

**DRAFT  
ECOLOGICAL EVALUATION  
for the**

**ASSIGNATION CREEK POTENTIAL RESEARCH NATURAL AREA**

**WHITE RIVER NATIONAL FOREST**

**PITKIN COUNTY, COLORADO**

Prepared by Margarette J. Lyon  
Colorado Natural Heritage Program  
October, 1995

**INTRODUCTION**

The Assignment Creek potential Research Natural Area is located about seven miles south of Carbondale, CO, west of the Crystal River.. It includes approximately 4,370 acres (1,769 ha.), consisting of shrublands dominated by Gambel oak, with mountain mahogany, serviceberry, snowberry and chokecherry; pinyon juniper woodlands; Douglas fir and aspen forests; and riparian woodlands with narrowleaf cottonwood and blue spruce.

**LAND MANAGEMENT PLANNING**

This document has been prepared by the Colorado Natural Heritage Program through a Challenge Cost-Share Agreement with the White River National Forest to produce Ecological Evaluations of potential Research Natural Areas. These evaluations are intended to aid the National Forest in environmental analysis during revision of their Forest Management Plan. The specific areas and boundaries for evaluation were chosen by the White River National Forest.

**OBJECTIVES**

One of the primary objectives of RNAs as listed in the Forest Service Manual (4063.02, USDA Forest Service 1990) is to “preserve a wide spectrum of pristine representative areas that typify important forest, shrubland, grassland, alpine, aquatic, geologic and similar natural situations...” The Assignment Creek potential RNA would meet this objective by providing excellent representation for a number of plant associations within the pinyon pine, Gambel oak, and Douglas fir alliances. It includes the largest areas of Gambel oak (1970 acres) and pinyon pine (1177 acres) of the potential RNAs seen during this survey. The riparian zone, although small, includes at least one plant association ranked G3 (“very rare or local throughout its range”) by the Colorado Natural Heritage Program (1995a). An Assignment Creek RNA would meet further objectives of the RNA system by (1) protecting elements of biodiversity, (2) serving as a reference area for the study of succession and long-term ecological changes, (3) providing a site for non-manipulative scientific research, and (4) serving as a control area for comparing results of manipulative research and resource management in other areas with similar ecosystem types. In order to accomplish these objectives, an Assignment Creek RNA should be managed to maintain, as much as possible, the natural composition, structure, and function of the area’s ecosystems (Andrews 1993).

## PRINCIPAL DISTINGUISHING FEATURES

The Assigination Creek potential RNA is located seven miles south of Carbondale, CO. Elevations in the area range from approximately 7000 ft. to 9000 ft. It includes the entire drainages of Perham Creek, which flows north and east into the Crystal River; Assigination Creek, which flows south to Perham Creek; and several intermittent streams which flow directly into the Crystal River.

**Ecoregion:** The area occurs within the North Central Highlands and Rocky Mountain Section (M311H) of Bailey's (1994) map of the ecoregions of the United States.

**Physiography and Geology:** The Assigination Creek potential RNA is within the Southern Rocky Mountain Province (Fenneman 1931). It is on the northwestern end of the Elk Mountains, an extension of the Sawatch Range. It has been included in the physiographic unit "Strongly dipping, soft sedimentary mountainous lands" (White River N.F. 1993). Exposed rocks are sedimentary redbeds of the Pennsylvanian and Permian Maroon formation. Immediately to its east is Mt. Sopris, a Tertiary stock intrusion of quartz monzonite. Assigination Ridge is a southern extension of the Grand Hogback, a long monoclinical ridge of Cretaceous sedimentary rock which marks the western boundary of the Rocky Mountains. The ridge to the east of Assigination Creek, above the Crystal River, consists of the Pennsylvanian/Permian Maroon formation, red sedimentary rocks which have been tilted and eroded into fantastic shapes (Bryant 1979, Bryant and Martin 1988.) Soils are red and sandy. Representative Great Groups of soils for the area are Cryboralfs and Cryochrepts (White River N.F. 1993).

