BOTANICAL SURVEY OF THE RUBY RANGE, MADISON COUNTY, MONTANA DILLON RESOURCE AREA, BUREAU OF LAND MANAGEMENT

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Prepared for:

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Bureau of Land Management
P. O. Box 36800
Billings, MT 59107-6800

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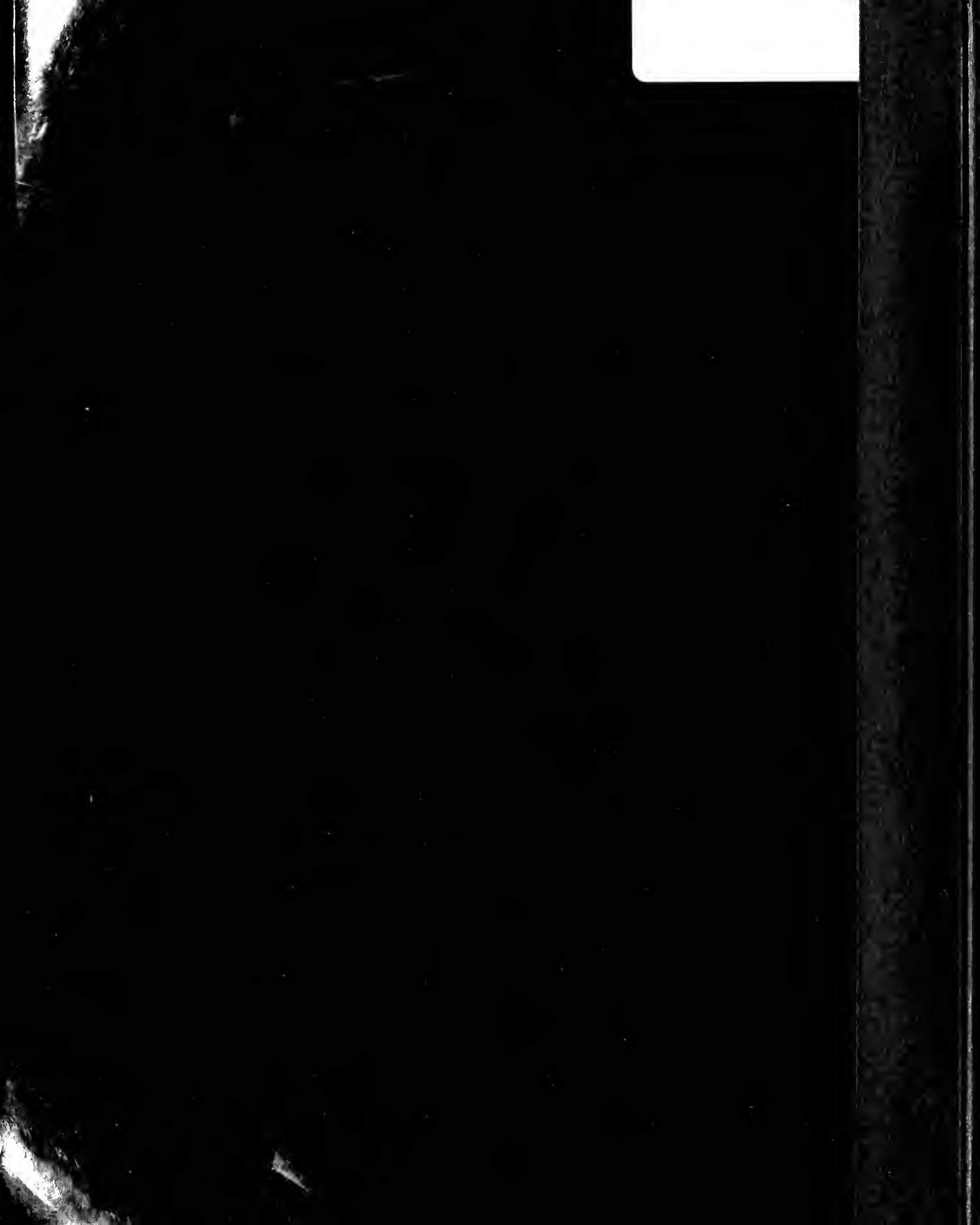

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EXECUTIVE SUMMARY

A botanical survey covering special status plant species and plant communities was conducted in the Ruby Range on lands administered by the Bureau of Land Management (BLM). The results contribute to the body of baseline information on biodiversity features of the Dillon Resource Area and of the state.

Despite being one of Montana's smaller and more arid ranges, the Ruby Range supports appreciable ecological diversity. Twenty plant associations were documented, including five which were not previously known from BLM lands. None are recognized as or recommended for BLM special status designation, but we note that they represent the most extensive and diverse timbered lands in the Resource Area, and that they include one or more stands which may be the best examples of the *Pinus flexilis/Festuca idahoensis* p.a. in southwestern Montana.

Survey of four special status plant species was conducted to recommend that two species be dropped from BLM special status designation. One of the two remaining species, *Lomatium attenuatum*, may be globally imperiled and is in need of further local and rangewide status survey.

In light of the ecology and botany results, the highest botanical diversity documented in the Ruby Range study area rests in the collective landscape and floristic diversity.

DEDICATION

This report is dedicated to Mr. Don Heinze, an inspirational and avid seeker of botanical knowledge.

ACKNOWLEDGEMENTS

We gratefully thank Bureau of Land Management professionals Brian Hockett for project planning and coordination and Sandra Brooks for State Office support. Crucial assistance was received from Margaret Beer (data management), Debbie Dover (data processing), and Cedron Jones (GIS mapping) at Montana Natural Heritage Program. The project was funded by a challenge cost-share agreement between the Bureau of Land Management and Montana Natural Heritage Program.

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Panorama from Ruby Mountain looking north; south facing slopes supporting xeric *Pinus flexilis*- and *Pseudotsuga menziesii*-dominated communities and including scree slopes, evident as less densely forested areas.

Looking south from southern end of Ruby Range; rolling terrain dominated by *Artemisia tridentata* ssp. *vaseyana*, with *Festuca idahoensis* important component at higher elevations and *Agropyron spicatum* at lower elevations.

Second-growth stand of pole-sized *Pinus contorta* on *Abies lasiocarpa/Linnaea borealis* habitat type in which *Vaccinium scoparium* and *L. borealis* are abundant undergrowth species; even these relatively mesic toeslope positions are only slowly recolonized by *A. lasiocarpa*.

Typical second-growth *Pseudotsuga menziesii/Arnica cordifolia* plant association with *P. menziesii* dominating the overstory and *A. cordifolia* and *Astragalus miser* the undergrowth.

With the exception of cattle trailing, a relatively undisturbed and late successional stand of *Pseudotsuga menziesii/Arnica cordifolia* plant association, showing multiple-aged structure (contrast with previous picture).

Second-growth *Pseudotsuga menziesii/Juniperus communis* plant association at northern end of Ruby Range; because of the high tree canopy cover and xeric site the undergrowth is very depauperate with scattered individuals of *J. communis*.

Ridgetop positions with lithic exposure of limestone are typically occupied by woodlands, in this case an old-growth stand of *Pinus flexilis/Festuca idahoensis* plant association.

Interior view of open, old-growth *Pinus flexilis/Festuca idahoensis* woodland with high herb diversity but low canopy coverage for all but *F. idahoensis*.

Pseudotsuga menziesii /scree type on steep, fractured and unstable limestone; trees are widely scattered *P. menziesii* and *Pinus flexilis* and the undergrowth is extremely depauperate, total cover less than 5%.

This good condition example of *Juniperus scopulorum/ Artemisia nova* plant association, a relatively uncommon vegetation type for Montana, has *Agropyron spicatum* as the herbaceous layer dominant.

Looking down the slope of an alluvial fan on east slope of Ruby Range in the vicinity of Porier Canyon mouth; vast expanses of the fan's upper portion are composed of calcareous outwash and support *Artemisia nova/Agropyron spicatum* in fair to good range condition.

An upper elevation, rolling terrain stand of *Artemisia tridentata* ssp. *vaseyana/Festuca idahoensis* in good to exellent condition, with *F. idahoensis* cover ranging from 40 to 60% and average *A. tridentata* cover about 25%.

Artemisia tridentata ssp. *tridentata/Agropyron smithii* community type on subirrigated terrace; the low cover values for *Elymus cinereus* (and high values for weedy and increaser species) point to it being a putative remnant on a site heavily impacted by past and ongoing cattle use.

Conditions of this high-elevation and windswept site approximate those of the high subalpine as indicated by the presence of the *Festuca idahoensis/Potentilla diversifolia* plant association; *F. idahoensis* , *Carex obtusata*, and *Koeleria macrantha* are the dominant graminoids.

In the foreground is a site burned five years ago and supporting a lush *Festuca idahoensis-Agropyron spicatum* c.t.; in the background is the unburned climax association, *Artemisia tridentata* ssp. *vaseyana/Festuca idahoensis*.

This marly, subirrigated wetland is dominated by *Carex simulata* and *C. praegracilis*. The next outer vegetation zone is characterized by *Juncus balticus* and *Deschampsia cespitosa* and marked cattle induced hummocks. Standing water constitutes about 20% of the surface.

Close-up photograph of *Townsendia florifer*

Habitat of *Townsendia florifer* and *Oryzopsis contracta*

INTRODUCTION

This report describes a botanical study, including ecological plant community sampling and floristic surveys focused on sensitive plants, conducted by the Montana Natural Heritage Program (MTNHP) in the Ruby Range during the summer of 1996. The purpose of ecological sampling was to document the range of vegetation in the study area, to identify unusual and excellent condition types, and to relate the vegetation to the existing literature. The object of sensitive plant surveys was to document BLM sensitive and watch plant species (USDI BLM 1996) which occur in the study area and determine which of these are imperiled and in need of protection and which are not. The results of these studies are essential for incorporating a botanical biodiversity perspective into management of the public lands under BLM domain.

Lands in the Dillon Resource Area, Butte District, have been a focus of baseline botanical studies over the five year history of the BLM botany program. They have been a priority because southwestern Montana has the highest levels of endemism in the state, and because plant species and communities had not been well documented there at low elevations. Ecological sampling throughout the area was incorporated into a matrix of plant community types found on BLM lands throughout the state (Cooper and DeVelice 1995) and culminated in the construction of a vegetation classification for southwestern Montana (Cooper et al. 1995). Baseline botanical surveys for sensitive plants have been conducted in major portions of the Dillon Resource Area including, the Centennial Valley (Culver 1993), the Tendoy Mountains and upper Big Sheep Creek drainage (Vanderhorst and Lesica 1994), Dutchman Mountain (Vanderhorst 1994a), the vicinity of Lemhi Pass (Vanderhorst 1994b), the Horse Prairie Creek Drainage (Vanderhorst 1995a), the Sage Creek drainage (Lesica and Vanderhorst 1995), and the Big Hole Valley, Grasshopper Creek drainage, and upper Madison Valley (Lesica 1994, Heidel and Vanderhorst 1996). This represents the majority of documentation behind the special status species and supporting database for the Dillon Resource Area. Prior to 1996, the Ruby Range remained as one of the last large unsurveyed blocks of BLM land in the Dillon Resource Area, and the study described herein was designed and conducted to fill this gap.

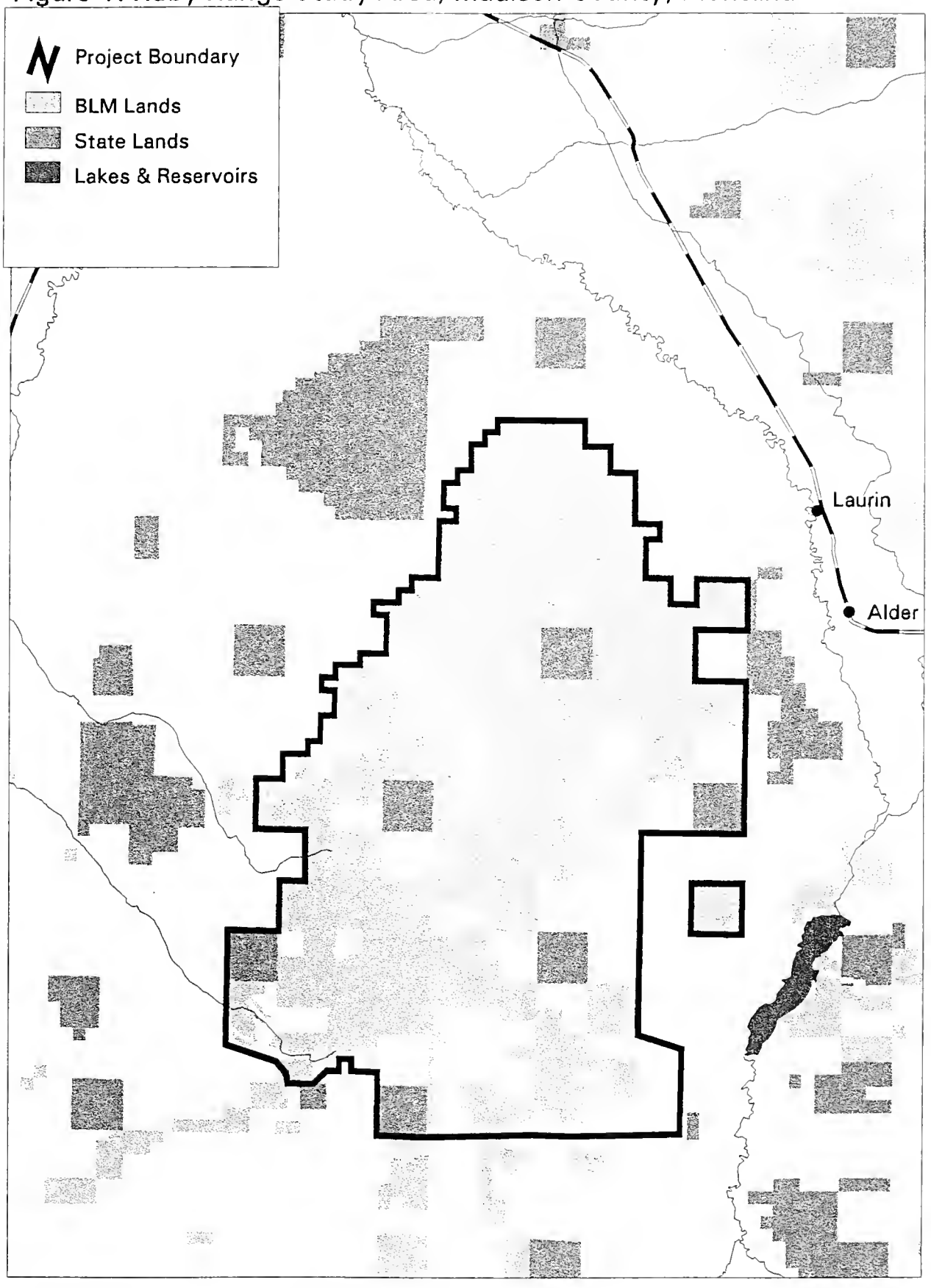
STUDY AREA

Physical Setting

The study area spans the Ruby Range, including BLM lands and some adjacent state and private lands, all north of Township 8 south in southwestern Madison County (Figure 1). The study area is unusual because BLM lands extend to high elevations of the range and do not surround a core of National Forest lands. Thus it represents some of the highest elevation BLM holdings in southwestern Montana. The highest peak in the Ruby Range is within a state owned section. Private lands in the Garden Creek grazing allotment were also included in the study.

The Ruby Mountains are a relatively small range in the basin and range province of southwestern Montana. They cover about 150 square miles and elevations range from about 5,400 ft (1,650 m)

Figure 1. Ruby Range Study Area, Madison County, Montana



Montana Natural Heritage Program, March 11, 1997

Figure 1. Ruby Range Study Area, Madison County, Montana

at the base to about 9,400 feet (2,860 meters) on the highest peak. The eastern slopes drain into the Ruby River Valley which separates the Ruby from the Gravelly and Tobacco Root Mountains to the east. The western slopes drain into the Beaverhead River, whose broad valley separates the Ruby from the Pioneer Mountains to the west. The Blacktail Deer Creek Valley, which drains to the Beaverhead River, separates the Ruby Range from the Blacktail Mountains to the south.

The northern part of the Ruby Range is composed of tightly folded Paleozoic limestone formations which create a steep topography of ridges and canyons. The lower flanks are met by coalesced alluvial fans which descend into the surrounding broad basins. The southern part of the Ruby Range is composed of Precambrian basement rocks (Alt and Hyndman 1986), mostly gneiss and schists, which have weathered to a rolling, hilly topography. The metamorphic basement rocks in the south include significant deposits of talc.

The climate of the study area is continental and semi-arid. Meteorological data from Alder (USDA Soil Conservation Service 1989) approximate the climate of the lowest elevations of the study area. Average daily temperatures range from 21.7° F in January to 63.1° F in July. Temperature extremes range from -32° to 93° F. Average annual precipitation is 12.89 inches, with peak precipitation in May through September. Climate at the higher elevations is cooler and wetter; based on soil types, average precipitation at the higher elevations of the range is probably about 24 inches (USDA Soil Conservation Service 1989). The east flank of the range is dryer than the west flank and the entire range lies in a rain shadow of higher ranges to the west, making it one of the driest ranges in southwestern Montana.

General soil mapping units in the study area include the Whitore-Hanson-Rock outcrop with primarily limestone parent materials in the northern part and the Oro Fino-Hapgood with primarily gneiss and schist parent materials in the southern part (USDA Soil Conservation Service 1989). The soils at the lowest elevations are aridisols, soils of the northern and western mountain slopes are mostly inceptisols and some alfisols, and soils of the southeastern hills are mostly mollisols.

Vegetation

The vegetation of the Ruby Range is mostly dry forest and woodland types, sagebrush shrubland, and grasslands. Timbered habitats are most extensive. Most of the land in the north and on the western flank in the south of the Ruby Range supports forests and woodlands. On the eastern flank in the south, forests and woodlands are mostly confined to northern aspects. The lowest elevations of the range support open Rocky Mountain juniper (*Juniperus scopulorum*) woodlands which grade into sagebrush steppe. Dry, rocky, south facing slopes support mountain mahogany (*Cercocarpus ledifolius*) woodlands or scrub and open stands of Douglas fir (*Pseudotsuga menziesii*) and limber pine (*Pinus flexilis*). Denser stands dominated by Douglas fir are the most extensive forests of the range, and occupy lower to upper cool, mostly north facing slopes. Spruce (*Picea*) communities are confined to moist positions as narrow stringers in canyon bottoms and on high elevation upper slopes; the taxon is generally treated as a hybrid swarm between *P. engelmanii* and *P. glauca*. Seral stands dominated by lodgepole pine (*Pinus contorta*)

are confined to acidic substrates (mostly granites) in the canyons. Old growth limber pine stands occur on southerly aspects at high elevations. The highest elevations support krumholtz spruce and limber pine.

Sagebrush steppe is the dominant vegetation in the foothills and dryer aspects of mountain slopes, extending to relatively high elevations in the southeastern part of the range with rolling topography on metamorphic bedrock. The communities are dominated by subspecies of big sagebrush (*Artemisia tridentata*) and by black sagebrush (*Artemisia nova*) and are usually codominated, under natural conditions, by the native bunch grasses Idaho fescue (*Festuca idahoensis*) and bluebunch wheatgrass (*Agropyron spicatum*). Adjacent to and in mosaics with the sagebrush steppe are scattered grasslands, mostly dominated by Idaho fescue and bluebunch wheatgrass, which occupy areas recently burned, more impacted by wind, or at higher elevations. Needle-and-thread (*Stipa comata*) dominates localized areas of calcareous alluvium at low elevations. Open habitats at the highest elevations are dominated by low-growing hardy forbs and grasses, but there is no true alpine vegetation in the range.

Wetlands in the Ruby Range are confined to springs and narrow riparian corridors along creeks. There is one fen, i.e., alkaline peatland, in the study area on private land at Mud Spring. The other fens which have been documented in the Ruby Valley to date are at lower elevations. Most of the wetland vegetation has been degraded by cattle grazing.

There is a long and extensive history of human-caused disturbance to the vegetation of the Ruby Range by logging, mining, and livestock grazing. Although its forests generally have low timber productivity, the proximity of the range to the goldrush boom towns of the late 1800's resulted in extensive clearcutting of accessible stands at lower and middle elevations. Cutting of timber in the canyons for fuelwood and ranch construction has continued to the present, and there are new logging roads and cutting units on BLM lands in the southwest of the range. A long history of mining is evidenced by scattered abandoned prospects throughout the range and currently there are two active strip mines in the southern end of the study area which are among the world's most economically important sources of talc (Alt and Hyndman 1986). There is also a long history of cattle grazing, continuing to the present, which has had its greatest impacts on sagebrush steppe, grasslands, and riparian vegetation. Many of the canyon bottoms have been reduced to stock driveways with little or no ground cover by vegetation. Grazing has also fostered the spread of exotic weeds. Spotted knapweed (*Centaurea maculosa*) is in early stages of invasion along perimeter boundaries, especially along travel routes used for livestock management and recreation. It has the potential to increase exponentially throughout the Ruby Range.

METHODS

Ecological methods

Vegetation and site characteristics were documented for 23 plots according to methodology described in Cooper et al. (1995). The plots were selected to sample rare and widespread native plant communities in good condition representing the spectrum of elevation, aspects, landforms and lithologies across the Ruby Range. Thirteen mostly lower elevation plots were sampled by Steve Cooper and Bonnie Heidel in July and ten mostly higher elevation plots were sampled by John Pierce in late July and August. Figure 2 shows the location of the 23 plots.

The data set was analyzed using the STRATA program of E.C.A.D.S. (Ecological Classification And Description System), a USDA Forest Service ecological sampling package descendent from ECODATA (Cooper et al. 1995). Based on their compositional similarity to community types/plant associations of published studies, plots were subjectively placed in 16 different types; synthesis and constancy/cover tables (Appendix B) were generated for the taxonomic units. The tables use six letter acronyms to designate plant species by their scientific name. These are the first three letters of the genus name followed by the first three letters of the specific epithet; acronyms of most species in the Ruby Range analysis are listed in Cooper et al. (1995) and a listing of standard acronyms for Montana species are listed in USDA Forest Service (1992).

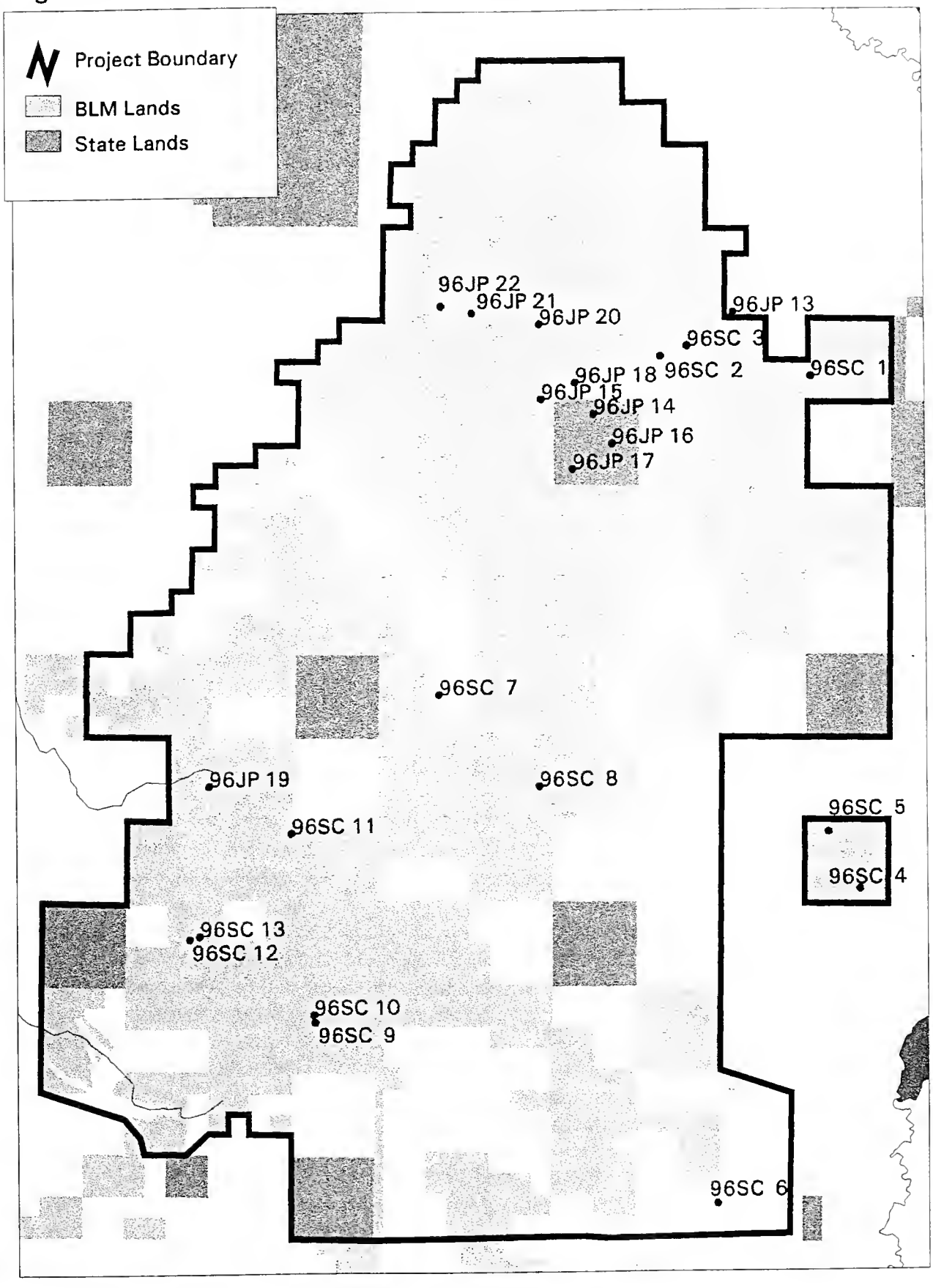
Vegetation Classification: A Perspective

Vegetation classification, long regarded as something of an academic exercise, has come to the forefront as a powerful natural resources management tool. Its utility is predicated on the argument that plant species composition and structure is the most complete integrator of biotic and site (abiotic) conditions and reflects the history of land use as well. More recently, vegetation has been employed as a framework for conservation planning among federal, state, and private organizations. The Nature Conservancy employs communities of native plants as the "coarse filter" for identifying and protecting common species and landscape ecosystems, and rare species as the "fine filter" (Noss 1987).

Vegetation units provide a basis for setting biodiversity conservation priorities, based on rangewide and statewide status. Criteria used include current and historic extent, uniqueness, existing protection and threats. This focus does not preclude, but rather complements the treatment of vegetation for its management values. To enhance its utility in both regards, background information on vegetation classification is summarized in this methods section with the goal of placing results of the inventory in a more fully developed ecological context.

In this report , beginning on pg. 15, we describe 20 vegetation or synecological units. Synecology is the field of ecology that deals with systems of many species, whole communities or major fractions of communities. The kinds of vegetation units recognized are abstract classes, each class being an assemblage of concrete examples, usually represented by samples or plots,

Figure 2. Locations of ECODATA vegetation inventory plots



Montana Natural Heritage Program, January 24, 1997

and based on some characteristics they hold in common. Communities can be classified based on different kinds of parameters, such as growth-form dominance, structure by strata, species composition or dominance based on an abstract grouping of samples "stands."

There are at least 20 schools of synecology (Shimwell 1971) based on different sets of classfication criteria and the accompanying concepts of and terminology for vegetation "organization." In the Inland Northwest and Northern Rocky Mountains, R. Daubenmire originated and applied a widely-used structured hierarchical classification system. The next several paragraphs will explain concepts of this classification because so many of the classifications developed throughout the west are the intellectual lineal descendants of those developed by Daubenmire (e.g. Daubenmire 1970 and Daubenmire and Daubenmire 1968).

Daubenmire is best known for his "habitat type" concept; a habitat type (h.t.) being all those land areas potentially capable of supporting similar plant communities at climax or some long-term stable state. Although this "climax" state is theoretical and seldom develops because of recurring disturbance, the trend toward climax can be identified in the field from an examination of stand age class structure (at least for forest and woodland formations). The climax plant community is the most meaningful index of the environmental factors affecting vegetation because it is the relatively stable concluding stage of plant succession and in dynamic equilibrium with macroclimate. A habitat type represents a discrete segment of the environmental spectrum. Thus the habitat type system has been treated as a land classification system centered around the potential plant community as an integrated bioassay of environmental factors as they affect species reproduction and competitive effects (Pfister and Arno1980, Steele et al. 1981) . Others (Hall 1980, Mueller-Dombois 1964) specify that to function as a management-oriented site or land classification system, habitat types should be more narrowly defined. These authors include landscape features, productivity, and other management-oriented variables in defining taxonomic units (habitat type or plant association).

Habitat types are conveniently named for the potential climax community type, termed plant association (Daubenmire and Daubenmire 1968). For example, *Abies lasiocarpa/Xerophyllum tenax* is the plant association potentially dominated in the tree layer by *A. lasiocarpa* (subalpine fir) and having an undergrowth in which *X. tenax* (beargrass) is diagnostic. In the classification hierarchy, the series (or alliance, TNC) level is denoted by the first Latin binomial; in forest and woodland types this is usually the most shade-tolerant tree adapted to the site. The species may be represented by little cover, but from successional studies and knowing its ecology we can project it to be an important component, the climax dominant. In the simplified ecology of western forests virtual single-species dominance is often the end-point of succession. For shrub- and forb-dominated types the strategy is basically the same but projecting population structure is more problematical. The second part of the type name is that of another indicator species (that may also be a dominant species as well), usually of a lesser lifeform; it is this second portion of the name that confers a higher degree of specificity and designates the association level. Indicators are chosen for their fidelity to a certain portion of the environmental spectrum and usually highly constant occurrence. Occasionally a type will be identified (in keys to types) by multiple and approximately equivalent indicator species, but be named for only one of the suite of indicator species. The presence of a third species name may indicate a phase (and be so noted), usually a minor floristic variation, difference in vegetation dominance in a third layer, or

broad transition between two allied habitat types, or it may simply be incorporated into the plant association name as a further descriptor or name serving to distinguish between similar types.

It should be noted that Daubenmire's concept of plant association differs from that recognized by the International Botanical Congress in that it refers only to late-seral or climax conditions rather than existing vegetation. An association is comprised of all climax stands in which the dominants of corresponding layers are essentially the same, to the extent that any differences in composition are due to chance dissemination or to a transitory historic factor, rather than to a fundamental dissimilarity in habitat potentialities. The plant association is a subjective concept based on those characters at least potentially common to all the separate stands which represent it, and which serve to distinguish the grouping from all other stands. It is abstract in that not all stands comprising it can be studied and we therefore assume that the range and mean characteristics of the inventoried stands represent the entire group. Note that no two stands grouped into one association are ever identical and that soil, macro- and microclimate, and the zoological component may differ from stand to stand, but that their sums produce vegetation groupings with a high degree of similarity.

