspirea	hodu	3	Native
	juniperus communis, common juniper	juco6	1	Native
	ribes cereum, wax currant	rice	3	Native
	symphoricarpos oreophilus, whortleleaf snowberry	syor2	3	Native
		<i>Total</i>	<i>13</i>	
	<i>5. Graminoid</i>			
	elymus spicatus, bluebunch wheatgrass	elsp3	10	Native
		<i>Total</i>	<i>10</i>	
	<i>6. Forb</i>			
	arenaria congesta, ballhead sandwort	arco5	3	Native
	mertensia, bluebells	merte	3	Native
	phlox multiflora, flowery phlox	phmu3	3	Native
	potentilla fissa, bigflower cinquefoil	pofi3	3	Native
	ptyryxia hendersonii, henderson's wavewing	pthe	3	Native
	selaginella densa, lesser spikemoss	sede2	3	Native
		<i>Total</i>	<i>18</i>	
		<i>Total for Plot</i>	<i>43</i>	

Plot: 01FM21.5 **LOCATION**

T 27 N, **R** 87W, **Sec** 18 , SW 1/4 sec

UTM Coordinates: 4,686,280 m N, 311,622 m E

Projection NAD 27 **Zone** 13N

Map name Youngs Pass

Scale 1:24,000

DESCRIPTION

Plot Group: Ferris herbaceous

Sampled on: 08/20/2001

Why was plot done? Illustrate composition of the matrix grassland at the foot of the Ferris Mountains

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Short grass vegetation with dwarf-shrubs. Common species are *Elymus spicatus*, *Koeleria macrantha*, *Poa secunda*, *Antennaria microphylla*, *Arenaria hookeri*, *Artemisia tripartita* ssp. *tripartita*, *Artemisia nova*.

Disturbance signs

None reported

Notes

Elevation 7,220 ft **Aspect** 250 **Slope** 10 **Topo. Position:**

Soil Texture Sandy Loam

Soil features Gravel is common. 1 hand-texture of surface 10 cm

Surface deposit Colluvial

Plot	01FM21.5	CANOPY COVER		
	<u>Scientific Name</u>	<u>NRCS Code</u>	<u>Cover Class</u>	<u>Origin</u>
	<i>2. Shrub</i>			
	artemisia nova, black sagebrush	arno4	3	Native
	artemisia tripartita ssp. rupicola, wyoming threetip sagebrush	artrr2	3	Native
	chrysothamnus viscidiflorus ssp. viscidiflorus, yellow rabbitbrush	chviv2	1	Native
	ericameria nauseosa ssp. nauseosa, rubber rabbitbrush	ernan3	1	Native
		<i>Total</i>	8	
	<i>5. Graminoid</i>			
	carex rossii, ross' sedge	caro5	3	Native
	elymus spicatus, bluebunch wheatgrass	elsp3	3	Native
	festuca idahoensis, idaho fescue	feid	3	Native
	koeleria macrantha, prairie junegrass	koma	3	Native
	poa secunda, sandberg bluegrass	pose	3	Native
		<i>Total</i>	15	
	<i>6. Forb</i>			
	antennaria microphylla, littleleaf pussytoes	anmi3	10	Native
	arenaria hookeri, hooker's sandwort	arho4	3	Native
	selaginella densa, lesser spikemoss	sede2	3	Native
		<i>Total</i>	16	
		<i>Total for Plot</i>	39	

Plot: 01FER01.30

LOCATION

T 26 N, **R** 87 W, **Sec** 6 , NE 1/4 sec

Map name Youngs Pass

DESCRIPTION

Plot Group:

Sampled on: 8/19/2001

Why was this plot done? To illustrate the composition and structure of aspen woodland in the Ferris Mountains WSA.