**Vegetation:** Major plant communities of the site are in four series: Gambel oak (*Quercus gambelii*), Pinyon pine (*Pinus edulis*), Douglas fir (*Pseudotsuga menziesii*) and narrowleaf cottonwood (*Populus angustifolia*). The most abundant of the major plant communities are those dominated by *Quercus gambelii*, in association with varying proportions of snowberry (*Symphoricarpos rotundifolius*), serviceberry (*Amelanchier alnifolia*), chokecherry (*Prunus [Padus] virginiana*), mountain mahogany (*Cercocarpus montanus*) and elk sedge (*Carex geyeri*). North-facing slopes and more mesic draws have Douglas fir with snowberry as the dominant understory shrub. Interspersed with the timbered areas are patches of aspen (*Populus tremuloides*). South and west-facing slopes, and erosional areas have pinyon pine, Utah juniper (*Juniperus osteosperma*), with a sparse understory, and bare red sandy soil; or in more mesic areas, an understory of mixed shrubs, usually oak or mountain mahogany. Many hillsides have a combination of pinyon and juniper with scattered Douglas fir. Riparian areas are dominated at the lower elevations by narrowleaf cottonwood, with scattered blue spruce (*Picea pungens*), and at the higher elevations along intermittent streams, by aspen. The riparian areas have high species diversity and are free from exotic species.

### **Human use:**

The major use of this area is by hunters, although use by mountain bikers is increasing, according to forest service personnel.

There is a social trail leading into the area from Highway 133 at Perham Creek, 11 miles south of the intersection of Colorado Highways 82 and 133. The lower part of the trail, through pinyon, juniper and oak, is used by mountain bikers, and is generally in good condition. It traverses a steep south-facing slope above the creek, and there is some mass wasting. At one place, a large pinyon has fallen, taking part of the trail with it. Only two hikers were observed in the area during two visits. There is evidence that the trail has had some use by horses, probably last year. Trail use has not impacted the adjacent areas, and would provide access for study of the RNA, so its continued use is recommended.

The trail continues along Perham Creek past Assigination Creek (not shown on map), and intercepts the trail from the west side, by an outfitter's camp. Two hunting camp areas were observed, each with stacks of firewood cut, one covered with sheets of tin; some supplies (stove pipes, etc.) covered with tarps, and tied to tree; and game hanging crossbars nailed to trees. Otherwise, human impact at these sites is not severe.

District personnel advise that there is an old mine and several test holes in the south Perham Creek area, and the remains of an old cabin south of the hunting camp.

No evidence of recent ATV use was observed. The trail leading from Perham Creek to Thompson Creek, shown on the topographic map, was previously a two-track road. At this time only one track is well worn.

## LOCATION

**National Forest, County, and Legal Description.** The potential RNA is located on the Sopris District of the White River National Forest, in Pitkin County. It occupies all or part of Township 9 South, Range 88 West, Sections 4 - 9, 16 - 20 and 30.

### **Maps.**

USDA Forest Service 1:126,720 map of White River National forest, 1991.

U. S. Geological Survey 1: 24,000 topographic maps: Mount Sopris, CO 39110732

Stony Ridge, CO 3910733

Placita, CO 3910723

**Total Acreage and Elevation.** The area comprises approximately 4,370 acres (1,769 ha.), ranging in elevation from 6,600 ft. to 9,600 ft. (2,015 m. to 2,926 m.)

**Boundary Description.** The northern boundary of the Assignment Creek potential RNA is defined by the National Forest / BLM boundary. On the east, it generally follows the Crystal River southward, along the boundary between National Forest and private land, to a point about 1/4 mi. south of Perham Creek; then follows the ridgetop around the Perham Creek drainage; then north along Assignment Ridge to the point of origin at the National Forest / BLM boundary.

**Access and Travel Routes.** The Assignment Creek potential RNA can be reached from the east from Colorado highway 133, south of Carbondale. There is a social trail leading into the area from Highway 133 at Perham Creek, 11 miles south of the intersection of Colorado Highways 82 and 133. The lower part of the trail, through pinyon, juniper and oak, is used by mountain bikers, and is generally in good condition. From the north and west, the area can be reached via the Thompson Creek trail, which begins at the gravel pit about 1.5 miles north of the National Forest boundary, west of Highway 133.