A problem in classification is posed by all vegetation stages preceding the climax condition. The vast majority of land area included in any one h.t. is recovering from disturbance and thus occupied by seral plant communities which vary due to floristic and recruiting accident (stochastic element), as well as stages of development. In forest/woodland vegetation, where the course of succession is protracted, it is possible to define intermediary and relatively homogeneous stages called "associes" or more commonly known as community types. "Community type" refers to seral vegetation stages or when the seral status of a stand or assemblage of like stands is in question.

There can be a many seral community types resulting from the disturbance of a single plant association. The great strength of classifications reflecting Daubenmire's approach is that they emphasize the fact that intrinsic characteristics of soil and macroclimate remain essentially unaltered during the successive cycles of destruction and regeneration of climaxes. If one accords temporary and climax communities equal weight, then one cannot establish with any degree of precision the relationship between communities and climate and soils. It follows therefore that immature units are most effectively related in classifications to the mature forms they represent. A telling advantage of centering classification on the most stable types that can be found is that it aggregates different successional communities represented by a virtually infinite variety of subtly intergrading stages that all lead to a highly reduced number of stable types. This results in a far more simplified classification than would be the product if all temporal variants of vegetation are treated as equally significant. This is not to say that tracking seral variants is not important, but it expands the scope of work .

Three common misconceptions arising from the use of plant association names, *sensu* Daubenmire, are that: (1) an abundance of climax vegetation is present in the current landscape, (2) we should manage the resource to promote climax vegetation, (3) to apply this classification system requires climax vegetation. The opposite is true in the first two instances: (1) a very high percentage of our forested landscape and a high, but unknown portion of non-forest land reflects some degree of disturbance, resulting in a preponderance of seral stages, (2) in forests and some

shrub-dominated environments, management strategies usually favor seral species, regardless of the plant association. In grasslands, conversely, usually the late-seral/climax species are favored. In the third instance, the misconception is too narrow and we can in fact compare the relative reproductive success of the tree species present with known successional patterns and scrutinize the current undergrowth vegetation to identify the plant association (i.e. habitat type). Where stands have been severely disturbed, are in early seral stages, or at the closed-canopy stage (having depauperate undergrowth vegetation) comparison of the stand with adjacent stands of later seral stages having comparable site factors permits identification of the potential climax vegetation.

Daubenmire and other western vegetation ecologists, who have developed classifications for various geographic and geopolitical entities, have paid scant attention to defining the higher level strata of what is a hierarchical system. However the Nature Conservancy hierarchical classification system, derived a modification of the UNESCO system Driscoll et al. 1973), is well-developed and represents a potential national vegetation classification. Currently it is being reviewed by a committee of the Vegetation Ecology Section of the Ecological Society of America. The floristically-defined vegetation units we have employed fit into the next higher levels (Formation and Group, essentially defined by physiognomic characteristics) of the Nature Conservancy classification.

The current Nature Conservancy hierarchical vegetation classification does not superscede that of Daubenmire but provides an overarching hierarchy, as well as recognition of recurrent seral assemblages, or **community types** (c.t.). in addition to the climax **plant associations** (p.a.) as presented for Montana in "A preliminary vegetation classification of the western United States" (Bourgeron and Engelking 1994).

The following sketches of study area plant associations and community types are arranged by decreasing stature of lifeform and alphabetically within lifeform; the barrens and wetland types are broken out separately due to the uniqueness of their environments. Description is provided of the accompanying environment, soils, and vegetation.

Within the vegetation section, in addition to giving a quick characterization of composition, a comparison between the study area occurrence of the type and other representations of the type throughout the state and western U. S. is made. The constancy-cover tables are useful for comparing the expression of community types on the study area to the named type as it occurs elsewhere. Local expressions in composition are readily appreciated in these comparisons. Two reports that present a preliminary regional synthesis of plant associations/communities across all lifeforms and environments and have dichotomous keys useful for identifying the vegetation types are "Plant communities of northeastern Montana: A first approximation" (DeVelice 1995) and "Classification of southwestern Montana plant communities: Emphasizing those of Dillon Resource Area, Bureau of Land Management" (Cooper et al. 1995). These publications can be consulted as conceptual models and technical references to the various vegetation units on the study area landscape.

Botanical methods

Prior to fieldwork, the Biological Conservation Database maintained by the MTNHP was queried for occurrences of plant species of special concern (Heidel 1996) known from the vicinity of the study area. There was one reported occurrence of *Machaeranthera commixta* near the crest of the range, based on a specimen collected by K. Lackshewitz. A population of *Eleocharis rostellata* was known just outside the study area boundaries at Warm Springs on the west side of Ruby Reservoir. These occurrences and the results of recent extensive botanical surveys in southwestern Montana (listed in the introduction of this report) were used to identify target species and habitats and guide timing of fieldwork.

Surveys for sensitive plants were conducted by Bonnie Heidel on June 2-5 and July 3-5, by John Pierce in late July and early August and and by Jim Vanderhorst on August 21-28. A map showing survey routes in the Ruby Range is provided in Appendix A. When populations of Montana plant species of special concern were encountered, MTNHP field survey forms were filled out and the populations were mapped. Information was recorded on habitat (associated vegetation, landscape position, soils), demography (population numbers and area covered), plant biology (phenology, vigor, reproductive success), and potential threats to the populations.

In the course of ecological and sensitive plant fieldwork, lists of the general flora of the Ruby Range were compiled by all workers. The primary references used to key out plants in the field were Dorn (1984, 1992) and Hitchcock and Cronquist (1973). Specimens were collected when field identification was difficult and to document populations of sensitive and other notable species. Specimens will be deposited at the herbaria of Montana State University (MONT) and University of Montana (MONTU).

Throughout this report the scientific plant names accepted by Dorn (1984) are used, with a few exceptions. To accommodate use with conventional range management references, older taxonomic treatments as presented in Hitchcock and Cronquist (1973) are followed for the wheat and rye grasses (the genera *Agropyron* and *Elymus*). These are lumped, except for crested wheatgrass, *Agropyron cristatum*, under the genus *Elymus* by Dorn (1984), and are split into *Elytrigia, Leymus*, *Pseudoroegneria*, and *Pascopyrum* by other authorities. Synonymy is given, as appropriate, to promote familiarity with the newer names. Synonyms (abbreviated syn.) are also given in the text for species where nomenclature in the constancy/cover tables (Appendix B) differs from Dorn (1984). Dorn's treatment for Montana does not cover infraspecific taxa but the subspecies of big sagebrush, *Artemisia tridentata*, are important ecological indicators and are used to designate southwestern Montana community types (Cooper et al. 1995). Taxonomic keys to these subspecies may be found in Beetle (1982) and in Dorn (1992).

RESULTS AND DISCUSSION

Ecological Results

Fifteen plant associations/community types were sampled in the Ruby Range study area, including nine forest and woodland types, three shrubland types, two grassland types, and one wetland type (Table 1). Each of the sampled types is described in detail in the following sections of this report.

Three of the forest types (ABILAS/ARNCOR, ABILAS/LINBOR, PICEA/SENSTR) and one woodland type (JUNSCO/ARTNOV) were not previously sampled on BLM lands in the Dillon Resource Area (Cooper and DeVelice 1995). This, and the relative high number of forest types documented in the study area reflects the unusually high concentration of forested area for BLM lands in southwestern Montana. The JUNSCO/ARTNOV community type was previously documented by just one plot on Montana BLM land in the Billings Resource Area. This rather small occurrence of JUNSCO/ARTNOV is insufficient to change its state rank from S2, nor does it impact its global rank; however, we are recommending this type be placed on the BLM state Watch List for communities.

Most forest and woodland types in the Ruby Range have a relatively high component of *Pinus flexilis* (limber pine) compared to descriptions of the community types from elsewhere, reflecting the aridity and lithology of the range. *Pinus flexilis* appears to replace *Pinus contorta* (lodgepole pine) as a major seral component in *Picea* (spruce) and *Pseudotsuga menziesii* (Douglas fir) community types on calcareous substrates. *Pinus flexilis* occupies high elevation sites whereas *Pinus albicaulis* (whitebark pine) dominates similar environments in wetter ranges with crystalline bedrock (e.g. the Centennial and Tobacco Root Mountains).

The low number of shrub and grassland types sampled probably underestimates the diversity of potential vegetation of these types in the study area. These are the habitats most heavily impacted by cattle grazing, thus, finding examples in good condition for sampling was difficult. The sampled plots tend to have steeper slopes than average for the types, or are grazing disclimaxes. The exception to these observations is the *Artemisia nova/Agropyron spicatum* plant association of the upper bajada on the east slope of the Ruby Range that is in good condition, probably owing to its distance from a consistent water source. This additional knowledge may be sufficient to rank this community as secure within the state, S5.

The wetland *Carex simulata* community type was sampled on private land in the study area but has not to date been documented on BLM land in Montana (Cooper and DeVelice 1995). The relative uniqueness of this type at low elevations on private lands mostly below BLM holdings points to an opportunity for conservation, or at least a need to inventory more low-elevation habitat for communities of this nature.

In addition to the sampled types, several vegetation communities were noted by reconnaissance in the study area (Table 2). These are mostly specialized habitats of low aerial extent or were heavily impacted by cattle grazing and so were not chosen for sampling.

Table 1. Community types sampled by plots in the Ruby Range study area. Locations of the plots are shown in figure 2 in the methods section.

COMMUNITY TYPE	ACRONYM	PLOT #
forest and woodland types		
Abies lasiocarpa/Arnica cordifolia	ABILAS/ARNCOR	96JP0014
Abies lasiocarpa/Linnaea borealis	ABILAS/LINBOR	96SC008
Picea/Senecio streptanthifolius	PICEA/SENSTR	96JP0015 96JP0016 96JP0018 96JP0020
Pseudotsuga menziesii/Arnica cordifolia	PSEMEN/ARNCOR	96JP0021 96SC0002 96SC0007
Pseudotsuga menziesii-Juniperus communis	PSEMEN/JUNCOM	96JP0022
Pseudotsuga menziesii/Festuca idahoensis	PSEMEN/FESIDA	96JP0019
Pseudotsuga menziesii/scree	PSEMEN/SCREE	96SC0003
Pinus flexilis/Festuca idahoensis	PINFLE/FESIDA	96SC0011
Juniperus scopulorum/Artemisia nova	JUNSCO/ARTNOV	96SC0004
shrubland types		
Artemisia nova/Agropyron spicatum	ARTNOV/AGRSPI	96SC0001 96JP0013
Artemisia tridentata ssp. *vasyana/Festuca idahoensis*	ARTTSV/FESIDA	96SC0009 96SC0013
Artemisia tridentata ssp. *tridentata/Agropyron smithii*	ARTTST/AGRSMI	96SC005
grassland types		
Festuca idahoensis/Potentilla diversifolia	FESIDA/POTDIV	96SC0010 96JP0017
Festuca idahoensis-Agropyron spicatum	FESIDA/AGRSPI	96SC0012
wetland types		
Carex simulata	CARSIM	96SC0006

Table 2. Community types noted on reconnaissance in the Ruby Range study area.

COMMUNITY TYPE AND CITATIONS	LOCATION AND COMMENTS
forest and woodland types	
Abies lasiocarpa/Vaccinium scoparium (Pfister et al. 1977)	upslope and grading into ABILAS/LINBOR in the Garden Creek drainage
Picea/Equisetum arvense (Pfister et al. 1977, Cooper et al. 1995, Hansen et al. 1995) or *Picea/Carex disperma*	wetland type occupying narrow stream bottom stringer and sideslope seep along Garden Creek below ABILAS/LINBOR. This and other riparian spruce types were probably more extensive in past, the habitats and positions are heavily degraded by cattle grazing and logging.
Picea/Linnaea borealis (Pfister et al. 1977)	toeslope below PSEMEN/ARNCOR in Laurin Canyon, restricted to deep soils and protected positions
Populus tremuloides/Cornus stolonifera (Hansen et al. 1995)	wetland type on alluvial terrace along Mormon Creek, *Cornus stolonifera* gaining dominance only on side of fence protected from grazing, grazed side of fence with browsed aspen saplings, little shrub cover, and heavy cover by exotics (*Cirsium arvense, Poa pratensis*)
Juniperus scopulorum/Agropyron spicatum	Spring Creek drainage in arid, calcareous southeastern foothills, on western aspects across draw from JUNSCO/ARTNOV.
shrubland types	
Artemisia tridentata ssp. *vasyana/Agropyron spicatum* (Cooper et al. 1995, Mueggler and Stewart 1980)	northeast foothills above ARTNOV/AGRSPI and on warmer aspects adjacent to PSEMEN/ARNCOR, this is a dryer type than ARTTSV/FESIDA which is the dominant sagebrush steppe type in the study area
Cercocarpus ledifolius/Agropyron spicatum (Mueggler and Stewart 1980, Cooper et al. 1995)	steep south facing limestone slopes in the northern canyons, in mosaics with PSEMEN/SCREE and adjacent to sagebrush steppe on gentler slopes with cooler aspects.
Sarcobatus vermiculatus/Agropyron smithii (Mueggler and Stewart 1980, Cooper et al. 1995)	saline terraces above Mud Spring, grading to ARTTST/AGRSMI or *Artemisia tridentata* ssp. *tridentata/Elymus cinereus*. Types with graminoid components dominated by *Agropyron smithii* are likely grazing disclimaxes with potential for dominance by *Elymus cinereus*.
wetland types	
Juncus balticus & *Deschampsia cespitosa* (Hansen et al. 1995)	narrow zonal ring of hummocky ground surrounding CARSIM at Mud Spring.

Descriptions of Vegetation Types

Tree-dominated Types

Abies lasiocarpa/Arnica cordifolia plant association

(ABILAS/ARNCOR; subalpine fir/heartleaf arnica; MTNHP rank **G5/S5**; 1 plot)

Environment: ABILAS/ARNCOR was sampled once on a relatively steep north facing slope near the crest of the Ruby Range at the head of Laurin Canyon. It is a minor type in the Ruby Range but is common elsewhere in semi-arid mountain ranges of southwestern Montana, usually on calcareous substrates. Vegetation nearby with similar aspects and positions with *Picea* rather than *Abies lasiocarpa* potential are classified as *Picea/Senecio streptanthifolius*. Downhill slopes are *Pseudotsuga menziesii/Arnica cordifolia.*

Soils: The plot lies close to the edge of the Whitore rock outcrop complex and Shadow complex soil mapping units (USDA Soil Conservation Service 1989). The soils are most likely similar to those of the Whitore series derived from limestone, or inclusions within the Shadow complex at high elevations on north slopes which support subalpine fir. Soils of both series are deep, well drained Cryochepts. The ground surface of the plot has about 40% cover by litter with somewhat over 20% exposed bare substrate, mostly gravel and some rock.

Vegetation: The plot is in an open stand of low growing, old, stunted trees dominated by *Picea* (ca. 30% cover) with *Abies lasiocarpa*, the indicated climax species, and *Pinus flexilis* well represented (ca. 10% cover each). *Juniperus communis* is the only shrub and *Poa secunda* is the only graminoid, both present in only trace amounts. The plot has total cover by forbs of about 10%, with *Antennaria microphylla* and *Antennaria racemosa* being the most common species. The indicator forb *Arnica cordifolia* is absent but is replaced by *Arnica latifolia* and *Arnica rybergii*. Ground cover by mosses is significant (ca. 30%).

Comments: It is instructive to note here that *Abies lasiocarpa* is very poorly represented in the Ruby Range, confined to high-elevation north slopes, reflecting the aridity of this range. The study area plot varies from descriptions of the type in the literature (Pfister et al. 1977, Cooper et al. 1995) by having a seral component of *Pinus flexilis* and *Picea* rather than the usual *Pinus contorta* and *Pseudotsuga menziesii*, and having *Arnica latifolia* and *Arnica rydbergii* rather than *Arnica cordifolia*. These differences are probably due to relatively high elevation, steep slopes, aridity of the range and also possibly the calcareous substrate. Note that this is the only default habitat type defined in Pfister et al. (1977), i.e. *A. cordifolia* need not be present for the type to be identified, stands simply fall out of the key as ABILAS/ARNCOR, if "none of the above" conditions specified in the key are satisfied.

Abies lasiocarpa/Linnaea borealis plant association

(ABILAS/LINBOR; subalpine fir/twinflower; MTNHP rank **G5/S5**; 1 plot)

Environment: ABILAS/LINBOR was sampled once on a northeast facing moderate slope at 7,080 feet elevation near the headwaters of Garden Creek. It is a minor type in the Ruby Range and was found on granitic substrate, which is relatively uncommon in the range. It is upslope from a narrow stringer of spruce community (*Picea/Equisetum arvense* or *Picea/Carex disperma*) in a heavily cattle impacted stream bottom. Slopes with similar aspects on limestone substrates in the vicinity support *Pseudotsuga menziesii/Arnica cordifolia* communities.

Soils: The plot is within the MacFarlane stony sandy loam soil mapping unit (USDA Soil Conservation Service 1989). Soils of the MacFarlane series are deep and well drained and are typically covered by 2" of forest litter. They are classified as Cryoboralfs. The soils of the sampled stand are derived from granitic parent material.

Vegetation: The sampled stand, which was clearcut in the late 1800's, is dominated by seral 70 feet tall *Pinus contorta* which contribute over 60% canopy cover. *Abies lasiocarpa*, the indicated climax species, and *Pseudotsuga menziesii* are poorly represented and *Picea* is well represented but not abundant. There is a dense shrub understory which is dominated by *Vaccinium scoparium* (ca. 80% cover) and *Linnaea borealis* (ca. 30% cover), indicating the *Vaccinium scoparium* phase of ABILAS/LINBOR (Pfister et al. 1977). The grass *Calamagrostis rubescens* contributes about 40% cover, while forbs have only about 10% total cover, with *Pyrola chlorantha* and *Arnica cordifolia* being the most common species. There is significant (ca. 40%) ground cover by mosses.

Comments: This stand was clearcut in the late 1800's, a time when harvest of timber for fuel and timbers for the mining boom was intense. Timber productivity for ABILAS/LINBOR ranges from low to high and is lowest for the *Vaccinium scoparium* phase (Pfister et al. 1977) which represents higher elevation sites, generally having acidic parent materials. It is also notable that within the Ruby Range (and elsewhere) *Abies lasiocarpa* types occur at considerably lower elevations on acidic substrates as opposed to calcareous substrates.

Picea/Senecio streptanthifolius plant association

(PICEA/SENSTR; spruce/Rocky Mountain butterweed; MTNHP rank **G4/S4**;3 plots)

Environment: PICEA/SENSTR, the driest of the *Picea* series associations identified in Montana (Cooper et al. 1995), is a major forest type at higher elevations on limestone in the northern Ruby Range. It was sampled by four plots on the eastern flank on moderately steep (ca. 50%) upper slopes with north and east exposures at 7,700 to 8,700 feet elevation. PICEA/SENSTR occupies positions barely moist enough to support *Picea*; it interdigitates, generally on north- and east-facing spur slopes, with communities of the *Pseudotsuga* series, which occur on drier exposures and positions.

Soils: The virtually exclusive association of PICEA/SENSTR with calcareous substrates throughout its range is further confirmed by its distribution within the Ruby Range. The Ruby Range plots are all within the Whitore-rock outcrop complex mapping unit (USDA Soil

Conservation Service 1989), a major type in the range with soils derived from limestone colluvium. Whitore soils are deep, well drained stony and channery loams typically covered by about 2" of forest duff. They are classified as Cryochrepts. Two of the study area plots have a high fraction of exposed gravel and rock.

Vegetation: The sampled stands are relatively open (30-70% total tree canopy cover) reflecting both their relative youth and site water stress and are dominated or codominated by seral *Pinus flexilis* and/or *Pseudotsuga menziesii*, with *Picea* slow to gain dominance. *Abies lasiocarpa* is present in one plot. Shrub cover is low, *Juniperus communis* being the only well represented species. There is also little grass cover, but *Elymus elymoides* (syn. *Sitanion hystrix*) is present in three of the plots. Total forb cover ranges from 3% to around 20% with the indicator *Senecio streptanthifolius* constant but never well represented. The forbs *Agoseris glauca*, *Delphinium glaucum*, *Solidago multiradiata* and *Valeriana dioica* have high constancy (75%). Two plots have significant (>20%) ground cover by mosses.

Comments: Timber productivity is the lowest of all *Picea* types in Montana (Pfister et al. 1977), and is probably extremely low in the Ruby Range judging from low canopy cover and slow pace of succession.

Pseudotsuga menziesii/Arnica cordifolia plant association

(PSEMEN/ARNCOR; Douglas-fir/heartleaf arnica; MTNHP rank **G4/S4**; 3 plots)

Environment: PSEMEN/ARNCOR is probably the most extensive forest type in the Ruby Mountains. It was sampled by three plots on the east, west, and south flanks of the northern part of the range, where it occupied middle to upperslope positions with cool northeasterly aspects at 6,900 to 7,900 feet elevation. It was found on both limestone and granitic substrates, but limestone is more extensive in the range. Adjacent habitats are narrow *Picea* stringers on cooler, wetter toe slopes and canyon bottoms, *Abies lasiocarpa* types on cooler granitic slopes, and other *Pseudotsuga menziesii* types on dryer, warmer aspects.

Soils: The three plots are within the Whitore-rock outcrop complex mapping unit (USDA Soil Conservation Service 1989), a major type in the Ruby Range with soils derived from limestone colluvium. However, the plot in Laurin Canyon was on granitic substrate, probably a small intrusion overlooked by the scale of soil mapping. Elsewhere, PSEMEN/ARNCOR is reported as common on both calcareous (Cooper et al. 1995) and non-calcareous substrates (Pfister et al 1977). Whitore soils are deep, well drained stony and channery loams typically covered by about 2" of forest duff. They are classified as Cryochrepts.

Vegetation: *Pseudotsuga menziesii* is the dominant conifer with cover ranging from around 40% to over 70% in the plots. *Pinus contorta* is abundant in the plots on granitic substrates. *Abies lasiocarpa*, *Picea*, and *Pinus flexilis* are poorly represented. *Mahonia repens* (syn. *Berberis repens*) and *Juniperus communis* are the only well represented shrubs, with the latter occurring in all three plots. Cover by grasses is low but, *Poa nervosa* is constant. Cover by forbs ranges from low to very high, with *Arnica cordifolia* and *Astragalus miser* constant and dominant. There is significant ground cover by mosses in one plot.

Comments: Most of the lower and middle elevation forests in the Ruby Range, including this type, were clearcut in the late 1800's and early 1900's, a time when harvest of timber for fuel and timbers for the mining boom was intense. Timber productivity of PSEMEN/ARNCOR is low (Pfister et al. 1977).

Pseudotsuga menziesii/Juniperus communis plant association

(PSEMEN/JUNCOM; Douglas-fir/common juniper; MTNHP rank **G5/S4**; 1 plot)

Environment: PSEMEN/JUNCOM was sampled by one unlogged plot on the west flank of the northern Ruby Range. The community is on a relatively steep, west facing slope at 7,440 feet elevation. Somewhat cooler, northerly aspects nearby have *Pseudotsuga menziesii/Arnica cordifolia* communities.

Soils: The plot is within the Whitore-rock outcrop complex mapping unit (USDA Soil Conservation Service 1989), a major type in the Ruby Range with soils derived from limestone colluvium. Whitore soils are deep, well drained stony and channery loams typically covered by about 2" of forest duff. They are classified as Cryochrepts.

Vegetation: There is moderate canopy cover (total about 60%) which is strongly dominated by pole to large sized *Pseudotsuga menziesii* with less cover by *Pinus flexilis*, which is seral and dying out due to long term competition. The understory is dominated by the low stature shrub *Juniperus communis* with about 20% cover. There are no abundant graminoids and relatively low cover by forbs, the most common being *Aster conspicuus*, *Astragalus miser*, and *Solidago multiradiata*.

Comments: The habitat type is also found on granitic substrates elsewhere in Montana, where *Pinus contorta* is the major seral tree species (Pfister et al. 1977). Judging from the small size and relatively old age (about 280 years) of *Pseudotsuga menziesii* in the plot, this type probably has low timber productivity in the Ruby Range.

Pseudotsuga menziesii/Festuca idahoensis plant association

(PSEMEN/FESIDA; Douglas-fir/Idaho fescue; MTNHP rank **G5/S4**; 1 plot)

Environment: PSEMEN/FESIDA, one of three study area woodland plant associations, was sampled once in the southwestern part of the study area on a moderate upper slope with west aspect at 7,900 feet. Nearby dryer aspects have *Artemisia tridentata* ssp. *vasyana* communities.

Soils: The plot is within the Shadow complex soil mapping unit (USDA Soil Conservation Service 1989). These are deep, somewhat excessively drained stony, channery, and sandy loams, which are locally derived from gneiss basement rock. The ground surface of the plot is mostly covered by litter, and the little exposed substrate is mostly soil.

Vegetation: The sampled stand had a typical woodland structure with a relatively open canopy (ca. 50% cover) dominated by short-stature, multi-aged *Pseudotsuga menziesii*. Pole-sized *Pinus flexilis* is well represented. Shrub cover is limited to a trace of *Artemisia tridentata* var. *vasyana*. Cover by grass is about 20%, dominated by *Festuca idahoensis* and *Poa secunda*. Forb cover is also around 20%, dominated by *Astragalus miser*. There is a trace of bryophyte cover.

Comments: The sampled plot is nearby an area recently opened to logging and may represent the community type of some of the cutting units. Timber productivity of the type is low (Pfister et al. 1977), and may be especially low in the Ruby Range as the low canopy cover in the plot is indicative of droughty conditions for the type.

Pseudotsuga menziesii/scree community type

(PSEMEN/scree; Douglas-fir/scree; MTNHP **G5/S4**; 1 plot)

Environment: In the Ruby Range PSEMEN/scree occupies steep, dry, warm, south and southwest facing canyon slopes with unstable limestone scree substrate. Where it was sampled in Laurin Canyon it is above a bench with a big sagebrush community (*Artemisia tridentata* ssp. *tridentata/Agropyron smithii*). Cooler aspects on the slopes across the canyon are mostly *Pseudotsuga menziesii/Arnica cordifolia* communities.

Soils: The plot is located within the Whitecow-rock outcrop complex soil mapping unit (USDA Soil Conservation Service 1989). The Whitecow series is a deep, well drained Cryochrept formed in limestone colluvium. PSEMEN/scree occupies the scree slopes within the complex. Scree substrates are unstable, with high content of coarse rock fragments and little horizon development.

Vegetation: The plot in the study area has widely spaced *Pseudotsuga menziesii*, *Juniperus scopulorum*, and *Pinus flexilis* with depauperate shrub and forb understories. Typically *Pseudotsuga menziesii* develops into large old growth trees on scree slopes (Cooper et al. 1995), but much of this community type in the study area has been logged for fuelwood. *Cercocarpus ledifolius* is the only well represented shrub in the plot. There is a trace of the bunchgrasses *Agropyron spicatum* (syn. *Elymus spicatus*, *Pseudoregneria spicatum*) and *Oryzopsis hymenoides*. The most common forb is *Senecio canus* while scattered *Cirsium subniveum*,

Oenothera caespitosa, Penstemon aridus, and *Phacelia hastata* are characteristic. The BLM sensitive plant *Lomatium attenuatum* was found in the plot.

Comments: Although these canyon slopes have extremely low timber productivity and are very steep, they were logged for fuelwood in the latter 1900's, probably because the trees are easily accessed and removed through winter logging. Pfister et al. (1977) lump this along with types dominated by other conifers under the simple designation "scree".

Pinus flexilis/Festuca idahoensis plant association

(JUNSCO/FESIDA; limber pine/Idaho fescue; MTNHP rank **G5/S5**; 1 plot)

Environment: This type was sampled once near the crest of the southern Ruby Range near the headwaters of Cottonwood and Stone Creeks. It was confined to moderate to steep, west facing wind impacted slopes near the ridgeline at about 8,600 feet elevation. An extensive stand of old growth PINFLE/FESIDA in good condition was also noted on the western flank of Ruby Peak (T6S R5W S17) around 8,800 feet elevation.

Soils: The plot is located on the Hanson-rock outcrop complex (USDA Soil Conservation Service 1989). The Hanson series is a dominant soil in the Ruby Range derived from limestone colluvium. It is classified as a Calcic Cryoboroll and is deep and well drained channery loam.

Vegetation: In structure, the sampled stand is typical of an old-growth woodland, consisting of an open canopy (40% cover) of low-stature old growth *Pinus flexilis* along with a trace of seedling-sized *Pseudotsuga menziesii*. The biggest trees have a diameter at breast height of 24-34", are over 500 years old and fire scars document at least three burns. The shrub *Juniperus communis* is well represented and there is a trace of *Artemisia tridentata* ssp. *vasyana*. The grass component is dominated by *Festuca idahoensis*, and *Agropyron spicatum* (syn. *Elymus spicatus*, *Pseudoroegneria spicata*) and *Poa nervosa* are well represented. There is a high diversity of forbs, most abundant being *Achillea millefolium*, *Antennaria microphylla*, *Arenaria congesta, Arnica cordifolia, Mertensia oblongifolia*, *Microseris nutans* and *Potentilla gracilis*.

Comments: This stand represents the highest elevation reported for this association in Montana as well as a documented example of one of the oldest stands (field examined cores registered in excess of 500 years). This plant association is represented in existing Resource Natural Areas (RNAs), but there are no examples from the Beaverhead-Deerlodge N. F. or Dillon Resource Area; this stand, though small, could be combined with surrounding terrain as typical for a high elevation mosaic of rangeland and open forest and placed in an RNA.

Cattle use of this habitat in the Ruby Range is light due to distance from water, whereas summer use by elk is possibly heavy. Cattle use may deplete the bunchgrass component (Pfister et al. 1977). Timber productivity is low and the time required for these stands to regenerate and attain their pre-disturbance structure is extremely long (Pfister et al. 1977).

The sensitive plant *Lomatium attenuatum* was not seen in this community type in the Ruby Range, but is known from similar habitat on Beaverhead National Forest land in the Tendoy Mountains (Vanderhorst 1995c).

Juniperus scopulorum/Artemisia nova community type

(JUNSCO/ARTNOV; Rocky Mountain juniper/black sagebrush; MTNHP rank G5/S2; 1 plot)

Environment: JUNSCO/ARTNOV was sampled by only one plot on a fan of dissected, calcareous alluvium in the arid southeastern foothills of the Ruby Range above Spring Creek; the slope was east-facing at 5,800 feet elevation. This is the first time the type has been documented in southwestern Montana and it has been documented by just one other plot in the state, located on calcareous parent materials in the Pryor Mountains of southeastern Montana (DeVelice and Lesica 1993). Slopes across the creek drainage with western aspects support a *Juniperus scopulorum/Agropyron spicatum* community without *Artemisia nova*. The heavily grazed stream terrace below supports a highly degraded *Artemisia tridentata* ssp. *tridentata/Agropyron smithii* community.