Uncertainty on measurements

Completeness of Spp lists Only the common species were recorded

Describe vegetation

Populus tremuloides 10 - 15 cm dbh and to 15 m tall dominate a tree overstory that contains some Pinus flexilis and Pseudotsuga menziesii. Overstory canopy cover is ca. 50%. Windthrow gaps are common. Snags are common. Many of the live trees have elk bite-marks and weeping wounds. Downed logs, mostly P. tremuloides, are common. Seedlings and saplings of Pinus flexilis, Abies lasiocarpa, and Pseudotsuga menziesii are present (especially in patches beneath canopy gaps) but P. tremuloides suckers are rare. Juniperus communis forms a shrub layer of 40% cover. The herbaceous undergrowth consists of Elymus trachycaulus ssp. trachycaulus, Bromus marginatus, Perideridia gardneri, Achnatherum nelsonii var. dorei, Carex rossii, Mahonia repens, and additional species. NO VEGETATION TABLE RECORD WAS ENTERED FOR THIS PLOT.

Disturbance signs

Old cattle droppings present in stand. A camp (probably hunting camp) has been located at the north end of the stand, and sawn logs are present in the stand near the camp.

Notes This aspen patch grows in a matrix of Artemisia tridentata ssp. vaseyana shrub vegetation. A patch of Pseudotsuga menziesii - Pinus flexilis woodland grows down-slope to the east.

Elevation 8,360 ft **Aspect** 225 **Slope** 5 **Topo. Position:**

APPENDIX 2. NOTES FROM OBSERVATION POINTS IN THE FERRIS MOUNTAINS WSA.

Notes were recorded by G. Jones, Aug 19 - 21 and Sept 19 & 20, 2001.

***Pinus flexilis* (Limber Pine) Woodlands**

Observation Point 19. NW ¼ NW ¼ Sec 33, T27N, R88W. South-facing slopes ca. 7700 feet elevation. Riparian zone along Indian Creek, upstream from two-track road. *Pinus flexilis* and *Juniperus scopulorum* form an open overstory that also contains some *Betula occidentalis* and *Salix bebbiana*. *Ribes oxycanthoides* is present in places. *Deschampsia cespitosa*, *Carex nebrascensis*, *Agrostis stolonifera*, gentian, *Trifolium* sp. are common in the herbaceous layer.

Observation Point 25. NE ¼ NW ¼ and NW ¼ NE ¼ Sec 1, T 26N, R88W. Elevation 7900 - 8000 feet, on south-facing slopes. Scattered *Pinus flexilis* and *Juniperus scopulorum* grow above a shrub layer of *Artemisia nova* and *Artemisia tridentata* ssp. *vaseyana*.

Observation Point 102. NE ¼ NW ¼ Sec 15, T27N, R88W. Isolated woodland on northwest-facing side of stream valley at 7200 feet elevation. *Pinus flexilis* trees to 10 m tall and 6" - 8" dbh form an open overstory. *Pinus flexilis* saplings and seedlings are common in the understory. The undergrowth consists mainly of *Artemisia tridentata* ssp. *vaseyana*, *Artemisia nova*, *Leucopoa kingii*, *Antennaria microphylla*, and *Carex rossii*, with small amounts of *Artemisia tripartita* ssp. *rupicola*, *Festuca idahoensis*, and *Achnatherum nelsonii* var. *dorei*.

Observation Point 115. SE ¼ NE ¼ Sec 22, T27N, R88W. North- and northeast-facing slopes at ca. 8200 feet elevation, on sandstone substrate. *Pinus flexilis* and *Pseudotsuga menziesii* form an open overstory above a low shrub layer of *Juniperus communis*, *Artemisia tridentata* ssp. *vaseyana* and a sparse herbaceous layer of *Elymus spicatus*, *Achnatherum* sp, and others. Many dead *Pinus flexilis* are present.

Observation Point 124. NW ¼ Sec 17, T27N, R88W. Isolated woodland on north-facing slope at ca. 7700 feet elevation. *Pinus flexilis* and *Pseudotsuga menziesii* form a tree overstory. Beneath the most open overstory is a low shrub layer of *Artemisia tridentata* ssp. *vaseyana* and *Cercocarpus montanus*. Beneath the more dense overstory, the low shrub layer is dominated by *Symphoricarpos oreophilus* and *Juniperus communis*. Many dead *Pinus flexilis* are present.