## AREA BY COVER TYPES

The cover type map of the site with acreages of each cover type is attached. Aerial photo interpretation and field observation indicates that the area is 45% shrub, 28% pinyon pine, 23% Douglas fir and 4% aspen. Vegetation was mapped based on interpretation of aerial photographs (USDA Color infra-red, 1:58,000, and USGS Ortho photographs, 1:24,000); topographic maps; and field observation. Not all areas have been field checked. In cases where a mixture of cover types was impossible to separate, polygons were mapped as mixtures. Acreage for each major cover type was determined by using a planimeter to measure areas of polygons on the attached map. Mixed polygons were arbitrarily assumed to contain equal amounts of each cover type to arrive at the estimated acreages below.

**Table 1.**  
Society of American Foresters Cover Types (Eyre 1980)

Type (SAF no.)	Acres	Hectares
Interior Douglas fir (SAF 210)	1,023	414
Aspen (SAF 217)	182	74
Pinyon pine (SAF 239)	1,177	476
Cottonwood/willow (SAF 235)	18	7
Non-forested	1,970	798
<b>Total</b>	<b>4,370</b>	<b>1,769</b>

**Table 2.**  
Kuchler Cover Types (Kuchler 1985)

Type (No.)	Acres	Hectares
Pine-Douglas fir (17) (includes aspen and cottonwood)	1223	495
Juniper - pinyon woodland (21)	1177	476
Mountain mahogany-oak scrub (31)	1970	798
<b>Total</b>	<b>4370</b>	<b>1769</b>

**Table 3.**  
Plant Series / Plant Associations

If the series or plant association is well represented in the area it is given an M for major representation. If the series or plant association covers only a small area, it is given an m for minor representation. Plant association names which are from Johnston (1987) are given using his nomenclature. For updated plant association names using SCS nomenclature see Appendix 1. For common names and plant name synonyms, see Appendix 2.

Series / Plant Association (see plot data for cross references with CNHP names)	Representation	Acres	Hectares
Pseudotsuga menziesii	M	1023	414
Pseudotsuga menziesii / Symphoricarpos oreophilus	M		
Populus tremuloides	m	182	74
Populus tremuloides/ Amelanchier alnifolia-Padus (Prunus)			

virginiana	m		
Quercus gambelii	M	1970	798
Quercus gambelii / Symphoricarpos oreophilus	M		
Quercus gambelii / Amelanchier alnifolia	M		
Quercus gambelii / Amelanchier utahensis	M		
Quercus gambelii-Padus (Prunus) virginiana/ Paxistima myrsinites	M		
Populus angustifolia	M	18	7
Populus angustifolia/ Alnus incana ssp. tenuifolia - Swida (Cornus) sericea	M		
Populus angustifolia / Amelanchier alnifolia	M		
Pinus edulis	m	1177	476
Pinus edulis-Juniperus osteosperma / Cercocarpus montanus	m		
Pinus edulis / Quercus gambelii	M		
Artemisia tridentata ssp. vaseyana	m		included with oak
Artemisia tridentata / Symphoricarpos oreophilus	m		
Juncus spp.	m	< 1	
Juncus arcticus / Carex spp	m		
Total acreage		4370	1769

### Description of Values

#### **Flora:**

**Threatened and Endangered species:** No Colorado Natural Heritage Program Species of Special Concern were observed.

**Exotic species:** Several were observed. See “Impacts and Possible Conflicts” section for listing.

#### **Vegetation:**

The Assnigation Creek potential RNA has a large representation of pinyon pine and mountain shrub communities, especially in the Gambel oak cover type. It includes approximately 1970 acres of Gambel oak, in association with varying proportions of snowberry, serviceberry, chokecherry, mountain mahogany and elk sedge. Pinyon pine, often mixed with oak and mountain mahogany, dominates 1177 acres of the potential RNA. These are the largest examples of these two alliances seen during this survey. The Douglas fir alliance is also well represented, with over 1000 acres of forest. The riparian zone, although small, includes at least one plant association ranked G2 (“globally imperiled”) and one ranked G3 (“very rare or local throughout its range”) by the Colorado Natural Heritage Program (1995a).