Soils: The plot is within the Musselshell-Amesha, bedrock substratum complex soil mapping unit (USDA Soil Conservation Service 1989). The Amesha series is found on upper slopes and hilltops within the unit and probably represents the soils of the community type. They are classified as Calciorthids and are deep well-drained calcareous soils formed in alluvium derived from soft loamy sedimentary beds. Soils of the Pryor Mountains JUNSCO/ARTNOV stand are also calcareous (DeVelice and Lesica 1993).

Vegetation: The plot has less than 20% cover by scattered *Juniperus scopulorum*. The low growing sagebrush *Artemisia nova* is the only well represented shrub with less than 20% cover. The grass component is dominated by *Agropyron spicatum* (syn. *Elymus spicatus, Pseudoregneria spicatum*) with about 30% cover, and *Stipa viridis* and *Poa secunda* (syn. *P. sandbergii*) are also common. There is a high diversity of forbs (29 species) with *Hedysarum boreale* being the most common species.

Comments: This is apparently one of the rarer community types in both the study area and statewide (S2) and is currently afforded no degree of protection; on a global scale it is rated only G5 because of vast and secure expanses on calcareous mountain ranges (pediments and bajadas thereof) of eastern Nevada (Blackburn et al. 1968). It is also significant for hosting a high diversity of forbs in an arid environment. JUNSCO/ARTNOV should be placed on the state BLM Watch List. The community is impacted only lightly by cattle, despite its location in a heavily impacted drainage, probably due to its aridity, steep slopes, and availability of other forage.

Artemisia nova/Agropyron spicatum plant association

(ARTNOV/AGRSPI; black sagebrush/bluebunch wheatgrass; MTNHP rank **G5/S4**; WHTF designation *Artemisia nova/Pseudoroegneria spicata*; 2 plots)

Environment: Fairly extensive examples of this type are found on dry, gently sloping, coarse-textured, calcareous alluvial fans at the foot of the Ruby Range in the northeast corner of the study area. It was sampled by two plots near the mouths of Portier and Laurin Canyons. Elevations are about 6,000 feet or less, and aspect is easterly. Elsewhere in southwestern Montana ARTNOV/AGRSPI usually occupies sites with west and south aspects (Cooper et al. 1995). Uphill slopes are *Artemisia tridentata* var. *vaseyana/Agropyron spicatum* steppe, and *Pseudotsuga menziesii* forest types on northerly aspects. Downhill slopes are private valley lands heavily grazed or converted to forage crop production.

Soils: In the Ruby Range it occurs on dry, rocky soils with alluvium parent material derived mostly from limestone. It was found on Crago very stony loam, a Calciorthid, and Hanson channery loam, a Calcic Cryoboroll (USDA Soil Conservation Service 1989). Elsewhere in Montana it is also found on calcareous substrates.

Vegetation: *Artemisia nova*, a low sagebrush, is the dominant shrub (ca. 20% cover) along with lesser amounts of *Guttierezia sarothrae* and *Chysothamnus nauseosus*. The low tree (tall shrub) *Juniperus scopulorum* is scattered within the community type. *Agropyron spicatum* (syn. *Elymus spicatus, Pseudoregneria spicatum*) is the dominant grass or codominant with *Festuca idahoensis* with each having around 20% cover. No forbs are well represented, but species of *Castilleja, Phlox hoodii*, and the exotic *Tragopogon dubious* are constant in both plots.

Comments: The habitat has been grazed in the past but remains in relatively good condition. Some spots with heavy shrub cover and bunchgrasses confined to growing from under shrubs indicate past heavy grazing. A few plants of *Centaurea maculosa* (spotted knapweed) were found and the habitat may be susceptible to invasions of this noxious weed. An adjacent landowner wants to graze goats in the vicinity. Fencing and a rest-rotation grazing regime are recommended. Mueggler and Stewart (1980) lump this type with the *Artemisia arbuscula/Agropyron spicatum* community type.

Artemisia tridentata ssp. *vasyana/Festuca idahoensis* plant association

(ARTTSV/FESIDA; mountain big sagebrush/Idaho fescue; MTNHP rank **G4/S4**; one plot)

Environment: This is probably the single most extensive community type in the Ruby Range, especially common in the southern part of the study area at middle elevations with gentle topography and soils weathered from Precambrian basement rock. The two sampled plots are around 7,500 feet elevation, with moderate slopes and southwestern and eastern aspects, but the type extends over many aspects and gradients. Surrounding higher elevations, wind-impacted slopes, and burned areas are *Festuca idahoensis* grasslands.

Soils: ARTTSV/FESIDA occupies vast acreages of the Sebud-Hapgood complex, the dominant soil mapping unit of the southern part of the study area (USDA Soil Conservation Service 1989). These are deep, well drained Cryoborolls of colluvium parent material derived from metamorphic basement rocks, mostly gneiss and schists.

Vegetation: *Artemisia tridentata* ssp. *vasyana* is the only well represented shrub in the plots with about 30% cover and *Festuca idahoensis* is the only well represented grass with about 40% cover. The bunchgrass *Agropyron spicatum* (syn. *Elymus spicatus, Pseudoregneria spicatum*) is present in small amounts in both plots. The forb component is relatively diverse and varies between the plots but cover by individual species is relatively low. *Lupinus sericeus* is the only forb abundant in both plots. Other forbs which are constant in the plots are *Achillea millefolium, Antennaria microphylla, Castilleja flava, Cerastium arvense, Erigeron compositus, Geum triflorum, Mertensia oblongifolia,* and *Phlox longifolia*. The *Geranium viscosissimum* phase of ATRTSV/FESIDA, which is indicated by high cover and diversity of forbs, occurs at more mesic sites with deeper soils, higher elevations, or cooler aspects. *Artemisia tridentata* is killed by fire, and burning results in higher cover by the bunchgrasses *Festuca idahoensis* and *Agropyron spicatum* (also see the description of FESIDA/AGRSPI in this report).

Comments: In the Ruby Range this type has a long history of grazing by livestock and is important big game habitat. Variation in slope results in differential use by cattle resulting in overgrazing of more level sites. The relatively high cover by sagebrush for the type found in the study area plots may be due to grazing pressures and/or fire suppression. Control of wildfires and a long history of cattle grazing in the Ruby Range have probably increased aerial and temporal coverage by ARTTSV/FESIDA with a corresponding decrease in *Festuca idahoensis/Agropyron spicatum.* This has probably resulted in a decrease in productivity of forage for big game and cattle.

Artemisia tridentata ssp. *tridentata/Agropyron smithii* community type

(ARTTST/AGRSMI: basin big sagebrush/western wheatgrass; WHTF designation *Artemisia tridentata* ssp. *tridentata/Pascopyrum smithii*; MTNHP rank **G2G3/SU undetermined**; 1 plot)

Environment: ARTTST/AGRSMI was sampled once in the drainage of Spring Creek in the eastern foothills of the Ruby Range and is a minor type confined to alluvial benches of creek and canyon bottoms. The sampled plot was on a gentle slope with east aspect at 6,120 feet elevation just above a developed spring. Drier upland slopes in the vicinity have *Artemisia tridentata* ssp. *vaseyana* and *Juniperus scopulorum* communities. Where it was seen in canyon bottoms, adjacent canyon slopes have *Cercocarpus ledifolius* and *Pseudotsuga menziesii* community types.

Soils: The plot is within the Musselshell-Amesha, bedrock substratum complex soil mapping unit (USDA Soil Conservation Service 1989). The Musselshell series is found in drainageways within the unit and probably represents the soils of the community type. They are classified as Calciorthids and are deep well-drained calcareous loams formed in alluvial and eolian materials derived mostly from limestone.

Vegetation: The shrub component of the plot is dominated by an open canopy (20-30% cover) of tall *Artemisia tridentata* ssp. *tridentata* with lesser amounts of *Chysothamnus nauseosus* and *C. viscidiflorus*. There is heavy grass cover, mostly by the introduced rhizomatous *Poa pratensis* (ca. 60% cover), but the indicative native rhizomatous *Agropyron smithii* (syn. *Pascopyron smithii*) is also abundant (ca. 30% cover). The native bunchgrasses *Elymus cinereus* (syn. *Leymus cinereus*) and *Poa cusickii* and the exotic annual *Bromus tectorum* and rhizomatous *Agropyron repens* (syn. *Elymus repens, Elytrigia repens*) are also common. The forb component is depauperate and composed of exotic or native weedy species including *Achillea millefolium*, *Capsella bursa-pastoris*, *Descurainia richardsonii, Lappula redowskii*, and *Taraxacum officinale*.

Comments: Canyon and creek bottoms in the Ruby Range are heavily impacted by a long history of cattle grazing and trailing, often making it difficult to determine potential natural vegetation. It is hypothesized that much of the land occupied by the ARTTST/AGRSMI community type in the study area and throughout southwestern Montana once supported the ARTTST/*Elymus cinereus* plant association, or at least *E. cinereus* (syn. *Leymus cinereus*) was more abundant (Lesica and Cooper 1997). Though Mueggler and Stewart (1980) rate palatability of the tall and coarse bunchgrass *E. cinereus* as poor to only fair, observations by Lesica and Cooper (1997) show it to be tender and highly desirable in the spring; it is speculated to be a decreaser under intensive spring grazing regimes.

The S-rank for this type is listed as undetermined because most sampled Montana occurrences of big sage with western wheatgrass have not specified what big sage subspecies characterized the site; these sites have been coded simply as *Artemisia tridentata*/AGRSMI and ranked S5. We suspect that most of the sites (certainly those where *A. tridentata* predominates on the first terrace up from steams), wherein *A. smithii* and/or *E. cinereus* are the dominant undergrowth, support the subspecies *A. tridentata tridentata*.

Herb-dominated Vegetation

Festuca idahoensis/Potentilla diversifolia plant association

(FESIDA/POTDIV; Idaho fescue/variable-leaved cinquefoil; MTNHP rank **G3/S3**; 2 plots)

Environment: FESIDA/POTDIV was sampled by two plots in windswept middle to high elevation upperslope positions near the crest of the Ruby Range. The plots have moderate slopes with northwest and southwest aspects at 7,880 and 9,000 feet elevation. Adjacent less wind impacted positions of lower slopes support *Artemisia tridentata* ssp. *vasyana/Festuca idahoensis* communities in the south and *Abies lasiocarpa*, *Picea* and *Pseudotsuga menziesii* forest types in the north.

Soils: The plots are within the Sebud-Hapgood rock outcrop complex, the dominant soil mapping unit of the southern part of the study area (USDA Soil Conservation Service 1989). These are deep, well drained Cryoborolls of colluvium parent material derived from metamorphic basement rocks, mostly quartzite, gneiss and schists.

Vegetation: The communities have a low growing patterned vegetation varying in species dominance depending on elevation and degree of influence by wind and soil erosion. The bunchgrass *Festuca idahoensis* is dominant in both plots with around 30% cover. The sedge

Carex obtusata is abundant and the grass *Poa cusickii* is well represented in the southern, lower elevation plot but are absent from the northern, higher elevation plot. Low growing mats of *Calamgrostis purpurescens* are dominant in some nearby areas outside and is present within the high elevation plot. The grass *Koeleria macrantha* (syn. *Koeleria cristata*) is present in trace amounts in both plots. *Selaginella densa*, a ground hugging fern ally, is well represented to abundant in both plots. *Cymopteris bipinnatus* is the only forb present (in trace amounts) in both plots. The forbs *Antennaria microphylla* and *Geum triflorum* are well represented in the low elevation plot and *Oxytropis sericeus* is well represented within and is dominant in some nearby areas outside the high elevation plot. The southern plot has a higher diversity of forbs and grasses. The indicator species for which the type is named, *Potentilla diversifolia,* was not found in either plot and is not common in the study area (see Comments Section for further elaboration).

Comments: These high-elevation grasslands are only lightly impacted by cattle grazing and are probably in the best condition of any grasslands in the study area. They constitute an important part of elk summer range. The absence or replacement of dominant and diagnostic species, and high variability between plots in the study area indicate a need for further refinement of the southwestern Montana high elevation grassslands classification; perhaps new indicator species will need to be identified. The two plots were placed in the FESIDA/POTDIV c.t. (Cooper and Lesica 1992), a type generally associated with upper subalpine and alpine environments, because of the considerable contribution of *Carex obtusata* and no contribution by *Agropyron caninum*, a highly constant species, of ten having high cover values, in the next most ecologically similar type, FESIDA-*Agropyron caninum* (Mueggler and Stewart 1980). FESIDA/POTDIV also bears a strong degree of resemblance in terms of sites occupied (higher elevations, generally >8,000 ft.) to both the *Festuca idahoensis-Carex scirpoidea* c.t. (speculated to occur in the Pryor Mountains vicinity by Mueggler and Stewart [1980]) and the FESIDA-*Carex obtusata* c.t. listed for Wyoming's Big Horn Mountains (Bourgeron and Engelking 1994, originally cited as *Festuca idahoensis/Lupinus sericeus* plant association). The forb compositions of both FESIDA-AGRCAN and FESIDA-CARSCI bear a strong resemblance to that of FESIDA/POTDIV.

Festuca idahoensis-Agropyron spicatum plant association

(FESIDA/AGRSPI; Idaho fescue/bluebunch wheatgrass; MTNHP **G5/S5**;
WHTF designation *Festuca idahoensis-Pseudoroegneria spicata*; one plot)

Environment: FESIDA/AGRSPI was sampled by one plot along the Left Fork of Stone Creek in an area which burned five or more years ago. It is in a midslope position on a dissected moderate slope with easterly aspect at 7,420 feet elevation. Unburned slopes in the area support extensive *Artemisia tridentata* ssp. *vasyana/Festuca idahoensis* communities.

Soils: The plot is within the Sebud-Hapgood rock outcrop complex, the dominant soil mapping unit of the southern part of the study area (USDA Soil Conservation Service 1989). These are deep, well drained Cryoborolls of colluvium parent material derived from metamorphic basement rocks, mostly gneiss and schists.

Vegetation: The potential climax vegetation of the site is clearly *Artemisia tridentata* ssp. *vasyana/Festuca idahoensis* (see description in this report for ARTTSV/FESIDA), but the shrub component has not yet reestablished after a fire five or more years ago. There is currently a trace

of the shrubs *Artemisia tridentata* ssp. *vasyana*, *Chysothamnus viscidiflorus*, and *Ribes setosum*. Grasses have higher cover and are more diverse than in adjacent unburned areas. The dominant grasses are *Festuca idahoensis* (ca. 50% cover) and *Agropyron spicatum* (ca. 10% cover); *Stipa nelsonii* and *Bromus pumpellianus* are also well represented. There is much less cover but a fairly high diversity of forbs, *Achillea millefolium, Collinsia parviflorum, Geranium viscosissimum,* and *Phacelia hastata* being the most common species.

Comments: Control of wildfires and a long history of cattle grazing in the Ruby Range have probably reduced aerial and temporal coverage by FESIDA/AGRSPI with a corresponding increase in ARTTSV/FESIDA. This has probably resulted in a decrease in productivity of forage for big game and cattle.

Carex simulata plant association

(CARSIM; short-beaked sedge; MTNHP rank **G3/S3**; 1 plot)

Environment: CARSIM is a minor wetland plant association, probably confined in the study area to Mud Spring near the base of the southeastern foothills of the Ruby Range. The mud of "Mud Lake" is actually marl, a calcareous clay deposit or intimate mixture of clay and particles of calcite and dolomite wherein the percentage of calcium carbonate may range from 90 to somewhat less than 30 percent. The site is on private land at the lower end of the Garden Creek grazing allotment. Additional examples of CARSIM may be found on other nearby private lands in the Ruby Valley. Mud Spring is a subirrigated calcareous wetland in a large swale of an alluvial bench at about 5,800 feet elevation. CARSIM is a minor wetland community type, probably confined in the study area to Mud Spring near the base of the southeastern foothills of the Ruby Range. This site extends the known lower elevation limits, which are otherwise at middle to high elevations (6,000-7,000 feet) in the mountains (Hansen et al. 1995), by some 200 feet. Surrounding upland habitats are *Artemisia tridentata* ssp. *vasyana/Agropyron spicatum* steppe and *Sarcobatus vermiculatus/Agropyron smithii* salt flats.

Soils: The community is within the Neen silty clay loam soil mapping unit (USDA Soil Conservation Service 1989). The unit has deep, poorly drained, salt affected soils formed in alluvium of stream terraces and upland swales. The Neen series are classified as Aquic Calciorthids. The CARSIM community type grows in saturated soils with organic accumulations, making them histosols. All of this wetland was saturated to the surface and exhibited mottling and gleying extending to within a few centimeters of the surface; the centermost three fourths had standing water covering at least 20 percent of the ground surface. Small parts of the wetland have a floating organic mat which has the best developement of the CARSIM community type.

Vegetation: The CARSIM p.a. occupies the continually saturated center at the head of the spring-fed wetland and is surrounded by a narrow zone of dryer hummocky topography typically occupied by the *Juncus balticus* and *Deschampsia cespitosa* plant associations. In the sampled plot there is full cover by graminoids, of these the sedge *Carex simulata* is dominant (ca. 70% cover), and *Carex nebrascensis* and the spike rush *Eleocharis pauciflora* are abundant. The sedge *Carex microptera* is well represented and the grasses *Deschampsia caespitosa* and *Muhlenbergia richardsonis* are common. The arrow grass, *Triglochim maritimum*, is also common. Total forb cover is around 10%; the most common species are *Aster brachyactis, Crepis runcinatus, Dodecatheon pulchella* and *Ranunculus uncinatus*.

Comments: Saturated soils of the CARSIM type make it less accessible to cattle, protecting it from direct grazing impacts. However, at the edges of the wetland, a narrow zone dominated by *Deschampsia cespitosa* and *Juncus balticus*, there are high-relief hummocks induced by cattle.

This is a high-quality site of a plant association that is rather uncommon in the state (S3) and beyond (G3), certainly so in the Ruby Range. It is subject to the impacts of cattle grazing and owes its existence to unique hydrological happenstance; two conditions that should make this type a target for protection. Presently the CARSIM association has no degree of protection anywhere in the Inland Northwest.

Sensitive Plant Survey Results

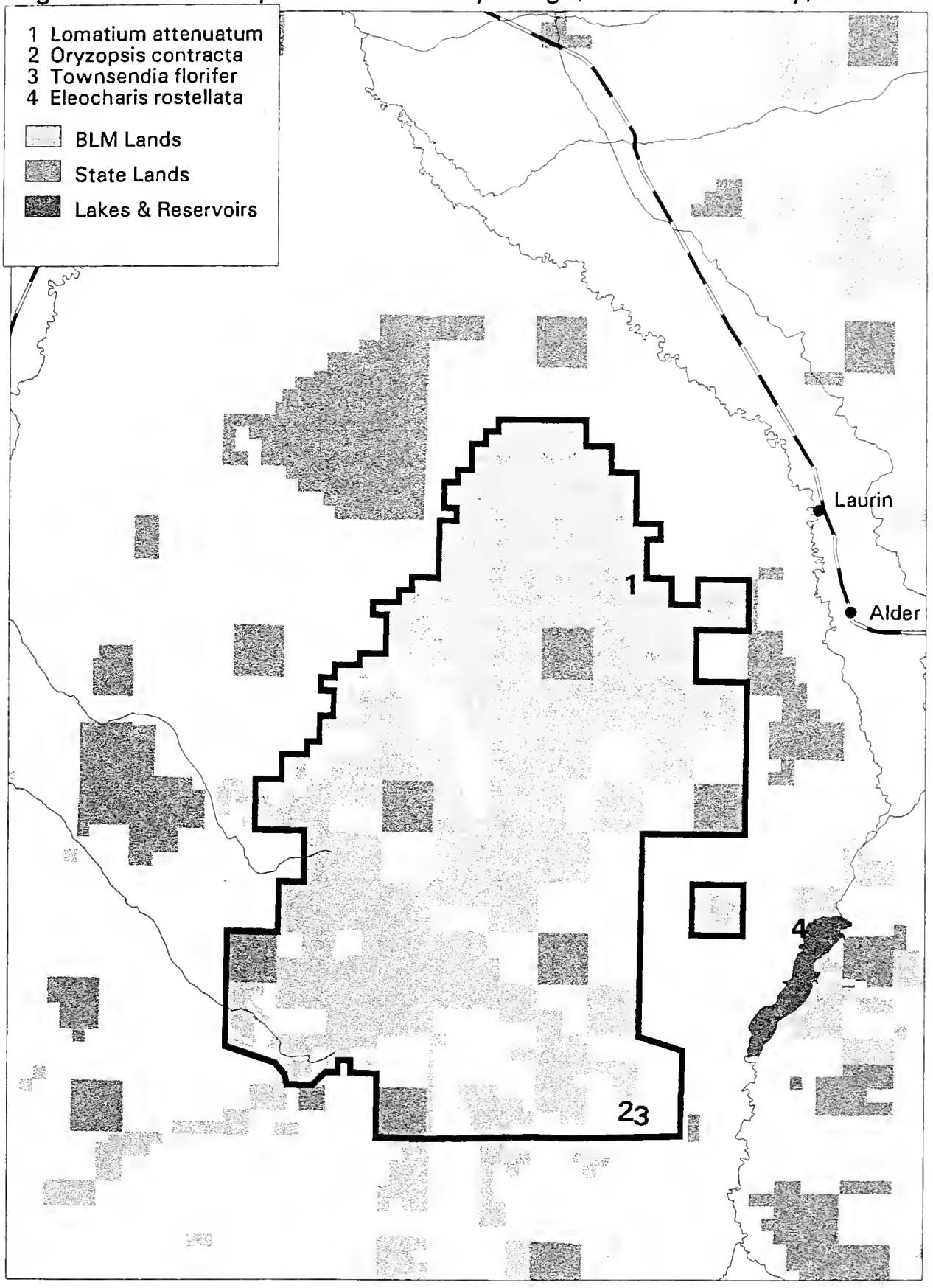
One population each of three plant species with BLM Sensitive or Watch status (USDI BLM 1996) were located for the first time in the Ruby Range study area (Figure 3). The three species are tapertip biscuitroot (*Lomatium attenuatum*), contracted ricegrass (*Oryzopsis contracta*), and showy townsendia (*Townsendia florifer*). Each of the three discoveries are also first records for Madison County. Watch status is recommended dropped for *Oryzopsis contracta* and Sensitive and Watch status are recommended retained, respectively, for *Lomatium attenuatum* and *Townsendia florifer* (Table 3). Of these species, two (*Oryzopsis contracta, Townsendia florifer*) are found in low elevation grasslands on colluvial substrate which are restricted to the southeastern most corner of the study area. The third species (*Lomatium attenuatum*) is on south-facing, limestone scree canyon walls. It is absent from 3/4 of the study area canyons, but its full extent along canyons in the northern half of the east flank has not been evaluated beyond partial documentation of the Laurin Canyon population in July. The species are treated separately in detailed status reviews in the following sections of this report. Element Occurrence Records for the populations and topographic maps showing their precise locations are provided in Appendix C.

Table 3. Recommended status for BLM sensitive and watch plant species in the Ruby Range Study Area.

	previous BLM\MTNHP status	recommended status
Lomatium attenuatum	Sensitive\ G2 S2	no change
Machaeranthera conmixta	Watch\ G4G5 T4T4 S1	drop
Oryzopsis contracta	Watch\ G3 S2	drop
Townsendia florifer	Watch\ G5 S1	no change

The previously reported occurrence of *Machaeranthera conmixta* is based on a misidentified specimen, and the species is not documented elsewhere in Montana. Therefore, it has been recommended for deletion from the BLM watch species list and it has been dropped from tracking as a state species of special concern. The specimen found at MONTU (K.L. Lackschewitz 10291) was originally determined *M. canescens*. A duplicate sent to NY was determined *M. conmixta* by A. Cronquist in 1982 and the MONTU specimen was annotated as such. However, in 1986, the specimen at MONTU was annotated by B.L. Turner as *M. canescens* var. *canescens*. *Machaeranthera canescens* is common in the Ruby Range and a population was found near the location given on the specimen label. The plants vaguely resemble *M. conmixta* in leaf morphology and the site is at an unusually high elevation for *M. canescens*, however, Turner's determination as *M. canescens* is concurred by the authors of this report.

Figure 3. Sensitive plants in the Ruby Range, Madison County, Montana



Montana Natural Heritage Program, March 11, 1997

The previously known population of *Eleocharis rostellata* on private land at Warm Springs above Ruby Reservoir was revisited but no population or potential habitat were found within the study area. This species is restricted to accumulations of travertine often associated with hot springs. The site at Warm Springs is heavily impacted by cattle grazing and recreationists, but the occurrence of *Eleocharis rostellata* seems resilient under these pressures. Three other species restricted to spring-fed alkaline meadows are found southeast of the study area, including *Astragalus leptaleus, Senecio debilis,* and *Triglochin concinnum* var. *debile*. This study did not afford the opportunity to inventory these potentially significant wetlands.

A number of species which were previously but are no longer tracked by MTNHP were documented in the Ruby Range; these are *Cirsium subniveum*, *Castilleja rustica*, and *Stanleya viridiflora*. These species are confined in Montana to the southwestern part of the state and were poorly known prior to the extensive surveys conducted by MTNHP in recent years. These surveys found them to be more common than previously known and not threatened in the state and they were dropped from tracking by MTNHP. Their occurrence in the study area is further evidence of their relative security in Montana.

A total of 433 species of vascular plants in 57 families were identified in the Ruby Range study area (Appendix D). This is a relatively high number considering the relatively dry growing season of 1996, the heavily cattle impacted vegetation, and the relatively small area covered. It is probably explained by the elevational amplitude of the study area, and by the fact that it was surveyed by four botanists, each with their own taxonomic strengths, working throughout the growing season. By comparison, there was a total 469 taxa identified on BLM and Beaverhead National Forest lands in the Tendoy Mountains and upper Big Sheep Creek drainage (Vanderhorst 1995c), a somewhat larger area with broader elevational and ecological amplitude. On the lower end, there were 329 taxa identified on BLM lands in the Horse Prairie Creek drainage (Vanderhorst 1994a), a larger study area which is confined mostly to foothill and basin topography.

Lomatium attenuatum Evert
TAPERTIP BISCUITROOT
Parsley Family (Apiaceae)

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None. It was formerly listed as Category 3C (USDI Fish and Wildlife Service 1993), removing it from Category 2 (C2) status. Listing of C2 species was officially discontinued by the Service in 1996 (U.S. Fish and Wildlife Service 1996).

Bureau of Land Management: Sensitive (USDI BLM 1996).

Montana Natural Heritage Program: It is ranked G2 S2, imperiled by rarity globally and in the state. The global rank was recently changed from G3 to G2 (Fertig 1996, Heidel 1996) because it was found to have a more restricted distribution in Wyoming than previously thought (W. Fertig, pers. commun.).

DESCRIPTION: Tapertip biscuitroot is a low herbaceous perennial growing from an elongated fleshy root. It has short stems which bear one or two finely dissected 3-pinnate leaves which are 2-11 cm long and ovate in outline with linear to oblanceolate ultimate segments < 1.5 mm wide. The herbage, flower stem, and inflorescence are scaberulous. The inflorescence is a many flowered compound umbel borne on a long peduncle which exceeds the leaves in fruit. The involucre is absent or inconspicuous, and the involucel is absent or consists of 1-6 narrow, attenuate bracts 1-4 mm long. The umbellets have about 15 small, yellow-petaled flowers with only 2-6 per umbellet developing into fruits. The mature fruits are glabrous, dorsally flattened schizocarps 5-8 mm long and 3-5 mm wide, with low ribs on their faces (adapted from Evert 1983).

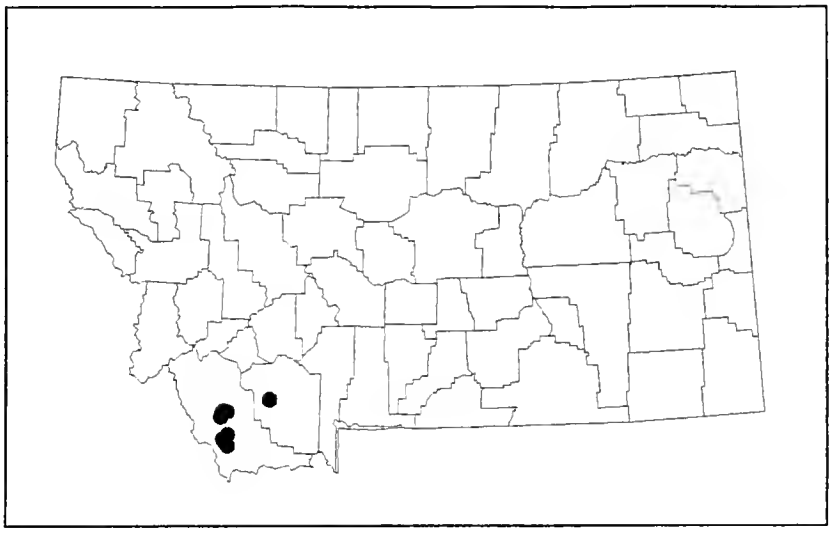
In habit, leaf dissection, and fruit characters, *Lomatium attenuatum* resembles the more common and widespread *Lomatium cous*. However, the former has inconspicuous, attenuated involucel bracts (hence its specific epithet) while the latter has conspicuous, broadly rounded bracts. Also, *Lomatium attenuatum* has greater overall scabrosity. It can be distinguished from low growing species of *Cymopteris* which it resembles by its fruits which have low ribs, rather than prominent wings on their flattened sides. Figure 4 is a line drawing of the species.

GEOGRAPHICAL DISTRIBUTION

Global distribution: *Lomatium attenuatum* is a regional endemic of the Rocky Mountains. It has population centers in northwestern Wyoming and southwestern Montana which are disjunct, separated by the Yellowstone highlands.

Montana distribution: The species was first discovered in the state in 1993 by Peter Lesica on BLM land in the Tendoy Mountains, Beaverhead County (Vanderhorst and Lesica 1994). Since then additional Beaverhead County populations were found on

the Beaverhead National Forest in the Tendoys (Vanderhorst 1995a) and to the north on BLM land in the drainage of Grasshopper Creek (Heidel and Vanderhorst 1996, Vanderhorst 1995b). In 1996 the species was found by Bonnie Heidel on BLM land in the Ruby Range, the first occurrence documented in Madison County. There are now a total of nine occurrences known in Montana (see state distribution map).



Local distribution: One population was documented in the study area in Laurin Canyon on the northeast flank of the Ruby Range. It is present in at least two openings on the lower south facing slopes of the lower 1/2 mile of the canyon. The species was not seen during June surveys in canyons on the west and southeast flanks of the Ruby Range, and it was not possible to conduct a complete survey in July because the plant was inconspicuous after flowering and was beginning to dry.