Observation Point 134. SW ¼ Sec 19, NW ¼ Sec 30, T27N, R87W. North-facing valley on the north side of the mountains, at 8200 - 8700 feet elevation. Open woodlands of *Pinus flexilis* and *Pseudotsuga menziesii* are mixed with dense forests of *Pinus contorta*.

Observation Point 136. NW ¼ Sec 19, T27N, R87W. Lower treeline on north side of the mountains, at ca. 7800 feet elevation. *Pinus flexilis* and *Pseudotsuga menziesii*, many of them saplings, form an open overstory above an understory of *Pinus flexilis* and *Pseudotsuga menziesii* seedlings, a sparse shrub layer of *Symphoricarpos oreophilus* and *Holodiscus dumosus*, and a sparse herbaceous layer of *Leucopoa kingii*, *Cymopterus longilobus*, and *Elymus spicatus*. Many of the *Pinus flexilis* in the overstory are dead.

***Pseudotsuga menziesii* (Douglas-fir) Woodlands and Forests**

Observation Point 14. SE ¼ SE ¼ Sec 29, T27N, R88W. Upper 50 m of *Pseudotsuga menziesii* stand on steep, north-facing slope, on limestone substrate. *Pseudotsuga menziesii* are mostly < 6" dbh, and < 10 m tall, but some are up to 12" dbh and 15 m tall. Larger trees have fire scars. Sparse undergrowth of *Juniperus communis*, *Symphoricarpos oreophilus* is present.

Observation Point 16. SW ¼ SW ¼ Sec 28, T27N, R88W. On south-facing slopes, woodland is *Pseudotsuga menziesii* over an undergrowth of *Artemisia tridentata* ssp. *vaseyana* -- essentially the

mountain big sagebrush shrub vegetation with an overstory of *Pseudotsuga menziesii*. On north-facing slopes, the woodland is *Pseudotsuga menziesii* over a sparse undergrowth of *Juniperus communis*.

Observation Point 20. SW 1/4 SE 1/4 Sec 28, T27N, R88W. Riparian zone along Birch Creek. *Pseudotsuga menziesii* forest with *Populus tremuloides* and a few *Picea engelmannii* in the overstory. *Betula occidentalis* grows throughout and is the most common shrub. *Acer glabrum* is common, and a few *Salix bebbiana* are present. Beneath the taller shrubs are *Rosa* sp., *Ribes oxycanthoides*, and a trace of *Cornus sericeus*. *Aster foliaceus* is common.

Observation Point 21. NW 1/4 NE 1/4 Sec 33, T27N, R88W. Dry part of canyon bottom, above Birch Creek. *Pseudotsuga menziesii* overstory above and undergrowth of *Juniperus communis*, *Mahonia repens*, *Poa pratensis*, *Elymus trachycaulus* ssp. *trachycaulus*, *Achnatherum nelsonii* var. *dorei*.

Observation Point 23. NW 1/4 SE 1/4 Sec 31, T27N, R87W. Canyon of Muddy Creek. *Pseudotsuga menziesii* forest of trees < 4" dbh and 5 - 6 m tall, with snags throughout. Undergrowth is sparse *Artemisia tridentata* ssp. *vaseyana* and *Juniperus communis*.

Observation Point 26. South side of Ferris Mountains above Muddy Creek. Open woodlands on sandstone and limestone are composed of *Pseudotsuga menziesii* and *Pinus flexilis*, with lots of *Artemisia tridentata* ssp. *vaseyana* beneath.