**Plant associations:** Populus angustifolia (Picea pungens) / Alnus incana - Cornus stolonifera (plot 3) is listed as rare or imperiled, and ranked G2 S2 by the Colorado Natural Heritage Program (1995a). Plot 11, Populus angustifolia / Amelanchier alnifolia / Smilacina stellata, is ranked G3S3. Plot 16, Quercus gambelii -Cercocarpus montanus / Carex geyeri is ranked G3 S3. Plot 8 may be close to Populus

tremuloides / Acer glabrum which is ranked G1G2 S1S2 by the Colorado Natural Heritage Program (1995a).

**Fauna:** Wildlife or their sign observed include mule deer, elk, and blue grouse. A herd of about 100 elk is known to occupy the area. Other species known from the area, according to forest service personnel, are mountain lion, black bear, bobcat, skunks, and several raptors. Undoubtedly, the area serves as suitable habitat for a wide variety of vertebrates and invertebrates which were not documented during this brief survey. The current forest plan calls for the area to managed with emphasis on winter range for deer and elk (White River National Forest 1990).

Threatened and endangered species: None were observed.

Exotic species: None were observed.

**Geology:** Spectacular red cliffs of the maroon formation outcrop east of Assignment Creek. The originally horizontal strata have been tipped vertical in some places, and in others, twisted and eroded into fantastic formations. Assignment Ridge, on the west side of the creek, is a continuation of the Grand Hogback, and consists of the Cretaceous Dakota and Burrow Canyon formations.

**Lands:** The entire potential RNA is part of a roadless area of the White River National Forest. Adjoining lands on the east are private, and on the north, BLM. The BLM has designated the adjoining Thompson Creek area an Area of Critical Environmental Concern (ACEC). Conservationists have proposed a wilderness area of 23,200 acres which includes both Thompson Creek and Assignment Ridge (see attached report).

#### **Impacts and Possible Conflicts:**

**Exotic species:** Several exotic species were present. *Poa pratensis* was the most abundant, occurring in several plots, and accounting for up to 5 - 25% cover. Others were mostly along trails, where none were abundant, and in a grazed meadow adjoining the cattle allotment (see discussion under "grazing" below. Those found were:

Chorispora tenella	purple mustard
Taraxacum officinale	common dandelion
Trifolium pratense	red clover
Bromus tectorum	cheat grass
Cynoglossum officinale	gypsyflower
Medicago lupulina	black medic
Poa pratensis	Kentucky bluegrass

The current forest plan allows manipulation of vegetation for wildlife habitat improvement, including "seeding, spraying, planting and mechanical treatments" (White River National Forest 1990). These treatments could lead to an increase in exotic species.

**Mineral resources:** The area is designated "no surface occupancy" in the Oil and Gas Leasing Environmental Impact Statement (White River National Forest 1993).

**Grazing:** The meadows on the west side of the area show a species composition indicative of heavy grazing, with dandelion and yarrow (see plot data). It appears to have had cattle on it last year. Although there is no active grazing allotment within the potential RNA, there is no physical barrier to cattle on the adjacent allotment, and they go as far as Perham Creek for water. This allotment is used from July 1 to August 1, every other year. These small areas are peripheral to the main values of the potential RNA, and could be eliminated.

**Timber:** The area has not been logged. The Douglas fir forested area occurs on steep, quite inaccessible slopes above Perham Creek. The area is designated 5A in the current forest plan . This calls for an “emphasis on winter range in non-forested winter ranges”, with wildlife values taking precedence over other uses. No silvicultural prescription is given (White River National Forest 1990).

**Watershed:** RNA status would protect watershed values.

**Recreation:** The Forest Service is evaluating the Perham Creek Trail for possible improvement to accommodate bicycle and horse use. This improvement might not be desirable if the area is to be considered for RNA designation. Although no recent evidence of off-road vehicle use was seen, it is a potential problem, especially with trail improvement.

**Recommendations:** The roadless area south of Perham Creek should be considered for inclusion in this RNA. It contains a large contiguous area of Douglas fir forest, and appears to have had little human impact.