HABITAT: *Lomatium attenuatum* grows on sparsely vegetated slopes in dry, poorly developed lithosols derived from limestone or volcanic parent materials. All but one Montana population, including the Ruby Range occurrence, are in soils derived from limestone. The substrates usually have a high fraction of gravel and are well drained, unstable, and easily disturbed. Larger populations extend over all aspects and slope positions but over a half of the known Montana occurrences including the one in the Ruby Range are confined to southerly aspects. Elevations range from 5,700 to 8,700 feet.

Vegetation on most of these slopes is a patchy mosaic of evergreen tree and shrub communities with openings occupied by scattered bunchgrasses and forbs. The habitats are commonly dominated by *Pinus flexilis* (limber pine), *Pseudostuga menziesii* (Douglas fir), or *Cercocarpus ledifolius* (mountain mahogany), and *Agropyron spicatum* (bluebunch wheatgrass) is usually the dominant bunchgrass. A few sites are big sagebrush (*Artemisia tridentata* subsp. *vasyana*) or low sagebrush (*A. nova*) communities or are larger openings with few closely associated woody species present. At several sites, *Lomatium attenuatum* grows with other BLM Sensitive or Watch species adapted to dry, limestone derived slopes, such as *Lesquerella pulchella*, *Phacelia incana*, and *Sphaeromeria argentea*, but these species were not found in the Ruby Range.

In the Ruby Range, the population of *Lomatium attenuatum* is on south to southwest facing canyon slopes at 6,240 to 6,400 feet elevation across a range of slope positions from ridgetop to lower slope. The site is within the Whitecow-rock outcrop complex. 25-90% slope soil mapping unit (USDA Soil Conservation Service 1989). The unstable, well drained, gravelly soil has limestone parent material and supports a *Pseudotsuga menziesii*/scree habitat type (Cooper et al. 1995) with *Cercocarpus ledifolius* assuming dominance around the eastern subpopulation. The tree canopy, made up of *Pseudotsuga menziesii*, *Pinus flexilis*, and *Juniperus scopulorum* is sparse, and the slopes were logged in the past. Ground cover by grasses and forbs is low and 80-90% of the ground is bare gravel and soil. The vegetation was sampled by a plot and is described under *Pseudotsuga*/scree in the Ecological Results section of this report. A photographic of the habitat is provided in Appendix E. This habitat, as represented by the soil series and vegetation is common in canyons in the northeastern Ruby Range.

POPULATION INFORMATION: Reported population estimates of the nine known Montana occurrences range from a few to over 10,000 plants extending over areas of 5 to 160 acres, and many occurrence records cite additional unsurveyed suitable habitat. In the Ruby Range about 50 plants were counted widely scattered across about 10 acres of apparently suitable habitat, but a complete survey was not conducted.

Lomatium attenuatum is a geophyte which completes its phase of active growth and reproduction early in the season, corresponding with months of cool temperatures and peak rainfall. Most plants had immature fruits at survey dates in late May and early June and mature fruits in July. At the Ruby Range site plants were observed in fruit on July 3, but by August 22 only a couple of dead stalks with aborted fruits were found. Populations are likely to go undetected by late summer surveys.

Poor seed production was observed in the study area and may be a cause of rarity. Evert (1983) mentions low fecundity in the description of the species from Wyoming, and Montana plants follow this pattern.

MANAGEMENT CONSIDERATIONS: Current Montana Natural Heritage Program G2/S2, and BLM Sensitive status remain appropriate. *Lomatium attenuatum* is a globally rare regional endemic with two separate population centers in Wyoming and Montana. The species was recently given higher conservation priority in Wyoming because surveys showed it had a more limited geographic range than previously assumed (W. Fertig, pers. commun.). Populations in Montana may represent the largest numbers and broadest distribution of the species, although it was not known in the state prior to 1993. All Montana occurrences but one are on BLM lands in the Dillon Resource Area. This species warrants special attention as a rare regional endemic and it is recommended that it be made the focus of a species status survey in Montana.

The 1996 discovery in the Ruby Range is an eastern extension of the known Montana range of the species, but it is unknown whether the occurrence is a small, disjunct population or represents a broader distribution in Madison County. June fieldwork in the Ruby Range only covered the southernmost canyons on the east flank, as far north as Hinch Creek, with negative results. June field survey of the following canyons with potential habitat for *Lomatium attenuatum* is needed to assess its status in the Ruby Range: Taylor Canyon, Spring Canyon, Porier Canyon, Laurin Canyon, Robinson Canyon, Bouge Canyon.

Montana populations of *Lomatium attenuatum* face few direct threats from management activities at this time. The slopes where it grows have low timber and forage productivity and are unsuitable for logging or grazing. In spite of this, the Ruby Range site was logged in the past, probably for fuelwood, and cattle trailing may occur on more level sites. Future mining activity in or near limestone formations could pose threats to populations. Exotic weeds are increasingly becoming established in southwestern Montana and may pose the greatest threat to populations in the future. In general, weed infestations are more extensive in the Ruby Range study area than in the vicinities where *Lomatium attenuatum* grows in Beaverhead County. The introduced forage alfalfas *Medicago lupulina* and *M. sativa* are becoming established on the scree slope habitat of *Lomatium attenuatum* in the study area, and the habitat is believed to be especially susceptible to invasions of spotted knapweed (*Centaurea maculosa*).

Oryzopsis contracta (Johnson) Shechter
CONTRACTED INDIAN RICEGRASS
Grass Family (Poaceae)

Note: The following information is an update to the status information presented in Heidel and Vanderhorst (1996), providing the basis for changing the state rank and recommending BLM status change.

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None. It was recently listed as a Category 2 (C2) species by the USDI Fish and Wildlife Service (1993), but recommended moved to Category 3C because it was not in jeopardy based on survey and herbarium studies in Wyoming which documented a broad distribution and limited degree of threat. The Category 2 list was discontinued by the U.S. Fish and Wildlife Service (1996) before any changes were made to the species' status.

Bureau of Land Management: Watch (USDI BLM 1996). It is recommended dropped from watch status based on this study in concert with other 1996 studies.

Montana Natural Heritage Program rank: Prior to this study it was ranked G3 SU (globally vulnerable; state status undetermined). The 1995 survey results suggested that it had been overlooked rather than being imperiled. This study in concert with other 1996 studies supports reranking the species to S3 (vulnerable in the state), and taking it off from the list of species which are actively tracked to be moved to the watch list. Distribution information will still be collected for it, and its status will be re-evaluated should there be evidence of decline.

DESCRIPTION: Contracted Indian ricegrass is a tufted perennial with glabrous stems 30-65 cm (12-28 inches) tall. The inflorescence is a panicle with branches that are initially contracted (hence the common name) but which become stiffly spreading at maturity. Spikelets are 1-flowered, slender, and app. 1 cm (3/8 inch) long. The lemmas are covered by short, white, silky hairs that do not exceed the lemma; the lemmas have an awn 6-12 mm (1/4-1/2 inches) long (from Fertig 1994, Wyoming Rare Plant Technical Committee 1995).

Oryzopsis contracta can be recognized by its contracted or stiffly spreading panicle branches, often with perpendicular pedicel angles, slender-shaped spikelets, and long-awned lemmas with short, silky white hairs. These hairs are equal or less than the length of the lemma (Fertig 1994).

It was initially described as a variety of *Oryzopsis hymenoides* (Johnson 1945) which it most closely resembles. A more detailed study by Shechter and Johnson (1966) led to recognition of this grass as a distinct species. It is intermediate between *Oryzopsis hymenoides* and *O. micrantha*, and is likely to have been overlooked or misidentified in Montana because of its overall resemblance to and habitat overlap with the former. Common indian ricegrass (*Oryzopsis hymenoides*) differs from *O. contracta* in having a wide-spreading, wavy-branched panicle, plump florets, lemmas with relatively short awns (usually <6 mm), and long silky hairs that exceed the body of the lemma (Wyoming Rare Plant Technical Committee 1994). The pedicel angles of branching are noticeably different in the field, providing a quick basis for making distinctions when matured inflorescences are present. Littleseed ricegrass (*Oryzopsis micrantha*) is distinguished by having glabrous lemmas and strictly contracted panicle branches.

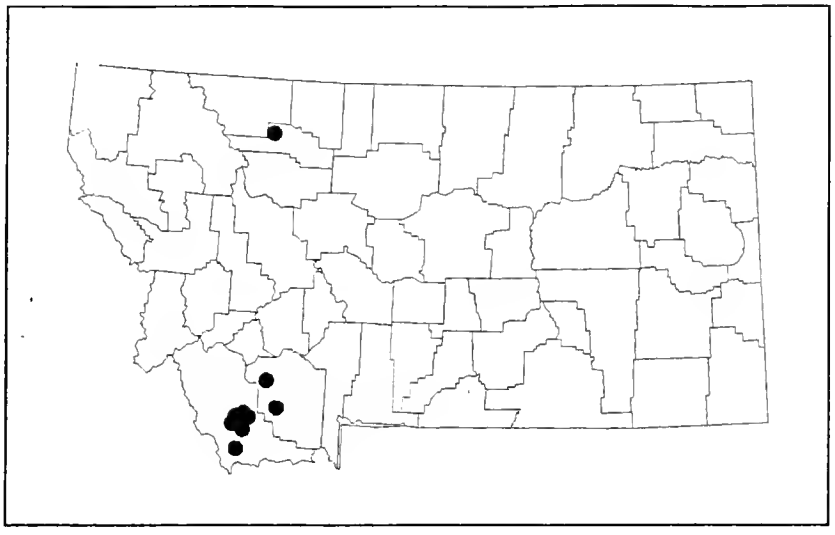
Note: *Oryzopsis* (ricegrass) is a widespread genus represented by five species in Montana. In a recent revision by Barkworth (1993), it has been split into three genera. By this treatment, *Oryzopsis contracta* becomes a synonym of *Acherantherum contractum* in a genus which includes most of the former species of *Oryzopsis* in addition to the short-awned species of *Stipa* (Fertig 1994).

GEOGRAPHICAL DISTRIBUTION

Global distribution: *Oryzopsis contracta* is a regional endemic of the Rocky Mountains with its center of distribution across central and western Wyoming, extending into north-central Colorado and southwest Montana (Fertig 1994). In 1996, it was also documented from north-central Montana.

Montana distribution: *Oryzopsis contracta* is currently known from Beaverhead and Madison Counties in southwestern Montana and from Pondera County in north-central Montana (see state distribution map). It was first recognized as part of the Montana flora when an herbarium specimen deposited at the Rocky Mountain Herbarium in Laramie, WY which had been originally identified as *Oryzopsis hymenoides* was annotated by Walter Fertig (Wyoming Natural Diversity Database) to *O. contracta*. The collector, C. W. Griffin, gave the location only as Beaverhead National Forest which at the time of this 1921 collection spanned three counties. Based on this collection, the species was assigned a state rank of "SH" (known only from historic records in the state). It was later determined that a duplicate of this specimen from Beaverhead National Forest was deposited at MRC. Its collection label included additional location information, mentioning the Sheep Creek Ranger Station. This was interpreted by Peter Stickney to correspond with a site in the Tendoy Mountains, 7 miles west of Lima, in T13S, R10W, Sec. 36. Five additional sites were documented south of the Pioneer Mountains (Heidel and Vanderhorst 1996). In 1996 it was documented twice in Madison County, during this study and during the separate *Spiranthes diluvialis* status survey (Heidel in progress). The major range extension documented during a baseline botanical survey at Alkali Lake in Pondera County, north-central Montana, is over 300 miles north (Heidel in progress).

Note: Herbarium specimens in *Oryzopsis hymenoides* folders have been checked at MONT (Rumely pers. commun.) and at MONTU (Heidel pers. obs.) without finding additional collections for annotation to *O. contracta*. This information has been sent to the Beaverhead National Forest, which maintains a small herbaria with collections from southwestern Montana.



Local distribution: One large site was documented for the species on private land at the lowest end of the Garden Creek Allotment, on the southeast edge of the Ruby Mountains project area. It spanned over 100 acres across an area over 1/2 mile long in T7S R5W Sec. 34, and is likely to extend onto adjoining lands under mixed public/private ownership.

HABITAT: The Ruby Range study area has the largest known population to date, so its habitat is described in detail first and is used for comparison with all other sites. It falls within the documented range of habitats in Wyoming, summarized as dry, shallow, sandy, or gravelly soils on slopes or rolling plains in open, sagebrush-grassland communities (Fertig 1994). The study site is a very dry setting, on shallow sandy to silty soils, over a variety of topographic positions across rolling grassland knolls, small silty outcrops, and uplands surrounded by sagebrush steppe at the interface between the montane and intermontane zones. It is on 0-20% slope, with a predominantly gentle slope and southeast aspect but all compasspoints included. In Beaverhead County the topographic positions of *Oryzopsis contracta* were on mid to lower slopes (0-30%) with most commonly south and west aspects, but in Pondera County, the small population was restricted to a ridgetop. The known range of elevations in Montana is 3890-7000 ft. with the lowest elevation site in Pondera County and the highest elevation site at the historic Beaverhead National Forest collection in the Tendoy Mountains.

Soils are consistently well-drained and light-colored, often with little or no profile development. They are derived from a wide variety of parent materials including Madison Group limestone, siltstone, alluvial gravel or sand, and quartzite. In the study area they are mapped as Trudau loam, 2-8% slopes (USDA Soil Conservation Service 1989), representing a silty colluvium.

The associated vegetation is sparse, whether it is a localized dry microhabitat or prevailing in a harsh landscape. It is dominated or co-dominated in the study area by *Stipa comata* as it is in Pondera County. In Beaverhead County it has been documented in grassland and steppe dominated by *Agropyron spicatum*, with or without *Artemisia tridentata* var. *wyomingensis,* and less often with *Artemisia arbuscula.* The following representative list of associated species in Montana reflects major differences between the three counties where it has been recently documented. The asterisked species are found at the Ruby Range site, the species marked by "+" are found at the Beaverhead County sites, and the species marked by "^" are found at the disjunct Teton County site. Most species on this list are associated with *Oryzopsis contracta* in only one of the three counties, further evidence that this species has broad ecological amplitude.

Agropyron smithii^
*Agropyron spicatum**+
*Allium textile**
Arenaria kingii+
Artemisia arbuscula+
Artemisia frigida+
Artemisia tridentata var. wyomingensis+
*Aster scopulorum**+
Astragalus gilviflorus^
Astragalus pectinatus^
*Astragalus vexilliflexus**
*Atriplex gairdneri**^
Bouteloua gracilis^
Bromus tectorum+
Carex filifolia^
*Chrysothamnus nauseosus**
*Commandra umbellata**
Cordylanthus ramosus+
Erigergon cespitosus^
*Erigeron ochroleucus var. scribneri**
Eriogonum flavum^
Galium boreale^
*Gutierrezia sarothrae**+
Hymenopappus richardsonii^
*Koeleria macranthera**
*Lesquerella alpina**+
Linum australe^
*Linum lewisii**
Melilotus officinalis^
Oenothera cespitosa^
Oryzopsis hymenoides+
Parornychia sessiliflora^
Phacelia linearis+
*Phlox hoodii**
Phlox longifolia+
*Poa secunda**+
Stipa comata+

Stipa viridula^*
*Townsendia florifer**

The preceding information does not include the associated species at the other Madison County site, which is in an intermontane valleybottom setting along unimproved roads where it may be accidental. The primary associated species at this other site include *Stipa comata, Agropyron smithii, Chrysothamnus nauseosus,* and *Sporobolus airoides.*

In the Ruby Range, it was not sympatric with common indian ricegrass *(Oryzopsis hymenoides)*, though the latter is in nearby montane settings. There was local overlap between these ricegrass species in all Beaverhead County sites documented in 1995, but not in any of the new 1996 sites. Its study area habitat overlaps with that of *Townsendia florifer* as shown in Appendix E.

POPULATION INFORMATION: The study area population numbers were estimated to be at least in the 100,000 order of magnitude, signifying the largest known population. Individuals are locally common in the arid grassland setting, in relatively high densities approaching 1 every meter. All other recent records document it in much lower densities and frequency. The next largest population is also in the Dillon Resource Area on Hennebrrry Ridge.

Mature plants have 1-few spikes per basal tuft, and the basal tufts are taken to represent discrete bunchgrass individuals. In southwestern Montana, the spikes emerge and expand in mid-June, and the inflorescence retains most seeds into July but readily shed seeds once cured. In Pondera County, it appeared that plants were about three weeks later in phenology compared to southwest Montana.

MANAGEMENT CONSIDERATIONS: Like common indian ricegrass, contracted ricegrass is considered to be a decreaser under livestock grazing (Fertig 1994). Its presence is taken to indicate rangeland in fair or better range condition. Its study area habitat appears to be in excellent condition, though the vegetation is extremely sparse and has low productivity. Nevertheless, it is located close to water, and potentially affected by allotment management actions. It might be appropriate to consider as a pasture indicator species, but its recommended deletion from BLM watch status would preclude special management provisions.

It does not appear to be a good competitor, and exotic species invasion poses threats. Because of its low competitive ability, it occurs elsewhere at localized natural or unnatural settings for early plant succession e.g., around rock outcrops or along roadside rights-of-way.

Townsendia florifer (Hooker) Gray
SHOWY TOWNSENDIA
Daisy Family (Asteraceae)

CONSERVATION STATUS

U.S. Fish and Wildlife Service: None.

Bureau of Land Management: Watch (USDI BLM 1996).

Montana Natural Heritage Program: ranked G5 S1, demonstrably secure globally, but critically imperiled because of extreme rarity in Montana.

DESCRIPTION: Showy townsendia is an annual, biennial, or short-lived perennial daisy which grows from a taproot and unbranched crown. It may have one or several flowering stems which are mostly 5-15 cm tall, each bearing one or more flower heads. The persistent tufted basal leaves are oblanceolate to obovate, and about 2-6 cm long and 3-11 mm wide and the stem leaves are similar or smaller. The herbage is densely hairy to almost hairless. Flower heads are subtended by an invcolure about 7-10 mm high composed of a few series of imbricate acute bracts. The flower heads consist of a ring of showy light-pink ray flowers which are about 7-12 mm long surrounding numerous tubular disk flowers. The disk flowers have a pappus composed of slender barbed bristlelike scales and the pappus of the ray flowers is similar but somewhat shorter. The fruits are lightly hairy (adapted from Cronquist 1955). Figure 5 is a line drawing of the species, and a close-up photo is shown in Appendix E.

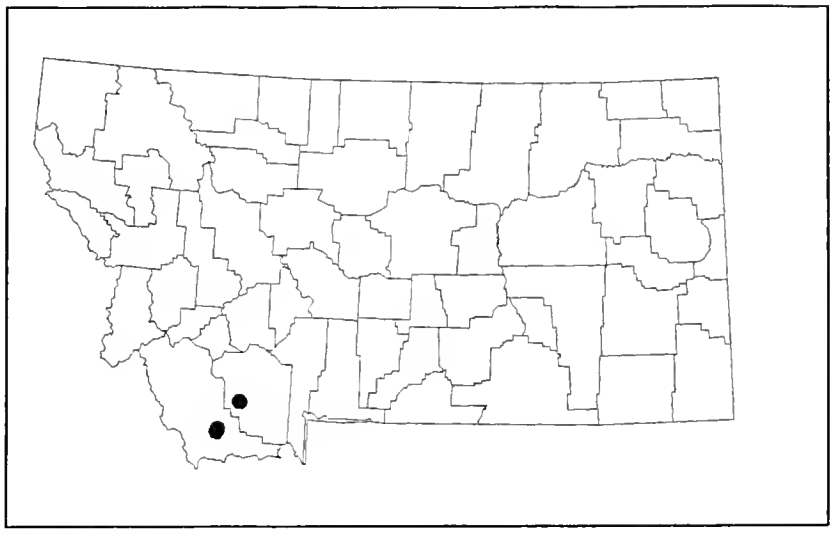
Townsendia florifer is most similar to *T. parryi* which is common in southwestern Montana but usually occurs at higher elevations. Both species have simple crowns and leafy flower stems which are tall compared to other Montana species of *Townsendia* which generally have branched caudices and leaves and flower heads which hug the ground. *Townsendia florifer* has smaller flower heads than *T. parryi* and has pink rays rather than lavender, purplish, or blue rays of the latter. It may also be mistaken for species of the other daisy genera *Aster* and *Erigeron*. Species of *Erigeron* differ by having an involucre consisting of a single series of narrow bracts all of about the same size. Species of *Aster* share the imbricate involucre of *Townsendia florifer*, but mostly have more numerous, smaller flower heads with blueish colored rays.

GEOGRAPHICAL DISTRIBUTION

Global distribution: Western North America, east of the Cascades and west to the Rocky Mountains, from Alberta south to Nevada, west to Utah and Idaho (Hitchcock and Cronquist 1983). It is known historically from Wyoming by pre-1935 collection (Fertig 1996) and was discovered in Montana in 1985.

Montana distribution: *Townsendia florifer* was first collected in the state by Peter Lesica in 1985 from two nearby sites in the Sage Creek area, Beaverhead County,

one of which was relocated in 1995 (Lesica and Vanderhorst 1995). With the 1996 discovery of the species in the Ruby Range there are now just three known occurrences in Montana (see state distribution map).



Local distribution: One population was discovered near Mud Spring on private land at the lower end of the Garden Creek allotment at the southeast edge of the Ruby Range study area. This is the first documented occurrence in Madison County. The low elevation potential habitat is limited to the immediate vicinity, and potential habitat elsewhere in the Ruby Valley outside of the study area was not searched.

HABITAT: Hitchcock (1955) describes the habitat throughout its range as "dry, open places in the plains and foothills, often among sagebrush." In southwestern Montana, *Townsendia florifer* grows in dry, bare soils of open habitats in foothills with elevations ranging from 5,800 to 6,500 feet. In the Sage Creek area it is found on eroding south-facing slopes and in sagebrush grasslands with sparse vegetation.

In the Ruby Range study area it grows in a foothills setting at gentle midslope positions in open plains above greasewood (*Sarcobatus vermiculatus*) flats and below the mountain slopes. The soil is powdery silt, mapped in the Trudau loam 2-8% series. The soil parent material is colluvium and the soils form on fans, footslopes, and terraces of sedimentary uplands (USDA Soil Conservation Service 1989). Most soils in this series are moderately to strongly alkaline, and the species associated with *Townsendia florifer* indicate that local soil conditions are calcareous. It has a low water holding capacity and there is much bare ground. The habitat type is in the *Stipa comata* series, and woody sages are absent. Associated plant species include *Koeleria macrantha* (syn. *K. cristata*),*Oryzopsis contracta, Poa secunda*, *Stipa viridula, Musineon divaricatum, Allium textile*, and *Artemisia frigida.* A photo of the habitat is shown in Appendix E. This foothills grassland habitat is limited to the lower Cottonwood Creek valley in the far southeastern corner of the study area.

POPULATION INFORMATION: There are three populations of *Townsendia florifer* with perhaps fewer than 100 total plants documented in Montana. The population in the Ruby Range study area is the largest known in Montana to date with about 50 plants in four diffuse groups. The species was described as rare at the Sage Creek sites with perhaps fewer than 20 plants at one site visited in 1985 and 1995 (Lesica and Vanderhorst 1995). The plants have been found in Montana in early June, and were in early stages of flowering on June 2 at the Ruby Range site.

MANAGEMENT CONSIDERATIONS: The known distribution of *Townsendia florifer* in Montana is restricted to a small area of arid foothills in east Beaverhead County and west Madison County, an area of mostly BLM and private holdings with a long history of use for livestock grazing. There are few populations and low total number of plants documented in the state and these occur in landscape positions accessible to cattle. The plants grow in bare soil and may be adapted to some level of disturbance associated with grazing, but population trends under current management regimes is unknown (Lesica and Vanderhorst 1995). It is possible that the species is more widespread than currently known because it grows at low elevations which are mostly privately owned and thus have not been surveyed for sensitive plants. All known Montana occurrences are on or near BLM lands in the Dillon Resource Area. Current BLM Watch status remains appropriate.

CONCLUSION

The Ruby Range contains the most extensive and diverse forests and woodlands on BLM lands in the Dillon Resource Area, although none of the types are rare or imperiled. Four of the timbered types and one of the wetland types had not previously been documented on BLM lands in the state. Segments of high elevation forest have exceptional quality and excellent condition. The best examples of these are recommended for special management consideration in cases where they represent the best examples on public lands of southwestern Montana; potentially the case with a noteworthy old-growth limber pine stand described under the *Pinus flexilis/Festuca idahoensis* p.a. In general, the predominance of limber pine in most forested upper-elevation community types is uncommon for southwestern Montana.

Much of the timbered land, as with the general landscape, is dry and has low productivity. All of the noteably intact landscape segments are places that escaped or were little-affected by the history of logging which continues to the present. Other notably intact segments of the landscape include the high elevation grasslands of *Festuca idahoensis/Potentilla diversifolia* p.a. at the south end, and the low elevation shrublands of *Artemisia nova/Agropyron spicatum* p.a. at the lower northeast end. They do not represent BLM special status community types nor habitats for special status species.

Three BLM special status species were documented for the first time *(Lomatium attenuatum, Oryzopsis contracta and Townsendia florifer*), and one previous record was to determined to be in error (*Machaeranthera conmixta*). The *Oryzopsis contracta* was determined from other concurrent studies to be more common than previously recognized, so both it and *Machaeranthera conmixta* are recommended for deletion from the BLM list of special status species. Potential habitat for *Townsendia florifer* barely extends into the study area, but the Ruby Range may provide important canyon habitat for *Lomatium attenuatum.* This possibility was not thoroughly assessed because the species was not discovered in the range until July, by which time it was difficult to survey. It is known from fewer than a dozen stations in the world, and is a priority for extended early season inventory and status evaluation.

Among the interesting vegetation features that were documented are the well-developed peatlands and springs of the Ruby Valley, which barely enter the study area. These Ruby Valley wetland systems are a priority for extended inventory for both their sensitive species and communities.

The Ruby Range is remarkably free of noxious weeds, but encroachment of spotted knapweed is taking place in low numbers around much of the perimeter and lower elevation travel routes. This poses the greatest potential threat identified to date for the special status species and low elevation plant communities.

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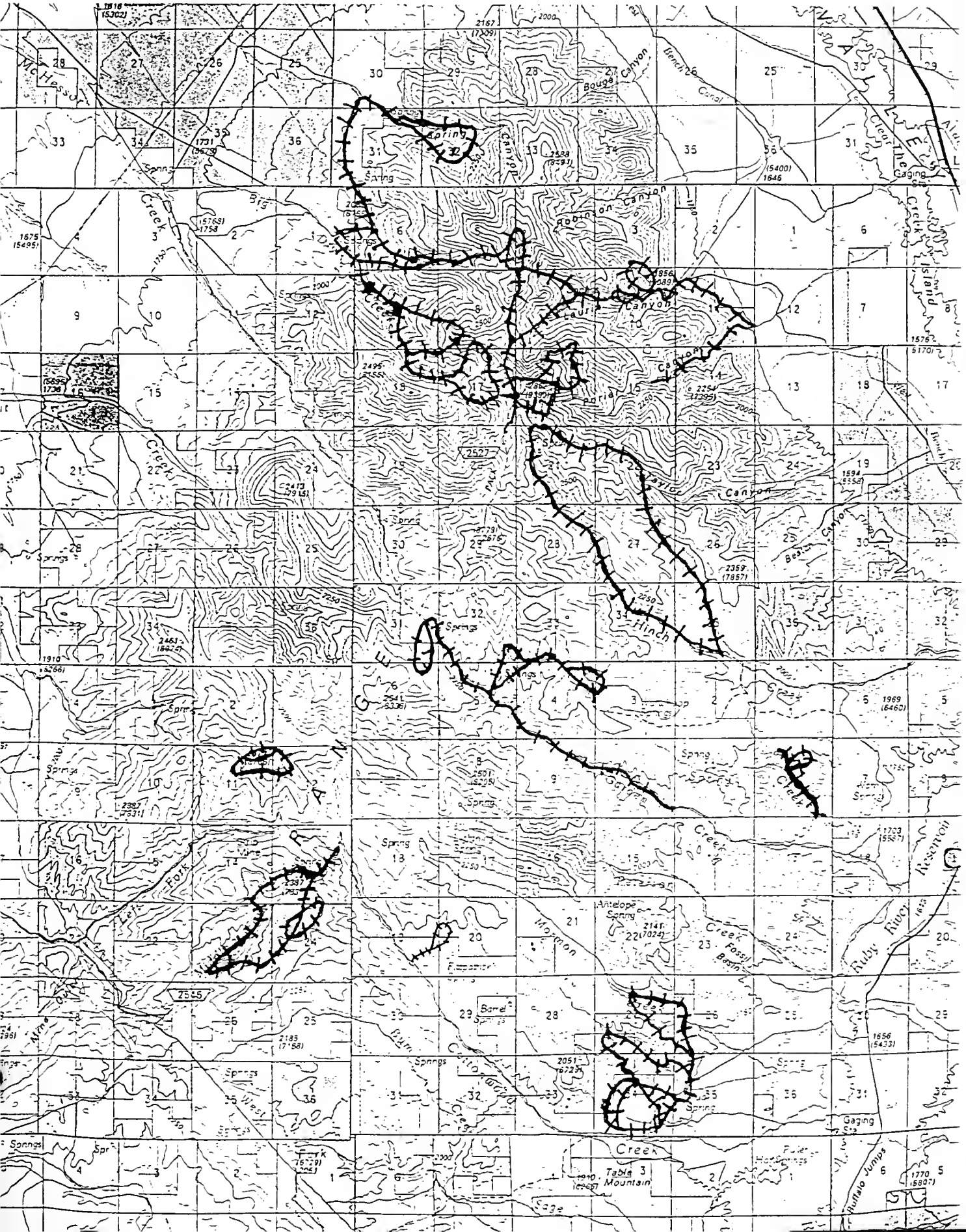
APPENDIX A: SENSITIVE PLANT SURVEY ROUTES IN THE RUBY RANGE



Appendix B. Vegetation synthesis and constancy/cover tables.