Observation Point 109. SW 1/4 SE 1/4 Sec 15, T27N, R88W. Elevation 7600 - 7800 feet. N-facing slope. Dense stand of *Pseudotsuga menziesii* of mixed sizes but most ≤ 6 " dbh. Fallen trunks, some burned, are common. Undergrowth all be absent; a few *Leucopoa kingii*, *Symphoricarpos oreophilus*, *Rubus idaeus* were noted. This is a stand of saplings in a burn.

Observation Point 111. SW 1/4 SE 1/4 Sec 15, T27N, R88W. Elevation 7800 - 8000 feet. NE-facing slope. *Pseudotsuga menziesii* forest of mixed-size trees, most ≤ 6 " dbh. Dense patches of saplings are mixed with more open patches. The undergrowth is much denser than at 109 but still is sparse (ca. 5% cover), and consists mainly of *Juniperus communis*, *Mahonia repens*, and *Leucopoa kingii*.

Observation Point 113. NE 1/4 NE 1/4 Sec 22 and NW 1/4 NW 1/4 Sec 23, T27N, R88W. Elevation 7900 - 8500 feet. NE-facing slope on limestone substrate. Patches of *Pseudotsuga menziesii* forest grow mixed with herbaceous openings. Overstory is *Pseudotsuga menziesii* and *Pinus flexilis*, mostly 6" - 8" dbh but of various sizes. Undergrowth is all but absent and consists of widely scattered *Juniperus communis*, *Leucopoa kingii*, *Symphoricarpos oreophilus*, *Rubus idaeus*, and a few *Galium boreale*. One small patch had an undergrowth of *Juniperus communis* with 5% - 10% cover.

Observation Point 126. SW 1/4 Sec 17, T27N, R88W. North-facing slope, elevation ca. 7600 - 7800 feet. Viewed through binoculars from the ridge across the valley to the north, ca. 1 mile away. *Pseudotsuga menziesii* forest on limestone, with openings of *Artemisia tridentata* ssp. *vaseyana* with *Cercocarpus montanus* and *Artemisia tripartita* ssp. *rupicola*.

Observation Point 129. NW 1/4 SW 1/4 Sec 8, T27N, R88W. NE-facing slope at 7300 - 7800 feet elevation, on ridge east of Whiskey Gap. Woodland of *Pseudotsuga menziesii* mostly ca. 6" dbh, with stumps (many burned) and a few fallen trunks of larger trees present. The undergrowth is relatively dense (ca. 10% cover) and consists mainly of *Leucopoa kingii*, *Carex geyeri*, and *Symphoricarpos oreophilus*, with some *Carex rossii* and *Poa nervosa*, and a few *Juniperus communis*.

***Pinus contorta* (Lodgepole Pine) Forests and Woodlands**

Observation Point 132. NW ¼ SW ¼ Sec 19, T27N, R87W. North- and northeast-facing slopes at ca. 8300 feet elevation. The upper part of the stand has a dense *Pinus contorta* overstory above an understory of *Abies lasiocarpa* saplings, while the lower part has an overstory of *Pinus flexilis*, *Pseudotsuga menziesii*, *Pinus contorta*, and *Abies lasiocarpa*. The very sparse undergrowth consists of scattered *Juniperus communis*, *Hieracium albiflorum*, *Pyrola secunda*, *Chimaphila umbellata*, and *Arnica cordifolia*.

Observation Point 134. SW ¼ Sec 19, NW ¼ Sec 30, T27N, R87W. North-facing valley on the north side of the mountains, at 8200 - 8700 feet elevation. Dense forests of *Pinus contorta* and mixed with open woodlands of *Pinus flexilis* and *Pseudotsuga menziesii*.

***Abies lasiocarpa* (Subalpine Fir) forests**

Observation Point 25. NW ¼ Sec 1, T26N, R88W. South-facing valley of Muddy Creek at ca. 7800 feet elevation. *Abies lasiocarpa* is restricted to the valley bottom along the creek. *Picea engelmannii* also is present.