The potential addition could include portions of T88 W, R9S, S 30, 31, and 32; and T88W, R10S, S 5, 6, and 7. The area appears to be roadless as far as Thompson Creek on the west, and to private land at Redstone and along the Crystal River on the south and east.

### **Evaluation**

**Criteria** of quality, condition, viability and defensibility were developed by the Rocky Mountain Region to assess how well a potential RNA meets RNA qualification (Anderws 1993). These criteria are based on those developed by the Colorado Natural Heritage Program to evaluate occurrences of individual elements and communities.

**Quality** is based on how well a site represents the targeted ecosystem type or protected biodiversity elements.

**Condition** refers to the naturalness of the site and the degree to which it has been degraded or altered from presettlement conditions.

**Viability** is the prospect for long-term survival of the ecosystem and its protected elements.

**Defensibility** is the extent to which the site can be protected from extrinsic anthropogenic factors.

The Assigination Creek potential RNA has been evaluated according to these criteria as follows:

**Quality:** The area contains some of the best representations of mountain shrub and pinyon-juniper communities in the White River National Forest. It includes approximately 1970 acres of Gambel oak, in association with varying proportions of snowberry, serviceberry, chokecherry, mountain mahogany and elk sedge. Pinyon pine, often mixed with oak and mountain mahogany, dominates 1177 acres of the potential RNA. These are the largest examples of these two alliances seen during this survey. The Douglas fir alliance is also well represented, with over 1000 acres of forest. The riparian zone, although small, includes at least one plant association ranked G3 (“very rare or local throughout its range”) by the Colorado Natural Heritage Program (1995a). The riparian areas and forested areas with Douglas fir and aspen on the cooler slopes provide a high level of biodiversity within a small area. The geology contributes to the unique quality of the landscape.

**Condition:** The area is in surprisingly good condition, considering its proximity to the highway. It is not grazed, and has not been logged. It is roadless, and has experienced little human impact. Prescribed burns for wildlife habitat improvement have mimicked natural fire. Exotic species occur mainly along trails and

in the meadow areas adjoining the adjacent cattle allotment. These small, less pristine, areas are peripheral to the major values of the RNA, and could be eliminated.

**Viability:** Potential threats to maintaining the ecosystem include increased recreational use and manipulation of vegetation for wildlife habitat improvement. Neither of these activities would necessarily cause damage.

**Defensibility:** The area is entirely within National Forest System lands on the White River National Forest, and under National Forest management.

### **Literature Cited**

- Andrews, T. 1993. Research Natural Area Guide for the Rocky Mountain Region. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
- Bailey, R. G., P. E. Avers, T. King and W. H. McNab. 1994. Ecoregions and Subregions of the United States. Prepared for the USDA Forest Service by the U. S. Geological Survey.
- Bourgeron, P. S. and L. D. Engelking, eds. 1994. A Preliminary Vegetation Classification of the Western United States. Unpublished report prepared by the Western Heritage Task Force for the Nature Conservancy, Boulder, CO.
- Bryant, Bruce. 1979. Geology of the Aspen 15-minute Quadrangle, Pitkin and Gunnison Counties, Colorado. U. S. Gov't. Printing Office, Washington D.C.
- Bryant, Bruce and Peter L. Martin. 1988. The Geologic Story of the Aspen Region. U. S. Geological Survey Bulletin 1603. U. S. Government Printing Office, Washington DC.
- Colorado Natural Heritage Program. 1995a. Colorado's Natural Heritage: Rare and Imperiled Animals, Plants, and Natural Communities. CNHP, Fort Collins, CO.
- Colorado Natural Heritage Program. 1995b. Significant Natural Communities found in Colorado. CNHP, Fort Collins, CO
- Eyre, F. S., ed. 1980. Forest Cover Types of the United States and Canada. Society of American Foresters, Washington.
- Fenneman, N. M. 1931. Physiography of Western United States. McGraw Hill Book Co., New York.
- Hess, Karl and Clinton H. Wasser. 1982. Grassland, Shrubland, and Forestland Habitat Types of the White River-Arapaho National Forest.
- Johnston, Barry. 1987. Plant Associations of Region Two, Edition 4. USDA Forest Service, Lakewood, CO.
- Kuchler, A. W. 1985. Map of the potential natural vegetation of the coterminous United States. American Geographical Society, New York.
- USDA Forest Service. 1990. Forest Service Manual 4063.
- USDA Soil Conservation Service. 1994. PLANTS. Plants of Colorado--Alphabetical Listing.
- Weber, William A. 1987. Colorado Flora: Western Slope. Colorado Associated University Press, Boulder, CO.