Synthesis and Constancy/Cover Tables that immediately follow this guide present vascular species cover by mid-point of cover classes or averages of cover class mid-points; Synthesis Table is for all sites (plots, only last two digits of 16 character identifier are given in synthesis and constancy/cover tables); the order of presentation of plots within synthesis table and plant association/community types (P.As./C.Ts.)within Constancy/Cover Table is as follows:

Guide to Plant Association/Community Type & Site Identification Code:

P.A./C.T. Number	Site Identification Code		
1. ABILAS/LINBOR:	1. NHMTECRR96SC0008		
2. ABILAS/ARNCOR:	2. NHMTBTRR96JP0014		
3. PICEA/SENSTR:	3. NHMTBTRR96JP0015	4. NHMTBTRR96JP0016	
	5. NHMTBTRR96JP0020	6. NHMTBTRR96JP0018	
4. PSEMEN/ARNCOR:	7. NHMTBTRR96JP0021	8. NHMTECRR96SC0002	
	9. NHMTECRR96SC0007		
5. PSEMEN/JUNCOM:	10. NHMTBTRR96JP0022		
6. PSEMEN/FESIDA:	11. NHMTBTRR96JP0019		
7. PSEMEN/SCREE:	12. NHMTECRR96SC0003		
8. PINFLE/FESIDA:	13. NHMTECRR96SC0011		
9. JUNSCO/ARTNOV:	14. NHMTECRR96SC0004		
10. ARTTST/AGRSMI:	15. NHMTECRR96SC0005		
11. ARTTSV/FESIDA:	16. NHMTECRR96SC0009	17. NHMTECRR96SC0013	
12. ARTNOV/AGRSPI:	18. NHMTECRR96SC0001	19. NHMTBTRR96JP0013	
13. FESIDA-AGRSPI:	20. NHMTECRR96SC0012		
14. FESIDA/POTDIV:	21. NHMTECRR96SC0010	22. NHMTBTRR96JP0017	
15. CARSIM:	23. NHMTECRR96SC0006		

Ruby Range Synthesis Table: Vascular Species Canopy Cover by Site (Plot) Within Plant Association/Community Type

(for order of community types see introduction to Appendix C)

Community	1	2	3	3	3	3	4	4	4	5	6	7	8	9	10
Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Trees															
ABILAS	1	10	1	---	---	---	---	1	---	---	---	---	---	---	---
JUNSCO	---	---	---	3	---	---	---	---	---	1	---	20	---	17	---
PICENG	4	30	3	10	30	40	---	3	---	---	---	---	---	---	---
PINCON	63	---	---	---	---	---	---	20	3	---	---	---	---	---	---
PINFLE	---	10	20	20	30	---	1	---	---	10	10	7	42	---	---
PSEMEN	1	---	10	3	10	50	40	53	70	50	40	33	1	---	---
Shrubs															
ACEGLA	---	---	---	---	---	---	---	1	---	---	---	1	---	---	---
ARCUVA	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---
ARTFRI	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
ARTNOV	---	---	---	---	---	---	---	---	---	---	---	---	---	17	---
ARTTST	---	---	---	---	---	---	---	---	---	---	---	---	---	---	23
ARTTSV	---	---	---	---	---	---	---	---	---	---	1	---	1	---	---
BERREP	---	---	---	---	---	---	---	3	---	---	---	1	---	---	---
CERLED	---	---	---	---	---	---	---	---	---	---	---	3	---	---	---
CHRNAU	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2
CHRVIS	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1
GUTSAR	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---
HAPSUF	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
JUNCOM	1	1	10	---	1	---	1	4	1	20	---	---	4	---	---
LINBOR	27	---	---	---	---	---	---	---	---	---	---	---	---	---	---
RIBLAC	---	---	---	---	---	1	1	1	---	---	---	---	---	---	---
RIBSET	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ROSWOO	---	---	---	---	---	---	---	1	---	1	---	1	---	---	---
SPIBET	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SYMORE	---	---	---	---	---	---	---	1	1	1	---	1	---	---	---
TETCAN	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
VACSCO	80	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Graminoids															
AGRCAN	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---
AGRREP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
AGRSMI	---	---	---	---	---	---	---	---	---	---	---	---	---	---	30
AGRSPI	---	---	1	---	---	---	---	---	---	---	1	1	13	33	---
AGRTRA	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BOUGRA	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BROMUS	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---
BROPUM	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BROTEC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
BROVUL	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---
CALPUR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CALRUB	40	---	---	---	---	---	---	---	10	---	---	---	---	---	---

Community	1	2	3	3	3	3	4	4	4	5	6	7	8	9	10
Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Graminoids continued															
CALSTR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CARCON	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---
CARDEW	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CAREXX	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CARGEY	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---
CARMIC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CARNEB	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CAROBT	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CARPAR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CARROI	---	---	---	---	---	---	---	---	---	1	---	---	1	---	---
CARSIM	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CARSTE	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DESCES	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ELEPAU	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ELYCIN	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4
FESIDA	---	---	---	---	---	---	---	---	---	---	3	---	23	---	---
FESOCC	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---
JUNBAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
KOEMAC	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
MUHRIC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ORYHYM	---	---	---	---	---	---	---	---	---	---	---	1	---	1	---
POACUS	---	---	---	---	---	---	---	---	---	---	---	---	1	---	20
POAINT	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
POANER	---	---	---	---	---	---	1	1	2	---	---	---	10	---	---
POANEV	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---
POAPRA	---	---	---	---	---	---	---	---	---	---	---	---	---	1	60
POASAN	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---
POASEC	---	1	1	---	---	---	---	---	---	1	3	---	---	---	---
SITHYS	---	---	1	1	1	---	1	---	---	---	---	---	---	---	---
STINEL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
STIVIR	---	---	1	---	---	---	---	---	---	---	1	---	---	3	---
TRICER	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
TRISPI	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---
Forbs															
ACHMIL	---	1	1	---	1	---	1	---	1	---	1	1	3	1	3
ACTRUB	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---
AGOGLA	---	---	1	1	1	---	---	---	1	---	---	---	---	---	---
ALLCER	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
ALLIUM	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ALLTEX	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ALYALY	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
ANDSEP	---	---	---	---	---	---	---	---	1	---	---	1	---	---	---
ANENUT	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
ANTANA	---	---	---	---	---	---	---	---	1	---	---	---	1	---	---
ANTDIM	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Community	1	2	3	3	3	3	4	4	4	5	6	7	8	9	10
Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Forbs Continued															
ANTMIC	---	3	---	---	---	---	---	---	---	---	1	1	3	1	---
ANTPAR	---	---	---	---	---	---	---	7	---	---	---	---	---	---	---
ANTRAC	1	3	---	---	1	1	3	---	3	---	---	---	---	---	---
ANTUMB	---	---	---	1	1	---	---	---	---	---	---	---	---	---	---
AQUFLA	---	---	---	---	---	1	---	1	---	---	---	---	---	---	---
ARABIS	---	---	---	---	---	---	---	---	1	---	1	---	1	---	---
ARACON	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---
ARAHIR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ARECON	---	---	---	1	---	---	---	---	---	---	1	---	3	---	---
ARNCOR	2	---	---	---	---	1	3	30	23	---	1	1	4	---	---
ARNLAT	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---
ARNRYD	---	1	1	1	---	---	---	---	---	---	---	---	---	---	---
ARNSOR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ASTADS	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
ASTBRA	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ASTCON	---	---	---	---	---	---	3	1	---	10	---	---	---	---	---
ASTERX	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ASTGIL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ASTKEN	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
ASTMIS	1	1	---	1	1	---	1	50	1	3	10	1	1	---	---
ASTOCC	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---
ASTPUR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ASTRAG	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---
ASTSCO	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
ASTSIB	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
BALSAG	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BESWYO	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
CAMROT	1	---	---	---	1	1	---	1	1	---	---	---	---	---	---
CAPBUR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
CASFLA	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CASLUT	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
CASMIN	---	---	1	1	---	---	---	---	---	---	---	---	---	---	---
CASRUS	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
CASTIL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CERARV	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CIRSCA	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CIRSIU	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---
CIRSUB	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
CIRUND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CLALAN	---	---	---	---	---	---	---	---	1	---	---	---	1	---	---
COLLIN	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
COLPAR	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---
COMUMB	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
CREACU	---	---	---	---	---	---	---	---	---	---	---	1	---	1	---
CREOCC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CRERUN	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Community	1	2	3	3	3	3	4	4	4	5	6	7	8	9	10
Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Forbs Continued															
CRYCEL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CRYSPI	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CYMBIP	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
CYNOFF	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DELBIC	---	---	---	---	---	---	---	---	---	---	1	---	1	---	---
DELGLA	---	---	1	1	1	---	1	---	---	---	---	---	---	---	---
DELNUT	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---
DELOCC	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
DESRIC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
DESSOP	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
DODCON	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
DODPUL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DOUMON	---	1	---	---	---	---	---	---	---	---	---	---	1	---	---
DRAOLI	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
DRASTE	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
EPIANG	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ERICAE	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ERICOM	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
ERIDIV	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ERIFLA	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ERIHUM	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ERIOVA	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
ERITWE	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
ERYASP	---	---	---	1	---	---	---	---	---	---	---	---	---	1	---
ERYREP	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
FRASPE	---	1	---	---	1	---	1	---	---	---	---	---	1	---	---
FRAVES	---	---	---	---	---	1	---	10	---	---	---	---	---	---	---
FRAVIR	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---
FRIPUD	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
GALBOR	---	---	---	---	---	---	---	1	3	---	---	---	---	---	---
GENAQU	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GERVIS	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GEUTRI	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HACPAT	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---
HAPACA	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
HEDBOR	---	---	---	---	---	---	---	---	---	---	---	---	---	3	---
HETVIL	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
HEUPAR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HIERAC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
LAPRED	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2
LEWRED	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
LINLEW	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
LINPER	---	---	1	---	---	---	---	---	---	---	---	---	---	1	---
LITPAR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
LOMAMB	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
LOMDIS	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---

Community	1	2	3	3	3	3	4	4	4	5	6	7	8	9	10
Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Forbs Continued															
LUPSER	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---
MACCAN	---	---	3	---	---	---	---	---	---	---	---	---	---	---	---
MEDSAT	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---
MEROBL	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---
MERVIR	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
MICNUT	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---
MUSDIV	---	---	---	---	---	---	---	---	---	---	---	1	2	1	---
MYOARV	---	---	---	---	---	---	---	---	1	---	---	---	1	---	---
OENCES	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---
OPUPOL	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
OSMCHI	---	1	---	---	1	1	1	---	---	---	---	---	---	---	---
OSMDEP	---	---	---	---	---	---	---	1	1	---	---	---	---	---	---
OXYLAG	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
OXYSER	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
PENARI	---	---	---	---	---	---	---	---	---	---	---	1	---	1	---
PENATT	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
PENSTE	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---
PERGAI	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PHACEL	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
PHAHAS	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---
PHLHOO	---	1	---	1	---	---	---	---	---	---	---	---	---	1	---
PHLLON	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
PHYGEY	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---
POLBIS	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---
POLDOU	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
POTDIV	---	1	---	---	1	---	1	---	1	---	---	---	1	---	---
POTENT	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
POTGRA	---	---	---	---	---	---	---	1	1	---	---	---	3	---	---
POTOVI	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
PYRCHL	2	---	---	---	---	1	---	---	---	---	---	---	---	---	---
PYRSEC	---	1	---	---	---	1	---	1	1	---	---	---	---	---	---
RANUNC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SAXOCC	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SEDBOR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SEDLAN	---	1	---	---	1	---	---	---	---	---	---	---	1	---	---
SENCAN	---	---	---	---	---	---	---	---	---	---	---	2	---	1	---
SENINT	---	---	---	---	---	---	---	---	---	---	1	---	1	---	---
SENSTR	---	1	1	1	1	1	---	1	---	---	---	---	---	---	---
SILENE	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SOLMUL	---	1	1	1	10	1	---	---	---	3	---	---	1	---	---
SPHCOC	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
STERUN	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---
SYNPIN	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---
TARLAE	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TAROFF	---	---	---	---	1	---	---	---	1	---	---	1	---	---	20
THAOCC	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---

Community	1	2	3	3	3	3	4	4	4	5	6	7	8	9	10
Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Forbs Continued															
TOWHOO	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOWMON	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---
TRADUB	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---
TRIMAR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TRIPAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
VALDIO	1	1	---	1	1	1	1	---	2	---	---	---	1	---	---
VIONUT	---	---	---	---	---	1	---	---	---	---	---	---	---	1	---
ZIGELE	---	1	---	---	1	---	---	---	---	---	---	---	---	---	---
ZIGVEN	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ferns & Fern-allies															
SELDEN	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Ruby Range Synthesis Table: Vascular Species Canopy Cover by Site (Plot) Within Plant Association/Community Type

(for order of community types see introduction to Appendix C)

Community	11	11	12	12	13	14	14	15
Site	16	17	18	19	20	21	22	23
Trees								
ABILAS	---	---	---	---	---	---	---	---
JUNSCO	---	---	1	1	---	---	---	---
PICENG	---	---	---	---	---	---	---	---
PINCON	---	---	---	---	---	---	---	---
PINFLE	---	---	---	---	---	---	---	---
PSEMEN	---	---	---	---	---	---	---	---
Shrubs								
ACEGLA	---	---	---	---	---	---	---	---
ARCUVA	---	---	---	---	---	---	---	---
ARTFRI	---	---	1	1	---	---	---	---
ARTNOV	---	---	23	10	---	---	---	---
ARTTST	---	---	---	---	---	---	---	---
ARTTSV	33	30	---	---	1	1	---	---
BERREP	---	---	---	---	---	---	---	---
CERLED	---	---	---	---	---	---	---	---
CHRNAU	---	---	1	2	---	---	---	---
CHRVIS	---	1	1	---	---	1	---	---
GUTSAR	---	---	3	3	---	---	---	---
HAPSUF	---	---	---	---	---	---	---	---
JUNCOM	---	---	---	---	---	---	---	---
LINBOR	---	---	---	---	---	---	---	---
RIBLAC	---	---	---	---	---	---	---	---
RIBSET	---	---	---	---	1	---	---	---
ROSWOO	---	---	---	---	---	---	---	---
SPIBET	---	---	---	---	---	---	---	---
SYMORE	---	1	---	---	1	---	---	---
TETCAN	---	---	1	1	---	1	---	---
VACSCO	---	---	---	---	---	---	---	---
Grasses								
AGRCAN	---	---	---	---	---	---	---	---
AGRREP	---	---	---	---	---	---	---	---
AGRSMI	---	---	3	---	---	---	---	---
AGRSPI	1	3	30	20	10	1	---	---
AGRTRA	---	---	---	---	1	---	---	---
BOUGRA	---	---	1	---	---	---	---	---
BROMUS	---	---	---	---	---	---	---	---
BROPUM	---	---	---	---	3	---	---	---
BROTEC	---	---	---	---	---	---	---	---
BROVUL	---	---	---	---	---	---	---	---
CALPUR	---	---	---	---	---	---	1	---
CALRUB	---	---	---	---	---	---	---	---

Community	* 11 *	11 *	12 *	12 *	13 *	14 *	14 *	15 *
Site	* 16 *	17 *	18 *	19 *	20 *	21 *	22 *	23 *
Graminoids Continued								
CALSTR	---	---	---	---	---	---	---	1
CARCON	---	---	---	---	---	---	---	---
CARDEW	---	1	---	---	1	---	---	---
CAREXX	---	---	---	---	1	---	---	---
CARGEY	---	---	---	---	---	---	---	---
CARMIC	---	---	---	---	---	---	---	10
CARNEB	---	---	---	---	---	---	---	23
CAROBT	---	---	---	---	---	33	---	---
CARPAR	---	---	---	---	---	---	---	1
CARROI	1	---	---	---	---	1	---	---
CARSIM	---	---	---	---	---	---	---	70
CARSTE	---	---	1	---	---	---	---	---
ELEPAU	---	---	---	---	---	---	---	27
ELYCIN	---	---	---	---	---	---	---	---
FESIDA	47	40	---	20	50	37	30	---
FESOCC	---	---	---	---	---	---	---	---
JUNBAL	---	---	---	---	---	---	---	1
KOEMAC	1	---	3	1	---	1	1	---
MUHRIC	---	---	---	---	---	---	---	3
ORYHYM	---	---	1	---	---	---	---	---
POACUS	---	---	---	1	---	4	---	---
POAINT	---	---	---	---	---	---	---	---
POANER	---	---	---	---	---	---	---	---
POANEV	---	---	---	---	---	---	---	---
POAPRA	---	---	1	---	1	---	---	---
POASAN	---	---	---	---	---	---	---	---
POASEC	---	1	---	---	1	---	---	---
SITHYS	---	---	---	---	---	---	---	---
STINEL	---	---	---	---	3	---	---	---
STIVIR	---	---	---	---	---	---	---	---
TRICER	---	---	---	---	---	---	---	---
TRISPI	---	---	---	---	---	---	1	---
Forbs								
ACHMIL	1	2	---	1	4	---	1	---
ACTRUB	---	---	---	---	---	---	---	---
AGOGLA	---	---	---	---	---	---	---	---
ALLCER	---	1	---	1	---	---	---	---
ALLIUM	---	---	---	---	---	1	---	---
ALLTEX	1	---	---	---	---	---	---	---
ALYALY	---	---	---	---	---	---	---	---
ANDSEP	---	---	---	---	---	---	---	---
ANENUT	---	---	---	---	---	---	---	---
ANTANA	---	---	---	---	---	---	---	---
ANTDIM	---	---	1	---	---	---	---	---

Community	11	11	12	12	13	14	14	15
Site	16	17	18	19	20	21	22	23
Graminoids Continued								
CALSTR	---	---	---	---	---	---	---	1
CARCON	---	---	---	---	---	---	---	---
CARDEW	---	1	---	---	1	---	---	---
CAREXX	---	---	---	---	1	---	---	---
CARGEY	---	---	---	---	---	---	---	---
CARMIC	---	---	---	---	---	---	---	10
CARNEB	---	---	---	---	---	---	---	23
CAROBT	---	---	---	---	---	33	---	---
CARPAR	---	---	---	---	---	---	---	1
CARROI	1	---	---	---	---	1	---	---
CARSIM	---	---	---	---	---	---	---	70
CARSTE	---	---	1	---	---	---	---	---
DESCES	---	---	---	---	---	---	---	4
ELEPAU	---	---	---	---	---	---	---	27
ELYCIN	---	---	---	---	---	---	---	---
FESIDA	47	40	---	20	50	37	30	---
FESOCC	---	---	---	---	---	---	---	---
JUNBAL	---	---	---	---	---	---	---	1
KOEMAC	1	---	3	1	---	1	1	---
MUHRIC	---	---	---	---	---	---	---	3
ORYHYM	---	---	1	---	---	---	---	---
POACUS	---	---	---	1	---	4	---	---
POAINT	---	---	---	---	---	---	---	---
POANER	---	---	---	---	---	---	---	---
POANEV	---	---	---	---	---	---	---	---
POAPRA	---	---	1	---	1	---	---	---
POASAN	---	---	---	---	---	---	---	---
POASEC	---	1	---	---	1	---	---	---
SITHYS	---	---	---	---	---	---	---	---
STINEL	---	---	---	---	3	---	---	---
STIVIR	---	---	---	---	---	---	---	---
TRICER	---	---	---	---	---	---	---	---
TRISPI	---	---	---	---	---	---	1	---
Forbs								
ACHMIL	1	2	---	1	4	---	1	---
ACTRUB	---	---	---	---	---	---	---	---
AGOGLA	---	---	---	---	---	---	---	---
ALLCER	---	1	---	1	---	---	---	---
ALLIUM	---	---	---	---	---	1	---	---
ALLTEX	1	---	---	---	---	---	---	---
ALYALY	---	---	---	---	---	---	---	---
ANDSEP	---	---	---	---	---	---	---	---
ANENUT	---	---	---	---	---	---	---	---
ANTANA	---	---	---	---	---	---	---	---
ANTDIM	---	---	1	---	---	---	---	---

Community	11	11	12	12	13	14	14	15
Site	16	17	18	19	20	21	22	23
Forbs Continued								
ANTMIC	1	4	1	---	1	7	---	---
ANTPAR	---	---	---	---	---	---	---	---
ANTRAC	---	---	---	---	---	---	---	---
ANTUMB	---	---	---	---	---	---	---	---
AQUFLA	---	---	---	---	---	---	---	---
ARABIS	---	---	---	---	---	---	---	---
ARACON	---	---	---	---	---	---	---	---
ARAHIR	---	1	---	---	---	---	---	---
ARECON	---	---	---	1	1	1	---	---
ARNCOR	---	---	---	---	---	---	---	---
ARNLAT	---	---	---	---	---	---	---	---
ARNRYD	---	---	---	---	---	---	---	---
ARNSOR	---	1	---	---	1	---	---	---
ASTADS	---	---	---	---	---	---	---	---
ASTBRA	---	---	---	---	---	---	---	2
ASTCON	---	---	---	---	---	---	---	---
ASTERX	---	---	---	---	---	---	---	---
ASTGIL	---	---	1	---	---	---	---	---
ASTKEN	---	---	---	---	---	---	---	---
ASTMIS	2	---	---	1	---	1	---	---
ASTOCC	---	---	---	---	---	---	---	---
ASTPUR	---	---	1	1	---	---	---	---
ASTRAG	---	---	---	---	---	---	---	---
ASTSCO	---	---	---	---	---	---	---	---
ASTSIB	---	---	---	---	---	---	---	---
BALSAG	---	3	---	---	1	---	---	---
BESWYO	---	---	---	---	---	2	---	---
CAMROT	---	---	1	---	---	---	---	---
CAPBUR	---	---	---	---	---	---	---	---
CASFLA	1	1	---	---	---	---	1	---
CASLUT	---	---	---	---	---	---	---	---
CASMIN	---	---	---	---	---	---	---	---
CASRUS	---	---	1	---	---	---	---	---
CASTIL	---	---	1	1	---	2	---	---
CERARV	1	1	---	---	---	---	---	---
CIRSCA	---	---	---	---	---	---	---	1
CIRSIU	---	---	---	---	---	---	---	---
CIRSUB	---	---	---	---	---	---	---	---
CIRUND	---	---	---	1	---	---	---	---
CLALAN	---	---	---	---	---	---	---	---
COLLIN	---	1	---	---	1	---	---	---
COLPAR	---	1	---	---	1	---	---	---
COMUMB	---	---	---	1	---	---	---	---
CREACU	---	1	---	---	---	---	---	---
CREOCC	---	---	1	---	---	---	---	---
CRERUN	---	---	---	---	---	---	---	1

Community	11	11	12	12	13	14	14	15
Site	16	17	18	19	20	21	22	23
Forbs Continued								
CRYCEL	---	---	1	---	---	---	---	---
CRYSPI	---	---	1	---	---	---	---	---
CYMBIP	1	---	1	---	---	1	1	---
CYNOFF	---	---	---	---	1	---	---	---
DELBIC	1	---	---	---	---	---	---	---
DELGLA	---	---	---	---	---	---	---	---
DELNUT	---	---	---	---	---	---	---	---
DELOCC	---	---	---	---	---	---	---	---
DESRIC	---	---	---	---	---	---	---	---
DESSOP	---	---	---	---	---	---	---	---
DODCON	---	---	---	---	---	1	---	---
DODPUL	---	---	---	---	---	---	---	2
DOUMON	---	---	---	---	---	---	1	---
DRAOLI	1	---	---	---	---	---	---	---
DRASTE	---	---	---	---	---	1	---	---
EPIANG	---	---	---	---	---	---	---	---
ERICAE	---	---	---	---	---	---	1	---
ERICOM	1	1	---	---	---	1	---	---
ERIDIV	---	---	---	1	---	---	---	---
ERIFLA	---	---	---	---	---	1	---	---
ERIHUM	---	---	1	---	---	---	---	---
ERIOVA	---	---	---	---	---	---	---	---
ERITWE	---	---	1	---	---	---	---	---
ERYASP	---	---	---	---	---	---	---	---
ERYREP	---	---	1	---	---	---	---	---
FRASPE	---	---	---	---	---	---	---	---
FRAVES	---	---	---	---	---	---	---	---
FRAVIR	---	---	---	---	---	---	---	---
FRIPUD	---	---	---	1	---	---	---	---
GALBOR	---	---	---	---	---	---	---	---
GENAQU	---	---	---	---	---	---	---	1
GERVIS	---	1	---	---	1	---	---	---
GEUTRI	1	1	---	---	1	7	---	---
HACPAT	---	---	---	---	---	---	---	---
HAPACA	1	---	---	1	---	---	---	---
HEDBOR	---	---	---	---	---	---	---	---
HETVIL	---	---	1	---	---	---	---	---
HEUPAR	---	---	---	---	---	1	---	---
HIERAC	---	1	---	---	---	---	---	---
LAPRED	---	---	---	---	---	---	---	---
LEWRED	1	---	---	---	---	---	---	---
LINLEW	---	---	1	---	---	---	---	---
LINPER	---	---	---	1	---	---	---	---
LITPAR	---	---	---	---	1	---	---	---
LOMAMB	---	1	---	---	---	---	---	---
LOMDIS	---	---	---	---	---	---	---	---

Community	11	11	12	12	13	14	14	15
Site	16	17	18	19	20	21	22	23
Forbs Continued								
LUPSER	8	2	---	---	1	1	---	---
MACCAN	---	---	---	---	---	---	---	---
MEDSAT	---	---	---	---	---	---	---	---
MEROBL	1	1	---	---	1	1	---	---
MERVIR	---	---	---	---	---	---	---	---
MICNUT	3	---	---	---	---	1	---	---
MUSDIV	1	---	---	---	---	---	---	---
MYOARV	---	---	---	---	---	---	---	---
OENCES	---	---	---	---	---	---	---	---
OPUPOL	---	---	1	---	---	---	---	---
OSMCHI	---	---	---	---	---	---	---	---
OSMDEP	---	---	---	---	---	---	---	---
OXYLAG	---	---	---	---	---	1	---	---
OXYSER	---	---	---	---	---	---	3	---
PENARI	---	---	---	---	---	---	---	---
PENATT	1	---	---	---	---	---	---	---
PENSTE	---	---	---	---	---	---	---	---
PERGAI	---	---	---	---	1	---	---	---
PHACEL	---	---	---	---	---	---	---	---
PHAHAS	---	---	---	---	2	---	---	---
PHLHOO	---	---	1	1	---	---	1	---
PHLLON	1	1	---	---	1	1	---	---
PHYGEY	---	---	---	---	---	---	---	---
POLBIS	---	---	---	---	---	---	---	---
POLDOU	---	1	---	---	1	---	---	---
POTDIV	---	---	---	---	---	---	---	---
POTENT	---	---	---	---	---	---	---	1
POTGRA	---	1	---	---	1	---	---	---
POTOVI	---	---	---	---	---	1	---	---
PYRCHL	---	---	---	---	---	---	---	---
PYRSEC	---	---	---	---	---	---	---	---
RANUNC	---	---	---	---	---	---	---	1
SAXOCC	---	---	---	---	---	2	---	---
SEDBOR	1	---	---	---	---	1	---	---
SEDLAN	---	1	1	---	---	---	---	---
SENCAN	---	---	1	---	---	---	---	---
SENINT	---	3	---	---	2	---	---	---
SENSTR	---	---	---	---	---	---	---	---
SILENE	---	---	---	---	1	---	---	---
SOLMUL	---	---	---	---	---	---	---	---
SPHCOC	---	---	1	---	---	---	---	---
STERUN	---	---	---	---	---	---	---	---
SYNPIN	---	---	---	---	---	---	---	---
TARLAE	---	1	---	---	1	---	---	---
TAROFF	---	---	1	---	---	---	---	---
THAOCC	---	---	---	---	---	---	---	---

Community	11	11	12	12	13	14	14	15
Site	16	17	18	19	20	21	22	23
Forbs Continued								
TOWDOU			1					
TOWMOU								
TRADOU			1	1				
TRIMAP								4
TRIPAL								1
VALOFO								
VIOBIF								
ZIGELE								
ZIGVEN				1		1		
Ferns & fern allies								
BELDEN						27	10	

Ruby Range Constancy Cover Table: Vascular Species Constancy (Average Canopy Cover) [Range, Minimum - Maximum]
***by Plant Association/Community Type** (for order of community types see introduction to Appendix C)*

Community # Sites	ABILAS/LINBOR N = 1	ABILAS/ARNCOR N = 1	PICEA/SENSTR N = 4	PSEMEN/ARNCOR N = 3	PSEMEN/JUNCOM N = 1
Trees					
ABILAS	100 (1) [1 - 1]	100 (10) [10 - 10]	25 (1) [1 - 1]	33 (1) [1 - 1]	0 (0) [0 - 0]
JUNSCO	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (3) [3 - 3]	0 (0) [0 - 0]	100 (1) [1 - 1]
PICENG	100 (4) [4 - 4]	100 (30) [30 - 30]	100 (21) [3 - 40]	33 (3) [3 - 3]	0 (0) [0 - 0]
PINCON	100 (63) [63 - 63]	0 (0) [0 - 0]	0 (0) [0 - 0]	67 (12) [3 - 20]	0 (0) [0 - 0]
PINFLE	0 (0) [0 - 0]	100 (10) [10 - 10]	75 (23) [20 - 30]	33 (1) [1 - 1]	100 (10) [10 - 10]
PSEMEN	100 (1) [1 - 1]	0 (0) [0 - 0]	100 (18) [3 - 50]	100 (54) [40 - 70]	100 (50) [50 - 50]
Shrubs					
ACEGLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
ARCUVA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
ARTFRI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARTNOV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARTTST	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARTTSV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BERREP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (3) [3 - 3]	0 (0) [0 - 0]
CERLED	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CHRNAU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CHRVIS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
GUTSAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HAPSUF	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
JUNCOM	100 (1) [1 - 1]	100 (1) [1 - 1]	50 (6) [1 - 10]	100 (2) [1 - 4]	100 (20) [20 - 20]
LINBOR	100 (27) [27 - 27]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
RIBLAC	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	67 (1) [1 - 1]	0 (0) [0 - 0]
RIBSET	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ROSWOO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	100 (1) [1 - 1]
SPIBET	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SYMORE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	67 (1) [1 - 1]	100 (1) [1 - 1]
TETCAN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
VACSCO	100 (80) [80 - 80]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
Graminoids					
AGRCAN	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
AGRREP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
AGRSMI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
AGRSPI	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
AGRTRA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BOUGRA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BROMUS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
BROPUM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BROTEC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BROVUL	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
CALPUR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CALRUB	100 (40) [40 - 40]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (10) [10 - 10]	0 (0) [0 - 0]

Community # Sites	ABILAS/LINBOR N = 1	ABILAS/ARNCOR N = 1	PICEA/SENSTR N = 4	PSEMEN/ARNCOR N = 3	PSEMEN/JUNCOM N = 1
Graminoids Continued					
CALSTR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARCON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARDEW	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CAREXX	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARGEY	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARMIC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
CARNEB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CAROBT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARROI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARSIM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]
CARSTE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DESCES	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ELEPAU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ELYCIN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
FESIDA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
FESOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
JUNBAL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
KOEMAC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
MUHRIC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ORYHYM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POACUS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POAINT	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
POANER	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 2]	0 (0) [0 - 0]
POANEV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]
POAPRA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POASAN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POASEC	0 (0) [0 - 0]	100 (1) [1 - 1]	25 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]
SITHYS	0 (0) [0 - 0]	0 (0) [0 - 0]	75 (1) [1 - 1]	33 (1) [1 - 1]	0 (0) [0 - 0]
STINEL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
STIVIR	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRICER	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRISPI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
Forbs					
ACHMIL	0 (0) [0 - 0]	100 (1) [1 - 1]	50 (1) [1 - 1]	67 (1) [1 - 1]	0 (0) [0 - 0]
ACTRUB	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
AGOGLA	0 (0) [0 - 0]	0 (0) [0 - 0]	75 (1) [1 - 1]	33 (1) [1 - 1]	0 (0) [0 - 0]
ALLCER	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ALLIUM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ALLTEX	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ALYALY	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANDSEP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANENUT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
ANTANA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANTDIM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]