***Populus tremuloides* (Aspen) woodlands**

Observation Point 105. NE ¼ NE ¼ Sec 15, T27N, R88W. Wetland on upper Cherry Creek at 7100 feet elevation. *Populus tremuloides* trees to 5 m tall forms a woodland mixed with clumps of *Betula occidentalis*, *Salix bebbiana*, *Ribes inerme* (or *R. oxyacanthoides*). The undergrowth in wet areas consists of *Carex nebrascensis*, *Juncus balticus*, *Deschampsia cespitosa*, *Viola* sp., and *Poa pratensis*. In dry areas, the undergrowth is dominated by *Trifolium* sp. and *Taraxacum* sp. The vegetation is heavily grazed and trampled. Many of the shrubs and trees are dead.

***Artemisia tridentata* ssp. *vaseyana* (Mountain Big Sagebrush) Shrub Vegetation**

Observation Point 17. Sw ¼ SW ¼ Sec 28, T27N, R88W. South-facing slopes 8000 - 8200 feet elevation, on sandstone dip slope. *Artemisia tridentata* ssp. *vaseyana*, *Purshia tridentata*, and *Holodiscus dumosus* form a dense shrub layer, with *Pinus flexilis* and *Pseudotsuga menziesii* scattered in it. *Juniperus communis* is common beneath the trees.

Observation Point 24. NW ¼ NW ¼ Sec 6, T26N, R88W and NW ¼ SW ¼ Sec 31, T27N, R88W. South-facing slopes at ca. 8000 feet elevation, on sandy soil. *Artemisia tridentata* ssp. *vaseyana* dominates a shrub layer in which *Symphoricarpos oreophilus* is common, but *Purshia tridentata* is absent. Common herbaceous species are *Achnatherum nelsonii* var. *dorei*, *Poa pratensis*, *Aster glaucodes*, *Lupinus* sp., and *Arenaria congesta*. *Pinus flexilis* and *Juniperus scopulorum* are scattered throughout.

Observation Point 25. NW ¼ and NE ¼ Sec 25, T28N, R88W. *Artemisia tridentata* ssp. *vaseyana* shrub vegetation, with structure and species composition varying on different landscape positions.

-- Protected draws. *Artemisia tridentata* ssp. *vaseyana* forms a shrub layer at least 1 m tall, with 15% - 25% cover. *Symphoricarpos oreophilus*, ca. 0.5 m tall, is present (\leq 5% cover). The undergrowth consists mainly of *Achnatherum nelsonii* var. *dorei*, *Poa pratensis*, *Elymus trachycaulus* ssp. *trachycaulus*, *Mertensia* sp., *Melica bulbosa*, *Mahonia repens*, and *Achillea millefolium*.

-- Sheltered slopes. The *Artemisia tridentata* ssp. *vaseyana* shrub layer is 0.5 m to 1 m tall and has 15% - 25% cover, and *Symphoricarpos oreophilus* 0.5 m tall is present. The herbaceous layer consists mainly of *Balsamorhiza sagittata*, *Elymus spicatus*, *Carex rossii*, *Antennaria microphylla*, *Achnatherum nelsonii* var. *dorei*, and others.

-- Exposed slopes. *Artemisia nova* and *Artemisia tridentata* ssp. *vaseyana* co-dominate a low shrub layer 0.3 m tall with 25% - 35% cover. Common herbaceous species are *Elymus spicatus*, *Carex rossii*, *Koeleria macrantha*, and *Arenaria congesta*. *Balsamorhiza sagittata* is present.

Observation Point 26. NW ¼ Sec 6, T26N, R88W. South-facing slopes on foothills at 8000 - 8200 feet elevation. *Artemisia tridentata* ssp. *vaseyana* forms a shrub layer with very little *Artemisia nova* or *Purshia tridentata*. Patches of *Pinus flexilis* and *Pseudotsuga menziesii* woodland are scattered throughout.