Community # Sites	ABILAS/LINBOR N = 1	ABILAS/ARNCOR N = 1	PICEA/SENSTR N = 4	PSEMEN/ARNCOR N = 3	PSEMEN/JUNCOM N = 1
Forbs Continued					
ANTMIC	0 (0) [0 - 0]	100 (3) [3 - 3]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANTPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (7) [7 - 7]	0 (0) [0 - 0]
ANTRAC	100 (1) [1 - 1]	100 (3) [3 - 3]	50 (1) [1 - 1]	67 (3) [3 - 3]	0 (0) [0 - 0]
ANTUMB	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
AQUFLA	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	33 (1) [1 - 1]	0 (0) [0 - 0]
ARABIS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
ARACON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARAHIR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARECON	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARNCOR	100 (2) [2 - 2]	0 (0) [0 - 0]	25 (1) [1 - 1]	100 (19) [3 - 30]	0 (0) [0 - 0]
ARNLAT	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARNRYD	0 (0) [0 - 0]	100 (1) [1 - 1]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARNSOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTADS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTBRA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTCON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	67 (2) [1 - 3]	100 (10) [10 - 10]
ASTERX	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTGIL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTKEN	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTMIS	100 (1) [1 - 1]	100 (1) [1 - 1]	50 (1) [1 - 1]	100 (17) [1 - 50]	100 (3) [3 - 3]
ASTOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTPUR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTRAG	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTSCO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTSIB	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
BALSAG	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BESWYO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CAMROT	100 (1) [1 - 1]	0 (0) [0 - 0]	50 (1) [1 - 1]	67 (1) [1 - 1]	0 (0) [0 - 0]
CAPBUR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CASFLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CASLUT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CASMIN	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
CASRUS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CASTIL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CERARV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CIRSCA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CIRSIU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CIRSUB	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
CIRUND	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CLALAN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
COLLIN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
COLPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
COMUMB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CREACU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CREOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CRERUN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]

Community # Sites	ABILAS/LINBOR N = 1	ABILAS/ARNCOR N = 1	PICEA/SENSTR N = 4	PSEMEN/ARNCOR N = 3	PSEMEN/JUNCOM N = 1
Forbs Continued					
CRYCEL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CRYSPI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CYMBIP	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
CYNOFF	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DELBIC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DELGLA	0 (0) [0 - 0]	0 (0) [0 - 0]	75 (1) [1 - 1]	33 (1) [1 - 1]	0 (0) [0 - 0]
DELNUT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
DELOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DESRIC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DESSOP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DODCON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DODPUL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DOUMON	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DRAOLI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DRASTE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
EPIANG	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERICAE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERICOM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERIDIV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERIFLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERIHUM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERIOVA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERITWE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERYASP	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERYREP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
FRASPE	0 (0) [0 - 0]	100 (1) [1 - 1]	25 (1) [1 - 1]	33 (1) [1 - 1]	0 (0) [0 - 0]
FRAVES	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	33 (10) [10 - 10]	0 (0) [0 - 0]
FRAVIR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
FRIPUD	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
GALBOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	67 (2) [1 - 3]	0 (0) [0 - 0]
GENAQU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
GERVIS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
GEUTRI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HACPAT	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
HAPACA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HEDBOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HETVIL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HEUPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HIERAC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LAPRED	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LEWRED	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LINLEW	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LINPER	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
LITPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LOMAMB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LOMDIS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]

Community # Sites	ABILAS/LINBOR N = 1	ABILAS/ARNCOR N = 1	PICEA/SENSTR N = 4	PSEMEN/ARNCOR N = 3	PSEMEN/JUNCOM N = 1
Forbs Continued					
LUPSER	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
MACCAN	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (3) [3 - 3]	0 (0) [0 - 0]	0 (0) [0 - 0]
MEDSAT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
MEROBL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
MERVIR	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
MICNUT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
MUSDIV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
MYOARV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
OENCES	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
OPUPOL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
OSMCHI	0 (0) [0 - 0]	100 (1) [1 - 1]	50 (1) [1 - 1]	33 (1) [1 - 1]	0 (0) [0 - 0]
OSMDEP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	67 (1) [1 - 1]	0 (0) [0 - 0]
OXYLAG	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
OXYSER	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PENARI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PENATT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PENSTE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]
PERGAI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PHACEL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PHAHAS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PHLHOO	0 (0) [0 - 0]	100 (1) [1 - 1]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
PHLLON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PHYGEY	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POLBIS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]
POLDOU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POTDIV	0 (0) [0 - 0]	100 (1) [1 - 1]	25 (1) [1 - 1]	67 (1) [1 - 1]	0 (0) [0 - 0]
POTENT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POTGRA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	67 (1) [1 - 1]	0 (0) [0 - 0]
POTOVI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PYRCHL	100 (2) [2 - 2]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
PYRSEC	0 (0) [0 - 0]	100 (1) [1 - 1]	25 (1) [1 - 1]	67 (1) [1 - 1]	0 (0) [0 - 0]
RANUNC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SAXOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SEDBOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SEDLAN	0 (0) [0 - 0]	100 (1) [1 - 1]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
SENCAN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SENINT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SENSTR	0 (0) [0 - 0]	100 (1) [1 - 1]	100 (1) [1 - 1]	33 (1) [1 - 1]	0 (0) [0 - 0]
SILENE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SOLMUL	0 (0) [0 - 0]	100 (1) [1 - 1]	100 (3) [1 - 10]	0 (0) [0 - 0]	100 (3) [3 - 3]
SPHCOC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
STERUN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SYNPIN	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TARLAE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TAROFF	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	33 (1) [1 - 1]	0 (0) [0 - 0]
THAOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	33 (1) [1 - 1]	0 (0) [0 - 0]

Community # Sites	ABILAS/LINBOR N = 1	ABILAS/ARNCOR N = 1	PICEA/SENSTR N = 4	PSEMEN/ARNCOR N = 3	PSEMEN/JUNCOM N = 1
Forbs Continued					
TOWHOO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TOWMON	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRADUB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRIMAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRIPAL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
VALDIO	100 (1) [1 - 1]	100 (1) [1 - 1]	75 (1) [1 - 1]	67 (2) [1 - 2]	0 (0) [0 - 0]
VIONUT	0 (0) [0 - 0]	0 (0) [0 - 0]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ZIGELE	0 (0) [0 - 0]	100 (1) [1 - 1]	25 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ZIGVEN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
Ferns & Fern-allies					
SELDEN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]

Ruby Range Constancy Cover Table: Vascular Species Constancy (Average Canopy Cover) [Range, Minimum - Maximum]
by Plant Association/Community Type (for order of community types see introduction to Appendix C)

Community # Sites	PSEMEN/FESIDA N = 1	PSEMEN/SCREE N = 1	PINFLE/FESIDA N = 1	JUNSCO/ARTNOV N = 1	ARTTST/AGRSMI N = 1
Trees					
ABILAS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
JUNSCO	0 (0) [0 - 0]	100 (20) [20 - 20]	0 (0) [0 - 0]	100 (17) [17 - 17]	0 (0) [0 - 0]
PICENG	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PINCON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PINFLE	100 (10) [10 - 10]	100 (7) [7 - 7]	100 (42) [42 - 42]	0 (0) [0 - 0]	0 (0) [0 - 0]
PSEMEN	100 (40) [40 - 40]	100 (33) [33 - 33]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
Shrubs					
ACEGLA	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARCUVA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARTFRI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
ARTNOV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (17) [17 - 17]	0 (0) [0 - 0]
ARTTST	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (23) [23 - 23]
ARTTSV	100 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
BERREP	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CERLED	0 (0) [0 - 0]	100 (3) [3 - 3]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CHRNAU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (2) [2 - 2]
CHRVIS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	100 (1) [1 - 1]
GUTSAR	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HAPSUF	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
JUNCOM	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (4) [4 - 4]	0 (0) [0 - 0]	0 (0) [0 - 0]
LINBOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
RIBLAC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
RIBSET	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ROSWOO	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SPIBET	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SYMORE	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TETCAN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
VACSCO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
Graminoids					
AGRCAN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
AGRREP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (3) [3 - 3]
AGRSMI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (30) [30 - 30]
AGRSPI	100 (1) [1 - 1]	100 (1) [1 - 1]	100 (13) [13 - 13]	100 (33) [33 - 33]	0 (0) [0 - 0]
AGRTRA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BOUGRA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BROMUS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BROPUM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BROTEC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (3) [3 - 3]
BROVUL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CALPUR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CALRUB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]

Community # Sites	PSEMEN/FESIDA N = 1	PSEMEN/SCREE N = 1	PINFLE/FESIDA N = 1	JUNSCO/ARTNOV N = 1	ARTTST/AGRSMI N = 1
Graminoids Continued					
CALSTR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARCON	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARDEW	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CAREXX	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARGEY	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARMIC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARNEB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CAROBT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARROI	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARSIM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARSTE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DESCES	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ELEPAU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ELYCIN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (4) [4 - 4]
FESIDA	100 (3) [3 - 3]	0 (0) [0 - 0]	100 (23) [23 - 23]	0 (0) [0 - 0]	0 (0) [0 - 0]
FESOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
JUNBAL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
KOEMAC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
MUHRIC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ORYHYM	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
POACUS	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	100 (20) [20 - 20]
POAINT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POANER	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (10) [10 - 10]	0 (0) [0 - 0]	0 (0) [0 - 0]
POANEV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POAPRA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	100 (60) [60 - 60]
POASAN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (2) [2 - 2]	0 (0) [0 - 0]
POASEC	100 (3) [3 - 3]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SITHYS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
STINEL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
STIVIR	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (3) [3 - 3]	0 (0) [0 - 0]
TRICER	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRISPI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
Forbs					
ACHMIL	100 (1) [1 - 1]	100 (1) [1 - 1]	100 (3) [3 - 3]	100 (1) [1 - 1]	100 (3) [3 - 3]
ACTRUB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
AGOGLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ALLCER	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
ALLIUM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ALLTEX	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ALYALY	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
ANDSEP	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANENUT	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANTANA	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANTDIM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]

Community # Sites	PSEMEN/FESIDA N = 1	PSEMEN/SCREE N = 1	PINFLE/FESIDA N = 1	JUNSCO/ARTNOV N = 1	ARTTST/AGRSMI N = 1
Forbs Continued					
ANTMIC	100 (1) [1 - 1]	100 (1) [1 - 1]	100 (3) [3 - 3]	100 (1) [1 - 1]	0 (0) [0 - 0]
ANTPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANTRAC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANTUMB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
AQUFLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARABIS	100 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARACON	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARAHIR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARECON	100 (1) [1 - 1]	0 (0) [0 - 0]	100 (3) [3 - 3]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARNCOR	100 (1) [1 - 1]	100 (1) [1 - 1]	100 (4) [4 - 4]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARNLAT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARNRYD	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARNSOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTADS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
ASTBRA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTCON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTERX	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTGIL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTKEN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTMIS	100 (10) [10 - 10]	100 (1) [1 - 1]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTPUR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTRAG	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTSCO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
ASTSIB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BALSAG	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BESWYO	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
CAMROT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CAPBUR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]
CASFLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CASLUT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
CASMIN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CASRUS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
CASTIL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CERARV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CIRSCA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CIRSIU	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CIRSUB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CIRUND	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CLALAN	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
COLLIN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
COLPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
COMUMB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
CREACU	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
CREOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CRERUN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]

Community # Sites	PSEMEN/FESIDA N = 1	PSEMEN/SCREE N = 1	PINFLE/FESIDA N = 1	JUNSCO/ARTNOV N = 1	ARTTST/AGRSMI N = 1
Forbs Continued					
CRYCEL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CRYSPI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CYMBIP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CYNOFF	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DELBIC	100 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
DELGLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DELNUT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DELOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
DESRIC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]
DESSOP	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
DODCON	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
DODPUL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DOUMON	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
DRAOLI	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
DRASTE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
EPIANG	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERICAE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERICOM	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERIDIV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERIFLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERIHUM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERIOVA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
ERITWE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
ERYASP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
ERYREP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
FRASPE	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
FRAVES	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
FRAVIR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
FRIPUD	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
GALBOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
GENAQU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
GERVIS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
GEUTRI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HACPAT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HAPACA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
HEDBOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (3) [3 - 3]	0 (0) [0 - 0]
HETVIL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
HEUPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HIERAC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LAPRED	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (2) [2 - 2]
LEWRED	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LINLEW	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LINPER	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
LITPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LOMAMB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LOMDIS	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]

Community # Sites	PSEMEN/FESIDA N = 1	PSEMEN/SCREE N = 1	PINFLE/FESIDA N = 1	JUNSCO/ARTNOV N = 1	ARTTST/AGRSMI N = 1
Forbs Continued					
LUPSER	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
MACCAN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
MEDSAT	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
MEROBL	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (2) [2 - 2]	0 (0) [0 - 0]	0 (0) [0 - 0]
MERVIR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
MICNUT	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (2) [2 - 2]	0 (0) [0 - 0]	0 (0) [0 - 0]
MUSDIV	0 (0) [0 - 0]	100 (1) [1 - 1]	100 (2) [2 - 2]	100 (1) [1 - 1]	0 (0) [0 - 0]
MYOARV	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
OENCES	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
OPUPOL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
OSMCHI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
OSMDEP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
OXYLAG	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
OXYSER	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
PENARI	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
PENATT	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
PENSTE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PERGAI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PHACEL	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
PHAHAS	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PHLHOO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
PHLLON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
PHYGEY	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POLBIS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POLDOU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POTDIV	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
POTENT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POTGRA	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (3) [3 - 3]	0 (0) [0 - 0]	0 (0) [0 - 0]
POTOVI	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
PYRCHL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PYRSEC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
RANUNC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SAXOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SEDBOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SEDLAN	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
SENCAN	0 (0) [0 - 0]	100 (2) [2 - 2]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
SENINT	100 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
SENSTR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SILENE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SOLMUL	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
SPHCOC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
STERUN	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SYNPIN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TARLAE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TAROFF	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (20) [20 - 20]
THAOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]

Community # Sites	PSEMEN/FESIDA N = 1	PSEMEN/SCREE N = 1	PINFLE/FESIDA N = 1	JUNSCO/ARTNOV N = 1	ARTTST/AGRSMI N = 1
Forbs Continued					
TOWHOO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TOWMON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRADUB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
TRIMAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRIPAL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
VALDIO	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
VIONUT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
ZIGELE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ZIGVEN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
Ferns & Fern-allies					
SELDEN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]

Ruby Range Constancy Cover Table: Vascular Species Constancy (Average Canopy Cover) [Range, Minimum - Maximum]
by Plant Association/Community Type (for order of community types see introduction to Appendix C)

Community # Sites	ARTTSV/FESIDA N = 2	ARTNOV/AGRSPI N = 2	FESIDA-AGRSPI N = 1	FESIDA/POTDIV N = 2	CARSIM N = 1
Trees					
ABILAS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
JUNSCO	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PICENG	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PINCON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PINFLE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
PSEMEN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
Shrubs					
ACEGLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARCUVA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARTFRI	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARTNOV	0 (0) [0 - 0]	100 (17) [10 - 23]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARTTST	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARTTSV	100 (32) [30 - 33]	0 (0) [0 - 0]	100 (1) [1 - 1]	50 (1) [1 - 1]	0 (0) [0 - 0]
BERREP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CERLED	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CHRNAU	0 (0) [0 - 0]	100 (2) [1 - 2]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CHRVIS	50 (1) [1 - 1]	50 (1) [1 - 1]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
GUTSAR	0 (0) [0 - 0]	100 (3) [3 - 3]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HAPSUF	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
JUNCOM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LINBOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
RIBLAC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
RIBSET	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ROSWOO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SPIBET	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
SYMORE	50 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
TETCAN	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
VACSCO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
Graminoids					
AGRCAN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
AGRREP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
AGRSMI	0 (0) [0 - 0]	50 (3) [3 - 3]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
AGRSPI	100 (2) [1 - 3]	100 (25) [20 - 30]	100 (10) [10 - 10]	50 (1) [1 - 1]	0 (0) [0 - 0]
AGRTRA	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
BOUGRA	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BROMUS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BROPUM	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (3) [3 - 3]	0 (0) [0 - 0]	0 (0) [0 - 0]
BROTEC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BROVUL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CALPUR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
CALRUB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]

Community # Sites	ARTTSV/FESIDA N = 2	ARTNOV/AGRSPI N = 2	FESIDA-AGRSPI N = 1	FESIDA/POTDIV N = 2	CARSIM N = 1
Graminoids Continued					
CALSTR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]
CARCON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARDEW	50 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
CAREXX	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARGEY	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CARMIC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (10) [10 - 10]
CARNEB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (23) [23 - 23]
CAROBT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (33) [33 - 33]	0 (0) [0 - 0]
CARPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]
CARROI	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
CARSIM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (70) [70 - 70]
CARSTE	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DESCES	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (4) [4 - 4]
ELEPAU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (27) [27 - 27]
ELYCIN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
FESIDA	100 (44) [40 - 47]	50 (20) [20 - 20]	100 (50) [50 - 50]	100 (34) [30 - 37]	0 (0) [0 - 0]
FESOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
JUNBAL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]
KOEMAC	50 (1) [1 - 1]	100 (2) [1 - 3]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
MUHRIC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (3) [3 - 3]
ORYHYM	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POACUS	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	50 (4) [4 - 4]	0 (0) [0 - 0]
POAINT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POANER	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POANEV	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POAPRA	0 (0) [0 - 0]	50 (1) [1 - 1]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
POASAN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
POASEC	50 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
SITHYS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
STINEL	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (3) [3 - 3]	0 (0) [0 - 0]	0 (0) [0 - 0]
STIVIR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRICER	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRISPI	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
Forbs					
ACHMIL	100 (2) [1 - 2]	50 (1) [1 - 1]	100 (4) [4 - 4]	50 (1) [1 - 1]	0 (0) [0 - 0]
ACTRUB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
AGOGLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ALLCER	50 (1) [1 - 1]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ALLIUM	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
ALLTEX	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ALYALY	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANDSEP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANENUT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANTANA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANTDIM	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]

Community # Sites	ARTTSV/FESIDA N = 2	ARTNOV/AGRSPI N = 2	FESIDA-AGRSPI N = 1	FESIDA/POTDIV N = 2	CARSIM N = 1
Forbs Continued					
ANTMIC	100 (3) [1 - 4]	50 (1) [1 - 1]	100 (1) [1 - 1]	50 (7) [7 - 7]	0 (0) [0 - 0]
ANTPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANTRAC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ANTUMB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
AQUFLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARABIS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARACON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARAHIR	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARECON	0 (0) [0 - 0]	50 (1) [1 - 1]	100 (1) [1 - 1]	50 (1) [1 - 1]	0 (0) [0 - 0]
ARNCOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARNLAT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARNRYD	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ARNSOR	50 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTADS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTBRA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (2) [2 - 2]
ASTCON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTERX	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTGIL	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTKEN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTMIS	50 (2) [2 - 2]	50 (1) [1 - 1]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
ASTOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTPUR	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTRAG	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTSCO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ASTSIB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
BALSAG	50 (3) [3 - 3]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
BESWYO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (2) [2 - 2]	0 (0) [0 - 0]
CAMROT	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CAPBUR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CASFLA	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
CASLUT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CASMIN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CASRUS	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CASTIL	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	50 (2) [2 - 2]	0 (0) [0 - 0]
CERARV	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CIRSCA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]
CIRSIU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CIRSUB	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CIRUND	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CLALAN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
COLLIN	50 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
COLPAR	50 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
COMUMB	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CREACU	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CREOCC	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CRERUN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]

Community # Sites	ARTTSV/FESIDA N = 2	ARTNOV/AGRSPI N = 2	FESIDA-AGRSPI N = 1	FESIDA/POTDIV N = 2	CARSIM N = 1
Forbs Continued					
CRYCEL	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CRYSPI	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
CYMBIP	50 (1) [1 - 1]	50 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]
CYNOFF	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
DELBIC	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DELGLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DELNUT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DELOCC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DESRIC	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DESSOP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DODCON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
DODPUL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (2) [2 - 2]
DOUMON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
DRAOLI	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
DRASTE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
EPIANG	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERICAE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
ERICOM	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
ERIDIV	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERIFLA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
ERIHUM	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERIOVA	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERITWE	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERYASP	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ERYREP	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
FRASPE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
FRAVES	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
FRAVIR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
FRIPUD	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
GALBOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
GENAQU	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]
GERVIS	50 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
GEUTRI	100 (1) [1 - 1]	0 (0) [0 - 0]	100 (1) [1 - 1]	50 (7) [7 - 7]	0 (0) [0 - 0]
HACPAT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HAPACA	50 (1) [1 - 1]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HEDBOR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HETVIL	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
HEUPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
HIERAC	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LAPRED	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LEWRED	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LINLEW	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LINPER	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LITPAR	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]
LOMAMB	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
LOMDIS	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]

Community # Sites	ARTTSV/FESIDA N = 2	ARTNOV/AGRSPI N = 2	FESIDA-AGRSPI N = 1	FESIDA/POTDIV N = 2	CARSIM N = 1
Forbs Continued					
TOWHOO	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TOWMON	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRADUB	0 (0) [0 - 0]	100 (1) [1 - 1]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
TRIMAR	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (4) [4 - 4]
TRIPAL	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (1) [1 - 1]
VALDIO	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
VIONUT	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ZIGELE	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]
ZIGVEN	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]	50 (1) [1 - 1]	0 (0) [0 - 0]
Ferns & Fern-allies					
SELDEN	0 (0) [0 - 0]	0 (0) [0 - 0]	0 (0) [0 - 0]	100 (19) [10 - 27]	0 (0) [0 - 0]

APPENDIX C.

Montana Natural Heritage Program
Element Occurrence Report

Scientific Name: LOMATIUM ATTENUATUM
Common Name: TAPER-TIP DESERT-PARSLEY

Global rank: G2 Forest Service status:
State rank: S2 Federal Status:

Element occurrence code: PDAPI1B240.009
Element occurrence type:

Survey site name: LAURIN CANYON
EO rank:
EO rank comments:

County: MADISON

USGS quadrangle: LAURIN CANYON

Township:	Range:	Section:	TRS comments:
006S	005W	10	S2NE4

Precision: S
Survey date: 1996-07-03 Elevation: 6240 - 6400
First observation: 1996-07-03 Slope/aspect: 10-25% / SSW
Last observation: 1996-07-03 Size (acres):

Location:
4 MILES WEST AND NORTHWEST OF ALDER; ACCESS OVER PRIVATE LAND CLOSED IN SECTION 11, SPANNING 1/2 MILE OF LAURIN CANYON ABOVE MOUTH.

Element occurrence data:
PATCHY AND WIDELY DISPERSED. INCONSPICUOUS IN FRUIT 3 JULY 1996. 50 PLANTS COUNTED BUT MAGNITUDE OF POPULATION SIZE AND AREA UNKNOWN.

General site description:
OPENINGS IN SPARSE WOODS ON STEEP, EXPOSED, SOUTH-FACING LIMESTONE CANYON SLOPE OF LOOSE, CALCAREOUS GRAVEL AND COBBLE OVER SILT. DOMINATED BY PSEUDOTSUGA MENZIESII, JUNIPERUS SCOPULORUM AND AGROPYRON SPICATUM. OTHER SPECIES INCLUDE PENSTEMON ARIDUS AND CIRSIUM SUBNIVEUM. IT OCCURS OVER A WIDE RANGE OF SLOPE POSITIONS CORRESPONDING WITH THE PATTERN OF SCREE OPENINGS.

Land owner/manager:
BLM: BUTTE DISTRICT, DILLON RESOURCE AREA

Comments:
SITE APPEARS TO HAVE A HIGH QUALITY AND GOOD CONDITION; THE MAGNITUDE OF POPULATION SIZE AND AREAL EXTENT NEED FURTHER EVALUATION.

Information source: HEIDEL, BONNIE. [BOTANIST] MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVENUE, P.O. BOX 201800, HELENA, MT 59620-1800. WORK: 406/444-3009.

Specimens: HEIDEL, B. (1477). 1996. MONTU.

Montana Natural Heritage Program
Element Occurrence Report

Scientific Name: TOWNSENDIA FLORIFER
Common Name: SHOWY TOWNSENDIA

Global rank: G5 Forest Service status:
State rank: S1 Federal Status:

Element occurrence code: PDAST9C080.003
Element occurrence type:

Survey site name: MUD SPRING
EO rank: BC
EO rank comments:

County: MADISON

USGS quadrangle: METZEL RANCH

Township:	Range:	Section:	TRS comments:
007S	005W	34	SE4

Precision: S
Survey date: 1996-06-05 Elevation: 5800 - 5840
First observation: 1996-06-02 Slope/aspect: 5% / SW
Last observation: 1995-06-05 Size (acres):

Location:
TAKE RUBY RIVER ROAD SOUTH FROM ALDER CA. 13 MILE PAST RUBY RESERVOIR. TURN WEST AT MALONEY RANCH WINDMILL AND TRAVEL CA. 3 MILES TO SITE.

Element occurrence data:
CA. 50 PLANTS IN 4 DIFFUSE GROUPS. MOST ARE MULTI-STEMMED, IN EARLY STAGES OF FLOWERING 2 JUNE 1996; SOME STILL IN BUD, FEW ROSETTES.

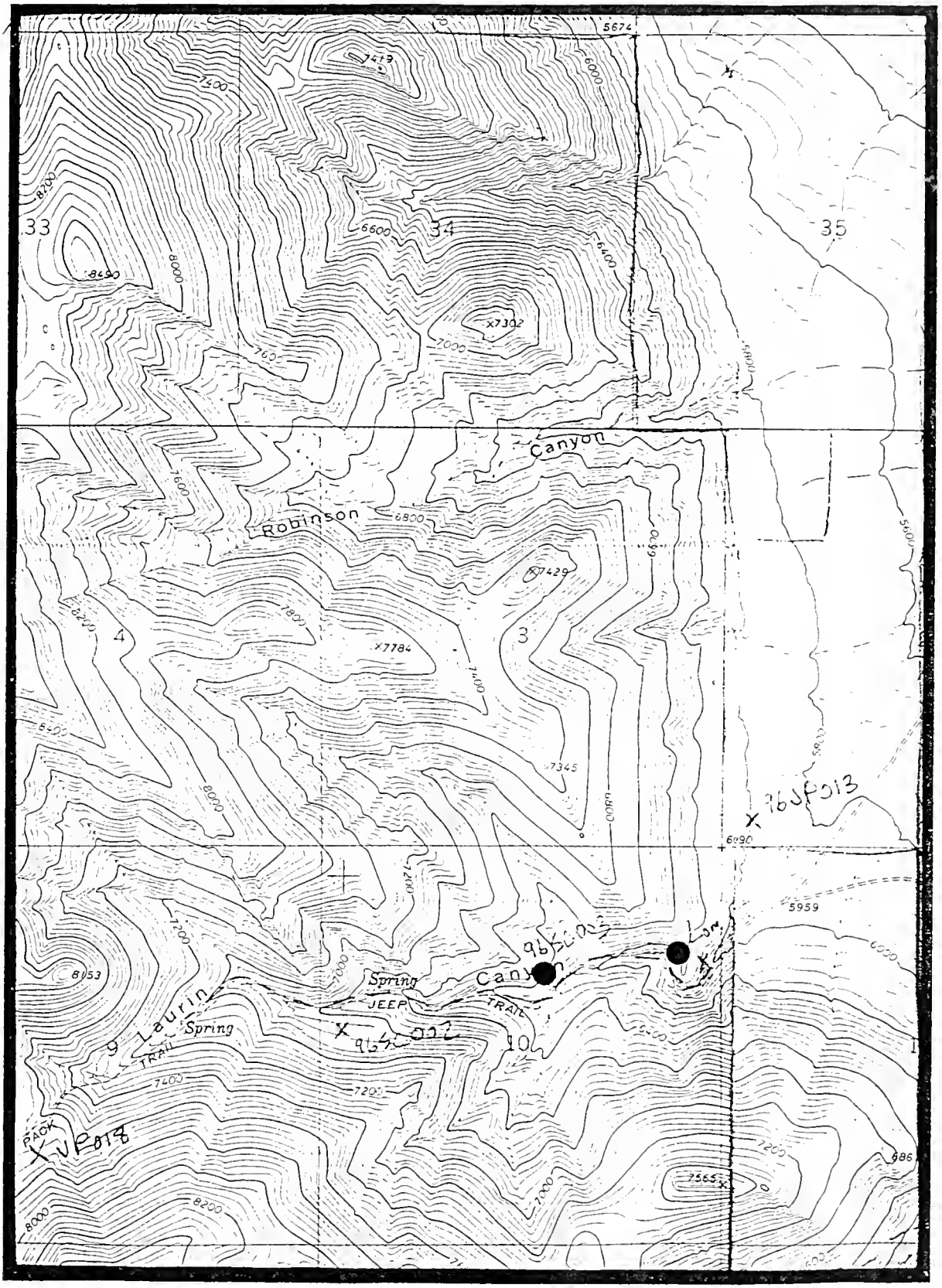
General site description:
HIGH, DRY PLAINS BELOW RUBY MOUNTAINS AND ABOVE GREASEWOOD FLATS, AT A GENTLE MIDSLOPE POSITION ON POWDERY SILT WITH MUCH BARE GROUND. LOCAL DOMINANTS INCLUDE STIPA COMATA. ASSOCIATED SPECIES INCLUDE: AGROPYRON SPP., POA SECUNDA, STIPA VIRIDULA, MUSINEON DIVARICATUM, ALLIUM TEXTILE, ARTEMISIA FRIGIDA.

Land owner/manager:
PRIVATELY OWNED LAND (INDIVIDUAL OR CORPORATE)

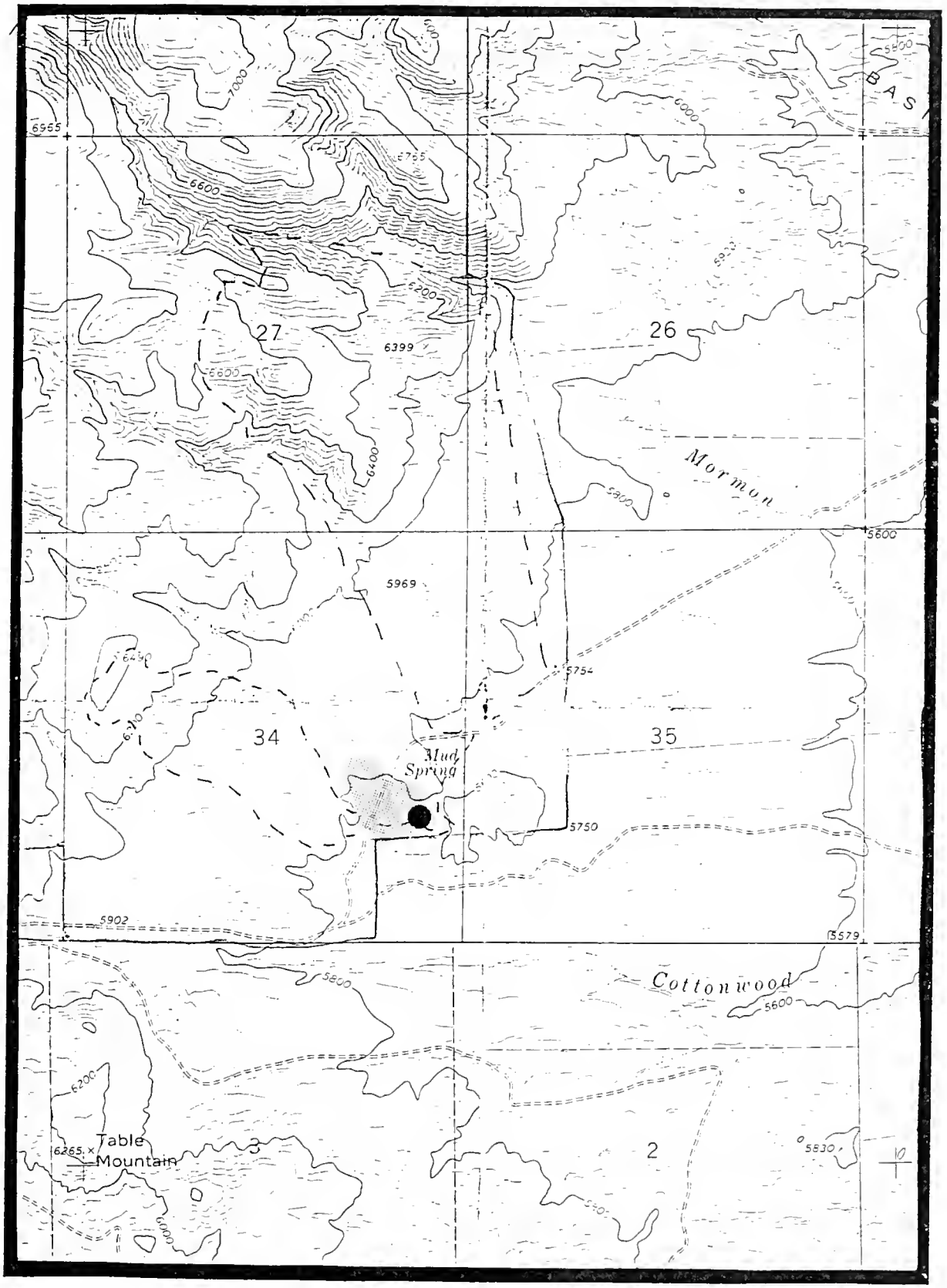
Comments:
GRAZING USE APPEARS TO BE IN THE WINTER.

Information source: HEIDEL, BONNIE. [BOTANIST] MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVENUE, P.O. BOX 201800, HELENA, MT 59620-1800. WORK: 406/444-3009.

Specimens: HEIDEL, B. (1441). 1996. MONTU.



Lomatium attenuatum 009
Laurin Canyon (7.5' Quad)



Townsendia florifer 003
Metzel Ranch (7.5' Quad)

SNAME	ACRONYM	FAMILY
ABIES LASIOCARPA	ABILAS	PINACEAE
ACER GLABRUM	ACEGLA	ACERACEAE
ACHILLEA MILLEFOLIUM	ACHMIL	ASTERACEAE
ACTAEA RUBRA	ACTRUB	RANUNCULACEAE
AGOSERIS GLAUCA	AGOGLA	ASTERACEAE
AGROPYRON CRISTATU	AGRCRI	POACEAE
AGROSTIS STOLONIFER	AGRSTO	POACEAE
AGROSTIS VARIABILIS	AGRVAR	POACEAE
ALLIUM BREVISTYLUM	ALLBRE	LILIACEAE
ALLIUM CERNUUM	ALLCER	LILIACEAE
ALLIUM SCHOENOPRAS	ALLSCH	LILIACEAE
ALLIUM TEXTILE	ALLTEX	LILIACEAE
ALNUS INCANA	ALNINC	BETULACEAE
ALOPECURUS PRATENSI	ALOPRA	POACEAE
ALYSSUM ALYSSOIDES	ALYALY	BRASSICACEAE
ALYSSUM DESERTORUM	ALYDES	BRASSICACEAE
AMELANCHIER ALNIFOLI	AMEALN	ROSACEAE
ANDROSACE SEPTENTRI	ANDSEP	PRIMULACEAE
ANEMONE MULTIFIDA	ANEMUL	RANUNCULACEAE
ANGELICA ARGUTA	ANGARG	APIACEAE
ANTENNARIA ANAPHALO	ANTANA	ASTERACEAE
ANTENNARIA DIMORPHA	ANTDIM	ASTERACEAE
ANTENNARIA MICROPHY	ANTMIC	ASTERACEAE
ANTENNARIA NEGLECTA	ANTNEG	ASTERACEAE
ANTENNARIA PARVIFOLI	ANTPAR	ASTERACEAE
ANTENNARIA RACEMOS	ANTRAC	ASTERACEAE
ANTENNARIA UMBRINEL	ANTUMB	ASTERACEAE
AQUILEGIA FLAVESCENS	AQUFLA	RANUNCULACEAE
ARABIS CONFINIS	ARACON	BRASSICACEAE
ARABIS GLABRA	ARAGLA	BRASSICACEAE
ARABIS HIRSUTA	ARAHIR	BRASSICACEAE
ARABIS NUTTALLII	ARANUT	BRASSICACEAE
ARCTOSTAPHYLOS UVA-	ARCUVA	ERICACEAE
ARENARIA CAPILLARIS	ARECAP	CARYOPHYLLACEAE
ARENARIA CONGESTA	ARECON	CARYOPHYLLACEAE
ARENARIA OBTUSILOBA	AREOBT	CARYOPHYLLACEAE
ARISTIDA PURPUREA	ARIPUR	POACEAE
ARNICA CORDIFOLIA	ARNCOR	ASTERACEAE
ARNICA LATIFOLIA	ARNLAT	ASTERACEAE
ARNICA LONGIFOLIA	ARNLON	ASTERACEAE
ARNICA MOLLIS	ARNMOL	ASTERACEAE
ARNICA RYDBERGII	ARNRYD	ASTERACEAE
ARNICA SORORIA	ARNSOR	ASTERACEAE
ARTEMISIA CAMPESTRIS	ARTCAM	ASTERACEAE
ARTEMISIA DRACUNCUL	ARTDRA	ASTERACEAE
ARTEMISIA FRIGIDA	ARTFRI	ASTERACEAE
ARTEMISIA LUDOVICIAN	ARTLUD	ASTERACEAE

SNAME	ACRONYM	FAMILY
ARTEMISIA MICHAUXIAN	ARTMIC	ASTERACEAE
ARTEMISIA NOVA	ARTNOV	ASTERACEAE
ARTEMISIA TRIDENTATA	ARTTSV	ASTERACEAE
ARTEMSIA TRIDENTATA	ARTTST	ASTERACEAE
ASTER ASCENDENS	ASTASC	ASTERACEAE
ASTER BRACHYACTIS	ASTBRA	ASTERACEAE
ASTER CONSPICUUS	ASTCON	ASTERACEAE
ASTER FOLIACEUS	ASTFOL	ASTERACEAE
ASTER MERITUS	ASTMER	ASTERACEAE
ASTER OCCIDENTALIS	ASTOCC	ASTERACEAE
ASTER SCOPULORUM	ASTSCO	ASTERACEAE
ASTER SIBIRICUS	ASTSIB	ASTERACEAE
ASTRAGALUS ADSURGE	ASTADS	FABACEAE
ASTRAGALUS AGRESTIS	ASTAGR	FABACEAE
ASTRAGALUS BISULCAT	ASTBIS	FABACEAE
ASTRAGALUS CANADEN	ASTCAN	FABACEAE
ASTRAGALUS CRASSICA	ASTCRA	FABACEAE
ASTRAGALUS DRUMMON	ASTDRU	FABACEAE
ASTRAGALUS GILVIFLOR	ASTGIL	FABACEAE
ASTRAGALUS KENTROP	ASTKEN	FABACEAE
ASTRAGALUS MISER	ASTMIS	FABACEAE
ASTRAGALUS PURSHII	ASTPUR	FABACEAE
ASTRAGALUS VEXILLIFL	ASTVEX	FABACEAE
ATHYRIUM FILIX-FEMINA	ATHFIL	POLYPODIACEAE
ATRIPLEX CONFERTIFOL	ATRCON	CHENOPODIACEAE
ATRIPLEX GARDNERI	ATRGAR	CHENOPODIACEAE
BALSAMORHIZA SAGITT	BALSAG	ASTERACEAE
BERTEROA INCANA	BERINC	BRASSICACEAE
BESSEYA WYOMINGENSI	BESWYO	SCROPHULARIACEAE
BETULA OCCIDENTALIS	BETOCC	BETULACEAE
BOUTELOUA GRACILIS	BOUGRA	POACEAE
BROMUS CILIATUS	BROCIL	POACEAE
BROMUS COMMUTATUS	BROCOM	POACEAE
BROMUS INERMIS	BROINE	POACEAE
BROMUS PUMPELLIANU	BROPUM	POACEAE
BROMUS TECTORUM	BROTEC	POACEAE
BROMUS VULGARIS	BROVUL	POACEAE
CALAMAGROSTIS PURP	CALPUR	POACEAE
CALAMAGROSTIS RUBES	CALRUB	POACEAE
CALAMAGROSTIS STRIC	CALSTR	POACEAE
CAMPANULA ROTUNDIF	CAMROT	CAMPANULACEAE
CAPSELLA BURSA-PAST	CAPBUR	BRASSICACEAE
CARDUUS NUTANS	CARNUT	ASTERACEAE
CAREX AQUATILIS	CARAQU	CYPERACEAE
CAREX CONCINNA	CARCON	CYPERACEAE
CAREX DEWEYANA	CARDEW	CYPERACEAE
CAREX FILIFOLIA	CARFIL	CYPERACEAE

SNAME	ACRONYM	FAMILY
CAREX GEYERI	CARGEY	CYPERACEAE
CAREX HAYDENIANA	CARHAY	CYPERACEAE
CAREX HOODII	CARHOO	CYPERACEAE
CAREX MICROPTERA	CARMIC	CYPERACEAE
CAREX NEBRASCENSIS	CARNEB	CYPERACEAE
CAREX OBTUSATA	CAROBT	CYPERACEAE
CAREX PRAEGRACILIS	CARPRA	CYPERACEAE
CAREX ROSSII	CARROS	CYPERACEAE
CAREX SCOPULORUM	CARSCO	CYPERACEAE
CAREX SIMULATA	CARSIM	CYPERACEAE
CAREX STENOPHYLLA	CARSTE	CYPERACEAE
CAREX UTRICULATA	CARUTR	CYPERACEAE
CASTILLEJA FLAVA	CASFLA	SCROPHULARIACEAE
CASTILLEJA LUTESCENS	CASLUT	SCROPHULARIACEAE
CASTILLEJA MINIATA	CASMIN	SCROPHULARIACEAE
CASTILLEJA RUSTICA	CASRUS	SCROPHULARIACEAE
CEANOTHUS VELUTINUS	CEAVEL	RHAMNACEAE
CENTAUREA MACULOSA	CENMAC	ASTERACEAE
CERASTIUM ARVENSE	CERARV	CARYOPHYLLACEAE
CERATOIDES LANATA	CERLAN	CHENOPODIACEAE
CERCOCARPUS LEDIFOL	CERLED	ROSACEAE
CHAENACTIS DOUGLASII	CHADOU	ASTERACEAE
CHEILANTHES FEEI	CHEFEE	POLYPODIACEAE
CHENOPODIUM FREMON	CHEFRE	CHENOPODIACEAE
CHORISPORA TENELLA	CHOTEN	BRASSICACEAE
CHRYSOTHAMNUS NAUS	CHRNAU	ASTERACEAE
CHRYSOTHAMNUS VISCI	CHRVIS	ASTERACEAE
CIRSIUM ARVENSE	CIRARV	ASTERACEAE
CIRSIUM HOOKERIANUM	CIRHOO	ASTERACEAE
CIRSIUM SCARIOSUM	CIRSCA	ASTERACEAE
CIRSIUM SUBNIVEUM	CIRSUB	ASTERACEAE
CIRSIUM UNDULATUM	CIRUND	ASTERACEAE
CIRSIUM VULGARE	CIRVUL	ASTERACEAE
CLAYTONIA LANCEOLAT	CLALAN	PORTULACACEAE
CLEMATIS OCCIDENTALI	CLEOCC	RANUNCULACEAE
CLEOME SERRULATA	CLESER	CAPPARACEAE
COLLINSIA PARVIFLORA	COLPAR	SCROPHULARIACEAE
COLLOMIA DEBILIS	COLDEB	POLEMONIACEAE
COMANDRA UMBELLATA	COMUMB	SANTALACEAE
CONYZA CANADENSIS	CONCAN	ASTERACEAE
CORALLORRHIZA TRIFID	CORTRI	ORCHIDACEAE
CORNUS STOLONIFERA	CORSTO	CORNACEAE
CORYDALIS AUREA	CORAUR	FUMARIACEAE
CREPIS ACUMINATA	CREACU	ASTERACEAE
CREPIS OCCIDENTALIS	CREOCC	ASTERACEAE
CREPIS RUNCINATA	CRERUN	ASTERACEAE
CRYPTANTHA CELOSIOI	CRYCEL	BORAGINACEAE

SNAME	ACRONYM	FAMILY
CYMOPTERUS BIPINNAT	CYMBIP	APIACEAE
CYNOGLOSSUM OFFICIN	CYNOFF	BORAGINACEAE
CYSTOPTERIS FRAGILIS	CSTFRA	POLYPODIACEAE
DACTYLIS GLOMERATA	DACGLO	POACEAE
DANTHONIA INTERMEDIA	DANINT	POACEAE
DELPHINIUM BICOLOR	DELBIC	RANUNCULACEAE
DELPHINIUM GLAUCUM	DELGLA	RANUNCULACEAE
DELPHINIUM NUTTALLIA	DELNUT	RANUNCULACEAE
DELPHINIUM OCCIDENTA	DELOCC	RANUNCULACEAE
DESCHAMPSIA CESPITO	DESCES	POACEAE
DESCURAINIA RICHARDS	DESRIC	BRASSICACEAE
DESCURAINIA SOPHIA	DESSOP	BRASSICACEAE
DISPORUM TRACHYCAR	DIPTRA	LILIACEAE
DISTICHILIS STRICTA	DISSTR	POACEAE
DODECATHEON CONJUG	DODCON	PRIMULACEAE
DODECATHEON PULCHE	DODPUL	PRIMULACEAE
DOUGLASIA MONTANA	DOUMON	PRIMULACEAE
DRABA OLIGOSPERMA	DRAOLI	BRASSICACEAE
DRABA PRAEALTA	DRAPRA	BRASSICACEAE
DRABA STENOLOBA	DRASTE	BRASSICACEAE
DRYAS OCTOPETALA	DRYOCT	ROSACEAE
ELEOCHARIS PAUCIFLO	ELEPAU	CYPERACEAE
ELYMUS CINEREUS	ELYCIN	POACEAE
ELYMUS ELYMOIDES	ELYELY	POACEAE
ELYMUS GLAUCUS	ELYGLA	POACEAE
ELYMUS SMITHII	ELYSMI	POACEAE
ELYMUS SPICATUS	ELYSPI	POACEAE
ELYMUS TRACHYCAULU	ELYTRA	POACEAE
ELYTRIGIA REPENS	ELYREE	POACEAE
EPILOBIUM ANGUSTIFOL	EPIANG	ONAGRACEAE
EPILOBIUM CILIATUM	EPICIL	ONAGRACEAE
EPILOBIUM PANICULATU	EPIPAN	ONAGRACEAE
EQUISETUM ARVENSE	EQUARV	EQUISETACEAE
EQUISETUM LAEVIGATU	EQULAE	EQUISETACEAE
ERIGERON CAESPITOSU	ERICAE	ASTERACEAE
ERIGERON COMPOSITUS	ERICOM	ASTERACEAE
ERIGERON DIVERGENS	ERIDIV	ASTERACEAE
ERIGERON HUMILIS	ERIHUM	ASTERACEAE
ERIGERON OCHROLEUC	ERIOCH	ASTERACEAE
ERIGERON PEREGRINUS	ERIPER	ASTERACEAE
ERIGERON PUMILUS	ERIPUM	ASTERACEAE
ERIGERON TWEEDYI	ERITWE	ASTERACEAE
ERIOGONUM FLAVUM	ERIFLA	POLYGONACEAE
ERIOGONUM MANCUM	ERIMAN	POLYGONACEAE
ERIOGONUM MICROTHE	ERIMIC	POLYGONACEAE
ERIOGONUM OVALIFOLI	ERIOVA	POLYGONACEAE
ERIOGONUM STRICTUM	ERISTR	POLYGONACEAE

SNAME	ACRONYM	FAMILY
ERIOGONUM UMBELLAT	ERIUMB	POLYGONACEAE
ERYSIMUM ASPERUM	ERYASP	BRASSICACEAE
ERYSIMUM REPANDUM	ERYREP	BRASSICACEAE
ERYTHRONIUM GRANDIF	ERYGRA	LILIACEAE
FESTUCA IDAHOENSIS	FESIDA	POACEAE
FESTUCA OCCIDENTALIS	FESOCC	POACEAE
FRAGARIA VESCA	FRAVES	ROSACEAE
FRAGARIA VIRGINIANA	FRAVIR	ROSACEAE
FRASERA SPECIOSA	FRASPE	GENTIANACEAE
FRITILLARIA ATROPURP	FRIATR	LILIACEAE
FRITILLARIA PUDICA	FRIPUD	LILIACEAE
GAILLARDIA ARISTATA	GAIARI	ASTERACEAE
GALIUM BOREALE	GALBOR	RUBIACEAE
GALIUM TRIFIDUM	GALTRF	RUBIACEAE
GALIUM TRIFLORUM	GALTRI	RUBIACEAE
GAYOPHYTON SPP.	GAYOPH	ONAGRACEAE
GENTIANA AFFINIS	GENAFF	GENTIANACEAE
GENTIANELLA AMARELL	GENAMA	GENTIANACEAE
GERANIUM RICHARDSO	GERRIC	GERANIACEAE
GERANIUM VISCOSISSIM	GERVIS	GERANIACEAE
GEUM ALEPPICUM	GEUALE	ROSACEAE
GEUM MACROPHYLLUM	GEUMAC	ROSACEAE
GEUM TRIFLORUM	GEUTRI	ROSACEAE
GLAUX MARITIMA	GLAMAR	PRIMULACEAE
GLYCERIA STRIATA	GLYSTR	POACEAE
GOODYERA OBLONGIFO	GOOOBL	ORCHIDACEAE
GRINDELIA SQUARROSA	GRISQU	ASTERACEAE
GUTIERREZIA SAROTHR	GUTSAR	ASTERACEAE
HACKELIA CINEREA	HACCIN	BORAGINACEAE
HACKELIA PATENS	HACPAT	BORAGINACEAE
HAPLOPAPPUS ACAULIS	HAPACA	ASTERACEAE
HAPLOPAPPUS INTEGRI	HAPINT	ASTERACEAE
HAPLOPAPPUS SUFFRITI	HAPSUF	ASTERACEAE
HEDYSARUM BOREALE	HEDBOR	FABACEAE
HELIANTHUS ANNUUS	HELANN	ASTERACEAE
HERACLEUM LANATUM	HERLAN	APIACEAE
HETEROTHECA VILLOSA	HETVIL	ASTERACEAE
HEUCHERA CYLINDRICA	HEUCYL	SAXIFRAGACEAE
HEUCHERA PARVIFLORA	HEUPAR	SAXIFRAGACEAE
HIERACIUM SPP.	HIERAC	ASTERACEAE
HORDEUM BRACHYANTH	HORBRA	POACEAE
HORDEUM JUBATUM	HORJUB	POACEAE
HYMENOPAPPUS FILIFO	HYMFIL	ASTERACEAE
HYOSCYAMUS NIGER	HYONIG	SOLANACEAE
IPOMOPSIS SPICATA	IPOSPI	POLEMONIACEAE
IRIS MISSOURIENSIS	IRIMIS	IRIDACEAE
JUNCUS BALTICUS	JUNBAL	JUNCACEAE

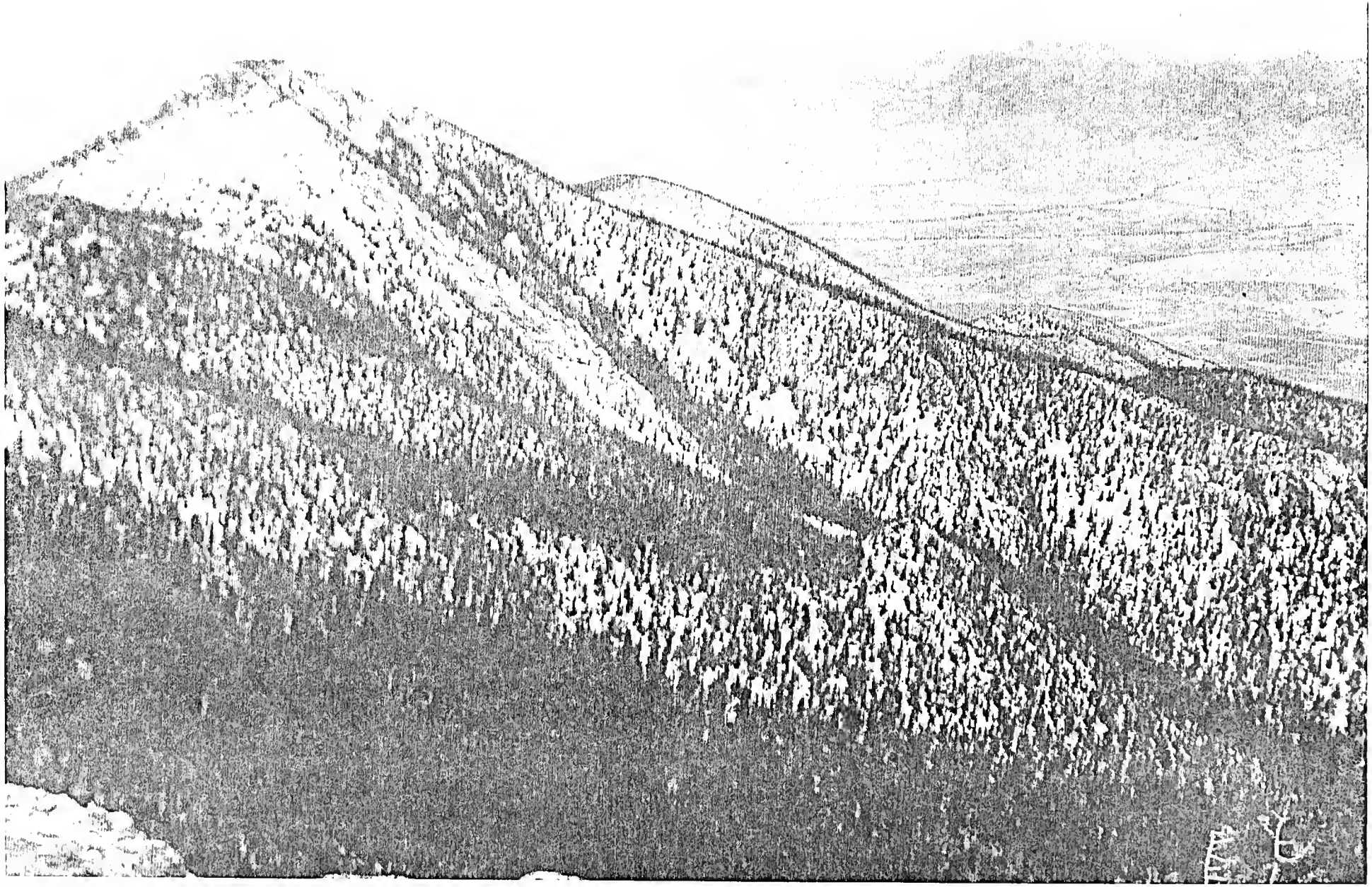
SNAME	ACRONYM	FAMILY
JUNCUS MERTENSIANUS	JUNMER	JUNCACEAE
JUNCUS REGELII	JUNREG	JUNCACEAE
JUNIPERUS COMMUNIS	JUNCOM	CUPRESSACEAE
JUNIPERUS SCOPULORU	JUNSCO	CUPRESSACEAE
KOCHIA SCOPARIA	KOCSCO	CHENOPODIACEAE
KOELERIA MACRANTHA	KOEMAC	POACEAE
LAPPULA MYOSOTIS	LAPMYO	BORAGINACEAE
LAPPULA REDOWSKII	LAPRED	BORAGINACEAE
LEPIDIUM PERFOLIATUM	LEPPER	BRASSICACEAE
LEPTODACTYLON PUNG	LEPPUN	POLEMONIACEAE
LESQUERELLA ALPINA	LESALP	BRASSICACEAE
LEWISIA REDIVIVA	LEWRED	PORTULACACEAE
LINNAEA BOREALIS	LINBOR	CAPRIFOLIACEAE
LINUM PERENNE	PINPER	LINACEAE
LISTERA BOREALIS	LISBOR	ORCHIDACEAE
LITHOPHRAGMA PARVIF	LITPAR	SAXIFRAGACEAE
LITHOSPERMUM ARVEN	LITARV	BORAGINACEAE
LITHOSPERMUM RUDER	LITRUD	BORAGINACEAE
LOMATIUM AMBIGUUM	LOMAMB	APIACEAE
LOMATIUM ATTENUATU	LOMATT	APIACEAE
LOMATIUM COUS	LOMCOU	APIACEAE
LOMATIUM DISSECTUM	LOMDIS	APIACEAE
LOMATIUM TRITERNATU	LOMTRI	APIACEAE
LONICERA UTAHENSIS	LONUTA	CAPRIFOLIACEAE
LUPINUS ARGENTEUS	LUPARG	FABACEAE
LUPINUS SERICEUS	LUPSER	FABACEAE
LUZULA CAMPESTRIS	LUZCAM	JUNCACEAE
LYGODESMIA JUNCEA	LYGJUN	ASTERACEAE
MACHAERANTHERA CAN	MACCAN	ASTERACEAE
MAHONIA REPENS	MAHREP	BERBERIDACEAE
MEDICAGO LUPULINA	MEDLUP	FABACEAE
MEDICAGO SATIVA	MEDSAT	FABACEAE
MELILOTUS OFFICINALIS	MELOFF	FABACEAE
MENTHA ARVENSIS	MENARV	LAMIACEAE
MENTZELIA DECAPETAL	MENDEC	LOASACEAE
MERTENSIA CILIATA	MERCIL	BORAGINACEAE
MERTENSIA OBLONGIFO	MEROBL	BORAGINACEAE
MERTENSIA VIRIDIS	MERVIR	BORAGINACEAE
MICROSERIS NUTANS	MICNUT	ASTERACEAE
MICROSTERIS GRACILIS	MICGRA	POLEMONIACEAE
MIMULUS GUTTATUS	MIMGUT	SCROPHULARIACEAE
MIMULUS LEWISII	MIMLEW	SCROPHULARIACEAE
MONESES UNIFLORA	MONUNI	PYROLACEAE
MONOLEPIS NUTTALLIAN	MONNUT	CHENOPODIACEAE
MONTIA SPP.	MONTIA	PORTALUCACEAE
MUHLENBERGIA RICHAR	MUHRIC	POACEAE
MUSINEON DIVARICATU	MUSDIV	APIACEAE

SNAME	ACRONYM	FAMILY
MYOSOTIS ARVENSIS	MYOARV	BORAGINACEAE
NEMOPHILA BREVIFLOR	MENBRE	HYDROPHYLLACEAE
NOTHOCALAIS TROXIMO	NOTTRO	ASTERACEAE
OENOTHERA CESPITOSA	OENCES	ONAGRACEAE
OPUNTIA POLYACANTHA	OPUPOL	CACTACEAE
OROBANCHE UNIFLORA	OROUNI	OROBANCHACEAE
ORTHOCARPUS LUTEUS	ORTLUT	SCROPHULARIACEAE
ORYZOPSIS CONTRACTA	ORYCON	POACEAE
ORYZOPSIS HYMENOIDE	ORYHYM	POACEAE
OSMORHIZA CHILENSIS	OSMCHI	APIACEAE
OSMORHIZA DEPAUPER	OSMDEP	APIACEAE
OXYTROPIS BESSEYI	OXYBES	FABACEAE
OXYTROPIS DEFLEXA	OXYDEF	FABACEAE
OXYTROPIS LAGOPUS	OXYLAG	FABACEAE
OXYTROPIS SERICEA	OXYSER	FABACEAE
PARIETARIA PENSYLVAN	PARPEN	URTICACEAE
PARNASSIA FIMBRIATA	PARFIM	SAXIFRAGACEAE
PEDICULARIS SPP.	PEDICU	SCROPHULARIACEAE
PENSTEMON ARIDUS	PENARI	SCROPHULARIACEAE
PENSTEMON ATTENUAT	PENATT	SCROPHULARIACEAE
PENSTEMON ERIANTHE	PENERI	SCROPHULARIACEAE
PENSTEMON MONTANUS	PENMON	SCROPHULARIACEAE
PENSTEMON PROCERUS	PENPRO	SCROPHULARIACEAE
PERIDERIDIA GAIRDNERI	PERGAI	APIACEAE
PETROPHYTON CAESPIT	PETCAE	ROSACEAE
PHACELIA HASTATA	PHAHAS	HYDROPHYLLACEAE
PHLEUM ALPINUM	PHLALP	POACEAE
PHLEUM PRATENSE	PHLPRA	POACEAE
PHLOX CAESPITOSA	PHLCAE	POLEMONIACEAE
PHLOX HOODII	PHLHOO	POLEMONIACEAE
PHLOX LONGIFOLIA	PHLLON	POLEMONIACEAE
PHYSARIA GEYERI	PHYGEY	BRASSICACEAE
PHYSOCARPUS MALVAC	PHYMAL	ROSACEAE
PICEA ENGELMANNII	PICENG	PINACEAE
PINUS CONTORTA	PINCON	PINACEAE
PINUS FLEXILIS	PINFLE	PINACEAE
PLAGIOBOTHRYS SCOUL	PLASCO	BORAGINACEAE
PLANTAGO ERIOPODA	PLAERI	PLANTAGINACEAE
PLANTAGO MAJOR	PLAMAJ	PLANTAGINACEAE
POA CUSICKII	POACUS	POACEAE
POA INTERIOR	POAINT	POACEAE
POA JUNCIFOLIA	POAJUN	POACEAE
POA NERVOSA	POANER	POACEAE
POA PALUSTRIS	POAPAL	POACEAE
POA PRATENSIS	POAPRA	POACEAE
POA SECUNDA	POASEC	POACEAE
POLYGONUM AVICULAR	POLAVI	POLYGONACEAE