Observation Point 114. NW ¼ Sec 23, T27N, R88W. Northeast-facing foothills at 7700 - 7900 feet elevation. *Artemisia tridentata* ssp. *vaseyana*, *Symphoricarpos oreophilus*, and *Purshia tridentata* form an open shrub layer above an undergrowth of *Artemisia tripartita* ssp. *rupicola*, *Elymus spicatus*, *Carex rossii*, *Antennaria microphylla*, *Thermopsis* sp., and other species.

Observation Point 127. SE ¼ SE ¼ Sec 7, T27N, R88W. Foot of southwest-facing slopes at 7400 - 7600 feet elevation. *Artemisia tridentata* ssp. *vaseyana* and *Purshia tridentata* form a shrub layer above an undergrowth of low-growing shrubs, grasses, and forbs. *Cercocarpus montanus* shrub stands grow on the higher slopes above.

Observation Point 129.

-- SW ¼ Sec 8, T26N, R88W. Steep, east-facing slopes on sides of draws, on Pre-Cambrian talus. *Artemisia tridentata* ssp. *vaseyana* and *Purshia tridentata* form an open shrub layer above a sparse undergrowth of *Elymus spicatus* and *Selaginella densa*.

-- SE ¼ Sec 8, T26N, R88W. Draws flowing north from ridge, at 7600 - 7800 feet elevation. *Artemisia tridentata* ssp. *vaseyana* and *Purshia tridentata* form a dense shrub layer ca. 0.75 m tall, with an undergrowth dominated by *Elymus spicatus* and *Achnatherum nelsonii* var. *dorei*.

***Cercocarpus montanus* (True Mountain Mahogany) Shrub Vegetation**

Observation Point 103. NW ¼ NE ¼ Sec 15, T27N, R88W. Northwest-facing slope on side of draw at 7100 feet elevation. *Cercocarpus montanus* and *Artemisia tridentata* ssp. *vaseyana* 0.75 m tall dominate the shrub layer in a small stand, which also includes *Purshia tridentata*, *Ericameria nauseosa*, and *Symphoricarpos oreophilus*. Scattered *Pinus flexilis* sapling are present. *Artemisia nova* is common beneath the taller shrubs. Common herbaceous species are *Carex rossii*, *Phlox multiflora*, *Koeleria macrantha*, *Elymus spicatus*, and *Leucopoa kingii*. *Chrysothamnus viscidiflorus* is present. The herbaceous vegetation has been heavily grazed. This shrub patch adjoins a small *Pinus flexilis* grove lower on the slope.

Observation Point 127. SE ¼ SE ¼ Sec 7, T27N, R88W. Upper parts of southwest-facing slopes at 7400 - 7700 feet elevation. *Cercocarpus montanus* dominates a shrub layer that contains small amounts of *Juniperus scopulorum*, *Amelanchier alnifolia*, and *Ericameria nauseosa*. The undergrowth is strongly dominated by *Elymus spicatus*, with some *Artemisia tridentata* ssp. *vaseyana*, *Achnatherum hymenoides*, and *Carex rossii*. Scattered *Pinus flexilis* and *Pseudotsuga menziesii* are present, both as individual trees and as small groups of trees.

***Artemisia nova* (Black Sagebrush) Shrub-Steppe**

Observation Point 25. NW ¼ and NE ¼ Sec 25, T28N, R88W. On exposed slopes, *Artemisia nova* and *Artemisia tridentata* ssp. *vaseyana* co-dominate a low shrub layer 0.3 m tall with 25% - 35% cover. Common herbaceous species are *Elymus spicatus*, *Carex rossii*, *Koeleria macrantha*, and *Arenaria*

congesta. *Balsamorhiz sagittata* is present. Nearby sheltered slopes and draws have taller *Artemisia tridentata* ssp. *vaseyana* shrub vegetation.

Observation Point 114. NW ¼ Sec 23, T27N, R88W. Northeast-facing foothills at 7700 - 7900 feet elevation. *Artemisia nova* shrub-steppe vegetation forms the matrix on the north footslopes, within which grow cushion plant - grass vegetation on ridgetops, *Artemisia tridentata* ssp. *vaseyana* shrub patches in draws, and scattered *Pinus flexilis* woodlands.

Observation Point 138. SE ¼ Sec 13 and NE ¼ Sec 24, T27N, R88W. North footslopes of Ferris Mountains at 7400 - 7500 feet elevation. *Artemisia nova* and *Artemisia tripartita* ssp. *rupicola* are present throughout the shrub-steppe vegetation. *Artemisia nova* dominates on the ridgetops and west-facing slopes, and *Artemisia tripartita* ssp. *rupicola* dominates on east-facing slopes and other locations sheltered from the west wind.

***Artemisia tripartita* ssp. *rupicola* (Three-tip Sagebrush) Shrub-Steppe**

Noticed virtually no *Artemisia tripartita* ssp. *rupicola* on the south side of the Ferris Mountains

Observation Point 110. SW ¼ SE ¼ Sec 15, T27N, R88W. Openings on north-facing limestone or sandstone slopes at 7700 - 7900 feet elevation. Short vegetation is dominated by *Artemisia tripartita* ssp. *rupicola*, *Elymus spicatus*, *Leucopoa kingii*, and *Festuca idahoensis*. Resembles the undergrowth in the *Cercocarpus montanus* vegetation lower on slope (plot 01FM20.5).

Observation Point 138. SE ¼ Sec 13 and NE ¼ Sec 24, T27N, R88W. North footslopes of Ferris Mountains at 7400 - 7500 feet elevation. *Artemisia tripartita* ssp. *rupicola* and *Artemisia nova* are present throughout the shrub-steppe vegetation. *Artemisia tripartita* ssp. *rupicola* dominates on east-facing slopes and other locations sheltered from the west wind, and *Artemisia nova* dominates on the ridgetops and west-facing slopes.

Riparian Shrub Vegetation

Many of the *Betula occidentalis* along all streams are dead.

Observation Point 17. SW ¼ Sec 28, T27N, R88W. Indian Creek in south-facing valley. *Betula occidentalis* shrub stands are mixed with *Populus tremuloides* groves. *Salix bebbiana*, *Pinus flexilis*, and a few *Populus angustifolia* are present. Meadows also are present.

Observation Point 22. SW ¼ Sect 34, T27N, R88W. Cottonwood Creek in south-facing valley at 7400 - 7600 feet elevation. *Betula occidentalis* dominates a tall shrub layer. *Juniperus scopulorum* and *Populus tremuloides* are common and *Populus angustifolia* is present.

Observation Point 26. NE ¼ Sec 1, T26N, R88W. Muddy Creek in south-facing valley. *Juniperus scopulorum* and *Betula occidentalis* dominate a tall shrub layer that contains *Populus tremuloides*, *Pinus flexilis* and *Salix bebbiana*. *Ribes* sp., *Juniperus communis*, and *Symphoricarpos oreophilus* are present beneath the taller shrubs. Common undergrowth species in wet places are *Agrostis stolonifera*, *Deschampsia cespitosa*, *Aster foliaceus* (?), and some *Carex nebrascensis* is wet places; in dry places, common species are *Poa pratensis* and *Achillea millefolium*.

Riparian Meadows

Observation Point 17. SW ¼ Sec 28, T27N, R88W. Indian Creek in south-facing valley. Common species in a herbaceous meadow are by *Poa pratensis*, *Carex praegracilis*, *Antennaria microphylla*, *Juncus balticus*, *Aster glaucodes*; less common species are *Muhlenbergia richardsonis*, *Achillea millefolium*, *Grindelia squarrosa*, *Lupinus* sp., and *Thermopsis* sp. *Betula occidentalis* shrub stands and *Populus tremuloides* groves are present as well.