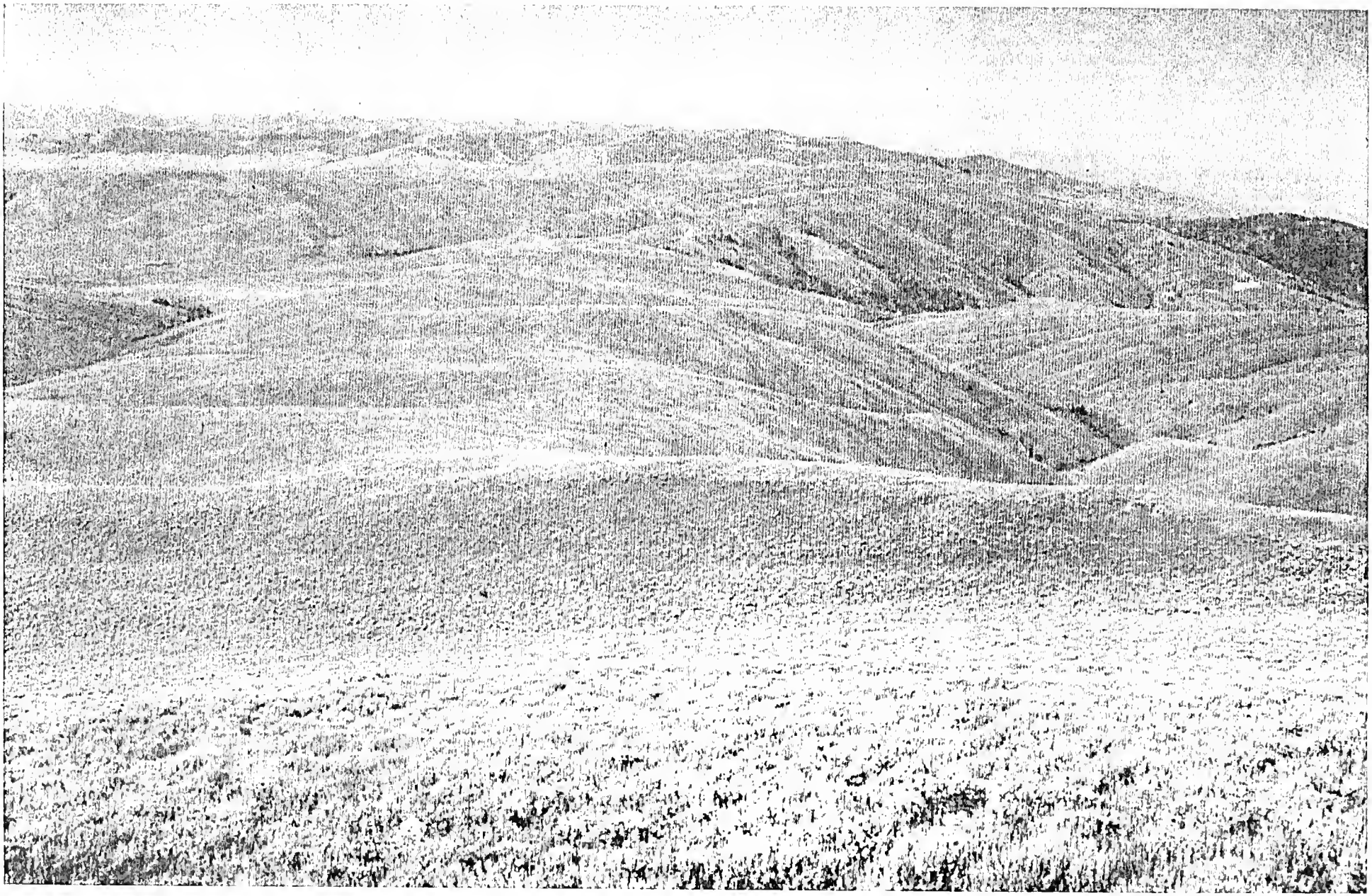
SNAME	ACRONYM	FAMILY
POLYGONUM BISTORTOI	POLBIS	POLYGONACEAE
POLYGONUM DOUGLASII	POLDOU	POLYGONACEAE
POPULUS ANGUSTIFOLI	POLANG	SALICACEAE
POPULUS BALSAMIFERA	POPBAL	SALICACEAE
POPULUS TREMULOIDES	POPTRE	SALICACEAE
POTENTILLA ANSERINA	POTANS	ROSACEAE
POTENTILLA ARGUTA	POTARG	ROSACEAE
POTENTILLA BIENNIS	POTBIE	ROSACEAE
POTENTILLA CONCINNA	POTCON	ROSACEAE
POTENTILLA DIVERSIFOL	POTDIV	ROSACEAE
POTENTILLA FRUTICOSA	POTFRU	ROSACEAE
POTENTILLA GRACILIS	POTGRA	ROSACEAE
POTENTILLA OVINA	POTOVI	ROSACEAE
PRUNUS VIRGINIANA	PRUVIR	ROSACEAE
PSEUDOTSUGA MENZIE	PSEMEN	PINACEAE
PYROLA CHLORANTHA	PYRCHL	PYROLACEAE
PYROLA SECUNDA	PYRSEC	PYROLACEAE
RANUNCULUS CYMBALA	RANCYM	RANUNCULACEAE
RANUNCULUS GLABERRI	RANGLA	RANUNCULACEAE
RANUNCULUS MACOUNII	RANMAC	RANUNCULACEAE
RANUNCULUS TESTICUL	RANTES	RANUNCULACEAE
RANUNCULUS UNCINAT	RANUNC	RANUNCULACEAE
RIBES AUREUM	RIBAUR	GROSSULARIACEAE
RIBES HUDSONIANUM	RIBHUD	GROSSULARIACEAE
RIBES LACUSTRE	RIBLAC	GROSSULARIACEAE
RIBES SETOSUM	RIBSET	GROSSULARIACEAE
RIBES VISCOSSISIMUM	RIBVIS	GROSSULARIACEAE
ROSA WOODSII	ROSWOO	ROSACEAE
RUBUS IDAEUS	RUBIDA	ROSACEAE
SAGINA PROCUMBENS	SAGPRO	CARYOPHYLLACEAE
SALIX BEBBIANA	SALBEB	SALICACEAE
SALIX BOOTHII	SALBOO	SALICACEAE
SALIX BRACHYCARPA	SALBRA	SALICACEAE
SALIX EXIGUA	SALEXI	SALICACEAE
SARCOBATUS VERMICUL	SARVER	CHENOPODIACEAE
SAXIFRAGA BRONCHIALI	SAXBRO	SAXIFRAGACEAE
SAXIFRAGA OCCIDENTA	SAXOCC	SAXIFRAGACEAE
SAXIFRAGA ODONTOLO	SAXODO	SAXIFRAGACEAE
SAXIFRAGA RHOMBOIDE	SAXRHO	SAXIFRAGACEAE
SEDUM BORSCHII	SEDBOR	CRASSULACEAE
SEDUM LANCEOLATUM	SEDLAN	CRASSULACEAE
SELAGINELLA DENSA	SELDEN	SELAGINACEAE
SENECIO CANUS	SENCAN	ASTERACEAE
SENECIO INTEGERRIMU	SENINT	ASTERACEAE
SENECIO STREPTANTHIF	SENSTR	ASTERACEAE
SENECIO TRIANGULARIS	SENTRI	ASTERACEAE
SHEPHERDIA ARGENTEA	SHEARG	ELAEAGNACEAE

SNAME	ACRONYM	FAMILY
SHEPHERDIA CANADENS	SHECAN	ELAEAGNACEAE
SILENE SPP.	SILENE	CARYOPHYLLACEAE
SISYMBRIUM ALTISSIMU	SISALT	BRASSICACEAE
SISYMBRIUM LOESELII	SISLOE	BRASSICACEAE
SMILACINA RACEMOSA	SMIRAC	LILIACEAE
SMILACINA STELLATA	SMISTE	LILIACEAE
SOLIDAGO MISSOURIEN	SOLMIS	ASTERACEAE
SOLIDAGO MULTIRADIAT	SOLMUL	ASTERACEAE
SOLIDAGO NEMORALIS	SOLNEM	ASTERACEAE
SPHAERALCEA COCCINE	SPHCOC	MALVACEAE
SPIRAEA BETULIFOLIA	SPIBET	ROSACEAE
SPRAGUEA UMBELLATA	SPRUMB	PORTALUCACEAE
STANLEYA VIRIDIFLORA	STAVIR	BRASSICACEAE
STELLARIA SPP.	STELLA	CARYOPHYLLACEAE
STEPHANOMERIA RUNCI	STERUN	ASTERACEAE
STEPHANOMERIA TENUI	STETEN	ASTERACEAE
STIPA COMATA	STICOM	POACEAE
STIPA NELSONII	STINEL	POACEAE
STIPA VIRIDULA	STIVIR	POACEAE
STREPTOPUS AMPLEXIF	STRAMP	LILIACEAE
SYMPHORICARPOS ALB	SYMALB	CAPRIFOLIACEAE
SYMPHORICARPOS ORE	SYMORE	CAPRIFOLIACEAE
SYNTHYRIS PINNATIFIDA	SYNPIN	SCROPHULARIACEAE
TARAXACUM LAEVIGATU	TARLAE	ASTERACEAE
TARAXACUM OFFICINAL	TAROFF	ASTERACEAE
TELESONIX JAMESII	TELJAM	SAXIFRAGACEAE
TETRADYMIA CANESCEN	TETCAN	ASTERACEAE
THALICTRUM OCCIDENT	THAOCC	RANUNCULACEAE
THERMOPSIS MONTANA	THEMON	FABACEAE
TOWNSENDIA EXSCAPA	TOWEXC	ASTERACEAE
TOWNSENDIA FLORIFER	TOWFLO	ASTERACEAE
TOWNSENDIA HOOKERI	TOWHOO	ASTERACEAE
TOWNSENDIA PARRYI	TOWPAR	ASTERACEAE
TRAGOPOGON DUBIUS	TRADUB	ASTERACEAE
TRIFOLIUM REPENS	TRIREP	FABACEAE
TRIGLOCHIN MARITIMUM	TRIMAR	JUNCAGINACEAE
TRIGLOCHIN PALUSTRE	TRIPAL	JUNCAGINACEAE
TRISETUM CERNUUM	TRICER	POACEAE
TRISETUM SPICATUM	TRISPI	POACEAE
URTICA DIOICA	URTDIO	URTICACEAE
VACCINIUM SCOPARIUM	VACSCO	ERICACEAE
VALERIANA DIOICA	VALDIO	VALERIANACEAE
VALERIANA EDULIS	VALEDU	VALERIANACEAE
VERATRUM VIRIDE	VERVIR	LILIACEAE
VERBASCUM THAPSUS	VERTHA	SCROPHULARIACEAE
VERONICA SPP.	VERONI	SCROPHULARIACEAE
VICIA AMERICANA	VICAME	FABACEAE

SNAME	ACRONYM	FAMILY
VICIA SATIVA	VICSAT	FABACEAE
VIOLA ADUNCA	VIOADU	VIOLACEAE
VIOLA MACLOSKEYI	VIOMAC	VIOLACEAE
VIOLA NEPHROPHYLLA	VIONEP	VIOLACEAE
VIOLA NUTTALLII	VOPNUT	VIOLACEAE
WOODSIA OREGANA	WOOORE	POLYPODIACEAE
WOODSIA SCOPULINA	WOOSCO	POLYPODIACEAE
ZANICHELLIA PALUSTRIS	ZANPAL	ZANNICHELLIACEAE
ZIGADENUS ELEGANS	ZIGELE	LILIACEAE
ZIGADENUS VENENOSU	ZIGVEN	LILIACEAE



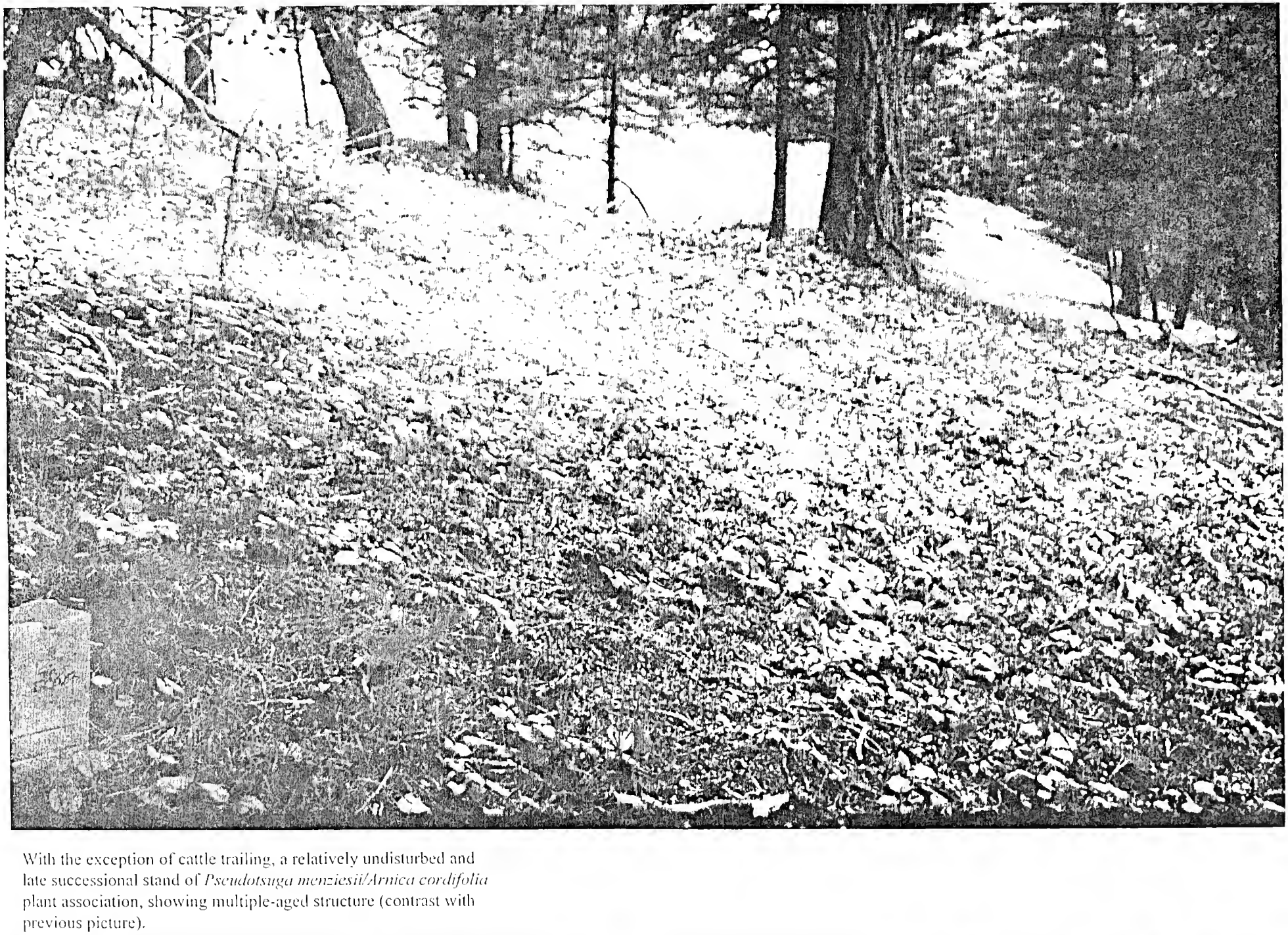
Panorama from Ruby Mountain looking north; south facing slopes supporting xeric *Pinus flexilis*- and *Pseudotsuga menziesii*-dominated communities and including scree slopes, evident as less densely forested areas.



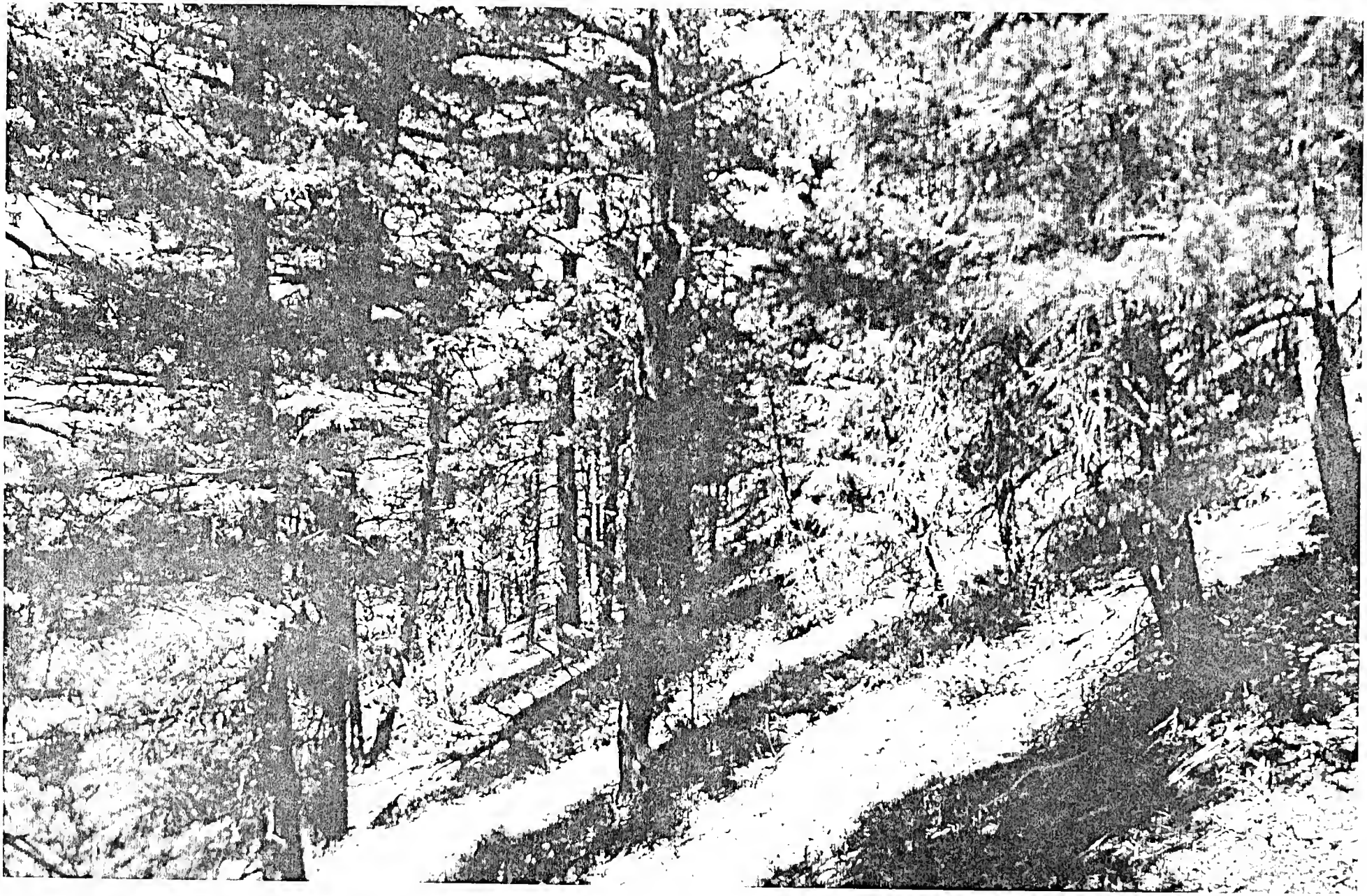
Looking south from southern end of Ruby Range; rolling terrain dominated by *Artemisia tridentata* ssp. *vaseyana*, with *Festuca idahoensis* important component at higher elevations and

Second-growth stand of pole-sized *Pinus contorta* on *Abies lasiocarpa/Linnaea borealis* habitat type in which *Vaccinium scoparium* and *L. borealis* are abundant undergrowth species; even these relatively mesic toeslope positions are only slowly recolonized by *A. lasiocarpa*.

Typical second-growth *Pseudotsuga menziesii/Arnica cordifolia* plant association with *P. menziesii* dominating the overstory and *A. cordifolia* and *Astragalus miser* the undergrowth.

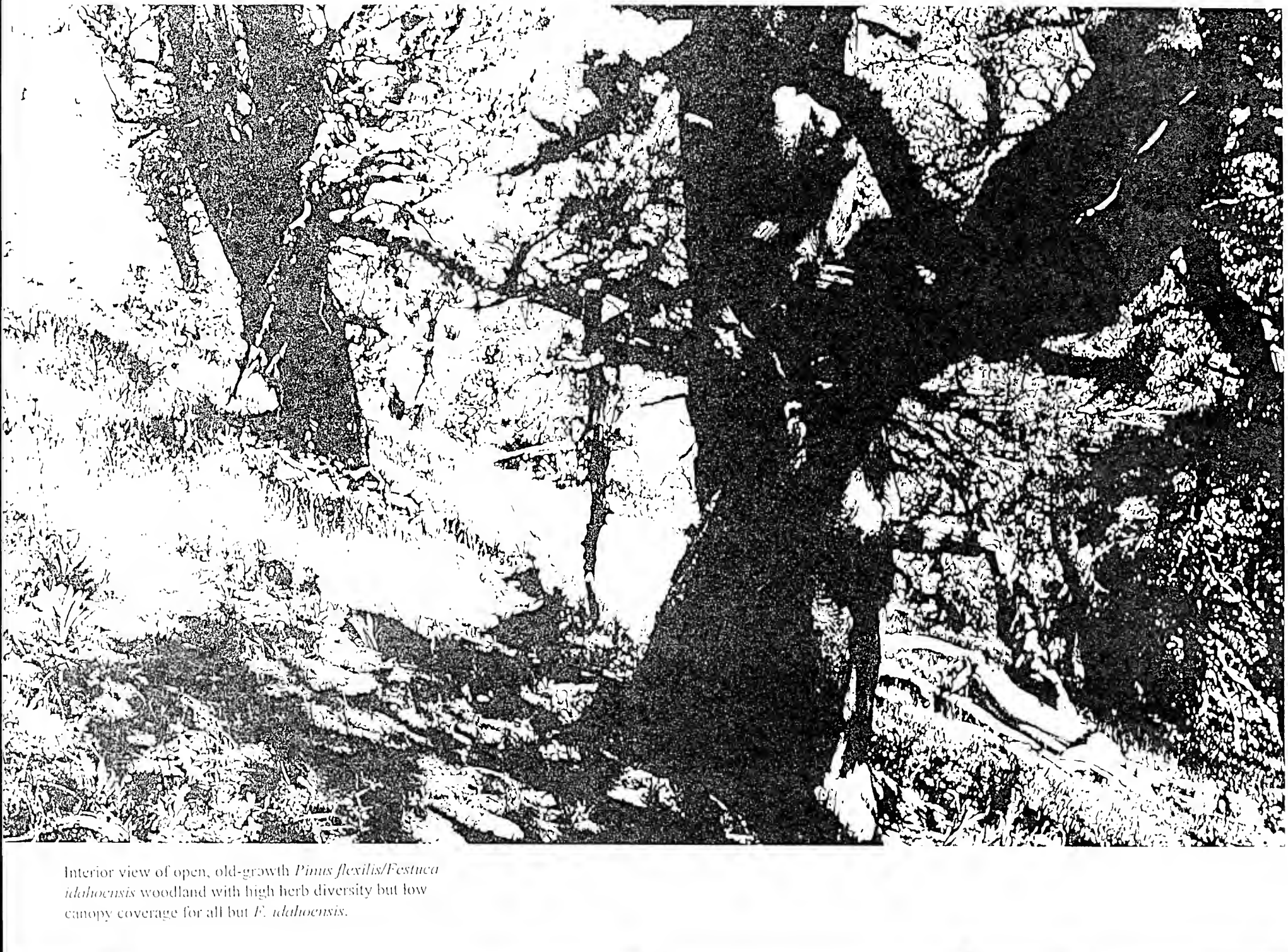


With the exception of cattle trailing, a relatively undisturbed and late successional stand of *Pseudotsuga menziesii/Arnica cordifolia* plant association, showing multiple-aged structure (contrast with previous picture).

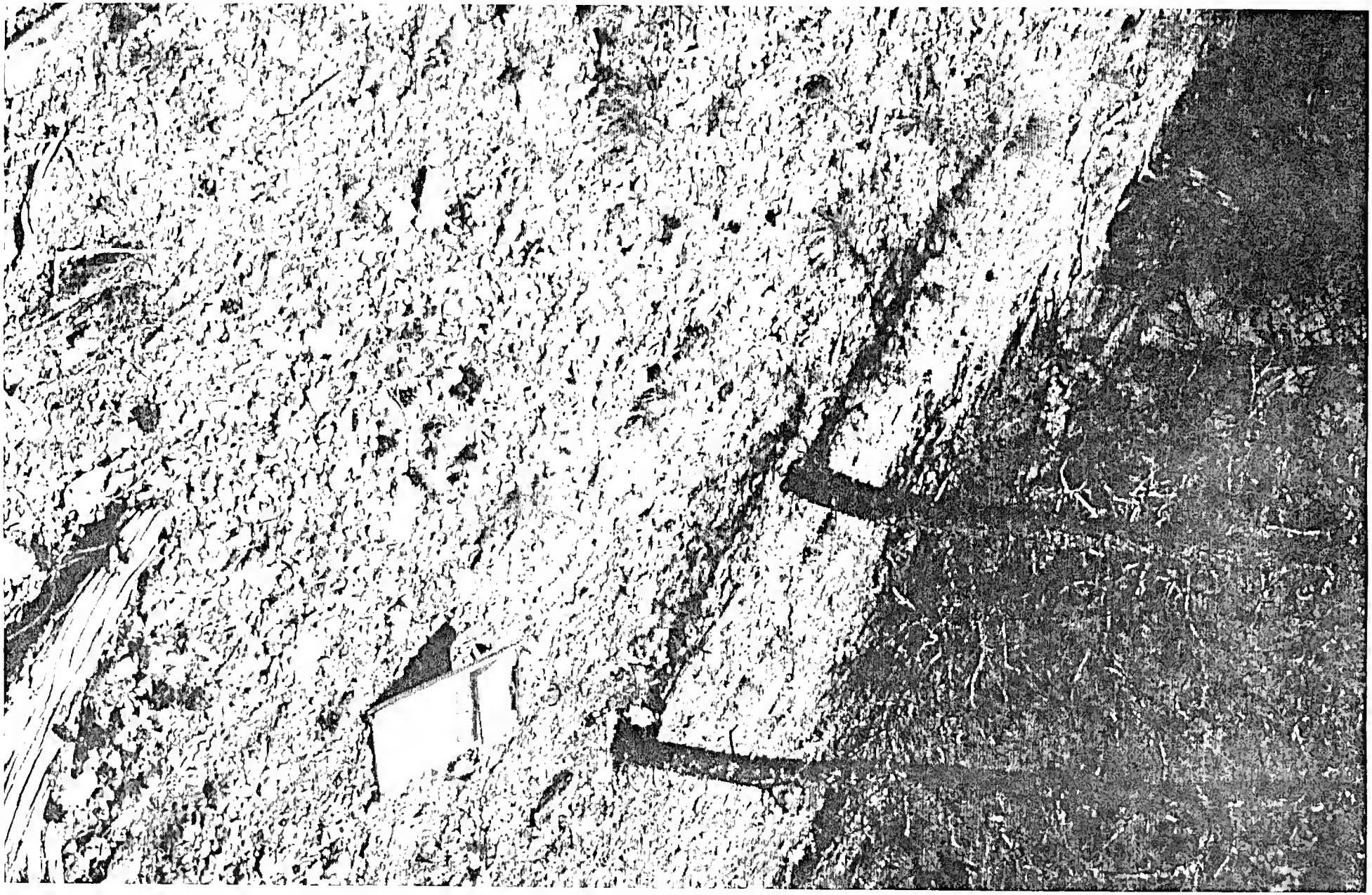


Second-growth *Pseudotsuga menziesii/Juniperus communis* plant association at northern end of study area; because of the high tree canopy cover and xeric site the undergrowth is very depauperate with only scattered individuals of *J. communis*.

Ridgetop positions with lithic exposure of limestone are typically occupied by woodlands, in this case an old-growth stand of *Pinus flexilis/Festuca idahoensis* plant association.



Interior view of open, old-growth *Pinus flexilis/Festuca idahoensis* woodland with high herb diversity but low canopy coverage for all but *F. idahoensis*.



Pseudotsuga menziesii /scree type on steep, fractured and unstable limestone; trees are widely scattered *P. menziesii* and *Pinus flexilis* and the undergrowth is extremely depauperate, total cover less than

This good condition example of *Juniperus scopulorum/Artemisia nova* plant association, a relatively uncommon vegetation type for Montana, has *Agropyron spicatum* as the herbaceous layer dominant.

Looking down the slope of an alluvial fan on east slope of Ruby Range in the vicinity of Porier Canyon mouth; vast expanses of the fan's upper portion are composed of calcareous outwash and support *Artemisia nova/Agropyron spicatum* in fair to good range condition.

An upper elevation, rolling terrain stand of *Artemisia tridentata* ssp. *vaseyana/Festuca idahoensis* in good to exellent condition, with *F. idahoensis* cover ranging from 40 to 60% and average *A. tridentata* cover about 25%.

Artemisia tridentata ssp. *tridentata/Agropyron smithii* community type on subirrigated terrace; the low cover values for *Elymus cinereus* (and high values for weedy and increaser species) point to it being a putative remnant on a site heavily impacted by past and ongoing cattle use.

Conditions of this high-elevation and windswept site approximate those of the high subalpine as indicated by the presence of the *Festuca idahoensis/Potentilla diversifolia* plant association; *F. idahoensis*, *Carex obtusata*, and *Koeleria macrantha* are the dominant graminoids.

In the foreground is a site burned five years ago and supporting a lush *Festuca idahoensis-Agropyron spicatum* c.t.; in the background is the unburned climax association, *Artemisia tridentata* ssp. *vaseyana/Festuca idahoensis*.

This marly, subirrigated wetland is dominated by *Carex simulata* and *C praegracilis*. The next outer vegetation zone is characterized by dominance of *Juncus balticus* and *Deschampsia cespitosa* and marked cattle induced hummocks. Standing water constitutes about 20% of the surface

Close-up photograph of *Townsendia florifer*

Habitat of *Townsendia florifer* and *Oryzopsis contracta*