Observation Point 105. NE ¼ NE ¼ Sec 15, T27N, R88W. Wetland on upper Cherry Creek at 7100 feet elevation. The undergrowth in wet areas consists of *Carex nebrascensis*, *Juncus balticus*, *Deschampsia cespitosa*, *Viola* sp., and *Poa pratensis*. In dry areas, the undergrowth is dominated by *Trifolium* sp. and *Taraxacum* sp. Clumps of *Betula occidentalis*, *Salix bebbiana*, and *Ribes inerme* (or *R. oxyacanthoides*) are present, as are *Populus tremuloides* trees. The vegetation is heavily grazed and trampled. Many of the shrubs and trees are dead.

Dry Meadows

Observation Point 23. NE ¼ SW ¼ Sec 31, T27N, R88W. Limestone slopes at ca. 8500 feet elevation. Small patches (50 to 60 sq m) of species-rich herbaceous vegetation. Common species include *Leucopoa kingii*, *Arenaria congesta*, *Carex rossii*, *Phlox multiflora*, *Aster glaucodes*, *Astragalus miser*. Also present are *Trisetum spicatum*, *Cirsium pulcherrimum*, *Achnatherum nelsonii* var. *dorei*, *Galium boreale*, *Potentilla ovina* ssp. *ovina*, *Mertensia* sp., *Elymus elymoides*, and *Swertia perennis*.

Observation Point 113. NE ¼ NE ¼ Sec 22 and NW ¼ NW ¼ Sec 23, T27N, R88W. Elevation 7900 - 8500 feet. NE-facing slope on limestone substrate. Patches of herbaceous and low shrub vegetation grow mixed with patches of *Pseudotsuga menziesii* woodland. Common species are *Elymus spicatus*, *Festuca idahoensis*, *Leucopoa kingii*, and *Antennaria microphylla*. *Artemisia tripartita* ssp. *rupicola* and *Artemisia tridentata* ssp. *vaseyana* are present. Scattered *Pseudotsuga menziesii* and *Pinus flexilis* trees and saplings grow in the herbaceous openings.

Observation Point 115. SE ¼ NE ¼ Sec 22, T27N, R88W. Upper part of south-facing slope on limestone, at 8300 - 8400 feet elevation. The dense vegetation is dominated by *Elymus spicatus*, *Leucopoa kingii*, *Carex rossii*, *Artemisia tripartita* ssp. *rupicola* and various forbs. *Artemisia tridentata* ssp. *vaseyana* is present, as are *Pinus flexilis* saplings and seedlings (many dead).

Observation Point 129. SW ¼ Sec 8, T27N, R88W. Openings in *Pseudotsuga menziesii* woodland on north-facing slopes, at 7100 - 7800 feet elevation. The dense, short vegetation is dominated by *Elymus spicatus* and *Festuca idahoensis*, and contains some *Artemisia tripartita* ssp. *rupicola*.

Weeds

Actroptilon repens (syn. *Centaurea repens*), Russian knapweed.

Observation Point 1. NE ¼ NW ¼ Sec 32, T27N, R88W. Elevation ca. 7,600 feet. Approximately 20 stems of *Centaurea repens* grow in area ca. 5 m x 5 m at point where two-track road crosses ephemeral stream channel.

Observation Point 2. NE ¼ NW ¼ Sec 32, T27N, R88W. Elevation ca. 7,700 feet. 30 - 40 stems of *Centaurea repens*, some in flower, grow in an area ca. 3 m x 10 m in outcrops of red sandstone and siltstone on a south-facing slope. The plants are along a jeep trail.

Cirsium arvense, Canada thistle

Observation Point 20. SW ¼ SE ¼ Sec 28, T27N, R88W. Elevation 8100 - 8200 feet. Approximately 100 stems of thistle grow in an area of ca. 100 square meters, in a patch of *Elymus cinereus* on the west side of Birch Creek. Some are in flower.

APPENDIX 3. PHOTOGRAPHS FROM 2001 FIELD SURVEY IN THE FERRIS MOUNTAINS WSA.

Appendix 3 is in a separate digital file, "Ferris_WSA_Appendix_3_Photos.doc."