White River National Forest. 1990. Land and Resource Management Plan. USDA Forest Service, Glenwood Springs, CO.

White River National Forest. 1993. Oil and Gas Leasing Draft Environmental Impact Statement.

## APPENDIX 1

### PLOT DATA FOR PLANT ASSOCIATIONS SAMPLED

Plant Association names are from Johnston (1987) or Hess and Wasser (1982) whenever a reasonably good fit can be found in those publications. Plant association names, edited to include the more recent plant species names from USDA Soil Conservation Service (1994), are given in parentheses where there are differences. Plant Association names are cross referenced with the names used by the Colorado Natural Heritage Program wherever possible. CNHP names are listed in bold type, followed by their global and state ranks.

Plant species coverage within plots was estimated into cover classes, and species are listed alphabetically within each class. Because of time limitations, not all species within the plots were always identified or collected. Plant species names are from USDA Soil Conservation Service (1994). Where these species names differ from Weber (1987), the Weber names are shown in parentheses. For instances in which the Weber and SCS names differ from Johnston (1987), the plant species names used by Johnston are given in parentheses and followed by \*. See Appendix 2 for common names.

Pinus edulis/Quercus gambelii (Johnston 1987)

Pinus edulis / Quercus gambelii / Carex geayeri h.t. (Hess and Wasser 1982)

#### **Pinus edulis/Quercus gambelii p. a. G5S5 (Colorado Natural Heritage Program 1995 b)**

Plot 1 (100 X 100 ft.)

Sampled on slope on north side of Perham Creek, about 1 mi. from trailhead. This is a mature (old growth?) pinyon site, with large (>30 ft. tall, 16 in. dbh) pinyons. There are several dead and down trees.

UTM's: 306,750 E / 4,348,900 N

USGS Quadrangle: Mt. Sopris 3910732

Elevation: 7200 feet (2195 m)

Slope: 25 degrees

Aspect: 170 degrees

Rock (2 -8 cm)	25 - 50	% coverage
Bare ground (litter)	25 - 50	
Pinus edulis	25 - 50	
Juniperus osteosperma	5 - 25	
Quercus gambelii	5 - 25	
Amelanchier alnifolia	5 - 25	
Cercocarpus montanus	5 - 25	
Oryzopsis hymenoides	1 - 5	
Carex geayeri	1 - 5	
Mahonia repens	<1	
Arabis sp.	<1	

Quercus gambelii / Padus virginiana / Paxistima myrsinites plant associations (Johnston 1987)

Similar to Quercus gambelii / Amelanchier alnifolia, Quercus gambelii / Amelanchier utahensis, and Quercus gambelii - Prunus virginiana / Amelanchier utahensis / Pachystima myrsinites h.t. (Hess and Wasser 1982).

#### **Quercus gambelii / Paxistima myrsinites p. a. GU S? (Colorado Natural Heritage Program 1995 b)**

Plot 2 (100 X 100 ft.)

Sampled on north side of Perham Creek, about 1.2 mi. from trailhead. This is more mesic than the Quga / Syor sites, but dryer than the typical Hess and Wasser Quga-Prvi/Amut/Pamy site, since it does not contain any *Paxistima*, and does have *Cercocarpus*, *Chrysothamnus* and *Physaria*.

UTM's: 306,600 E / 4,390,000 N

USGS Quadrangle: Mt. Sopris 3910732

Elevation: 7500 feet (2286 m.)

Slope: 25 degrees

Aspect: 120 degrees

Rock (0 -1 m)	50 - 75% coverage
Bare ground (litter)	1 - 5
<i>Quercus gambelii</i>	50 -75
<i>Padus virginiana</i>	25 - 50
<i>Amelanchier</i> sp.	5 - 25
<i>Cercocarpus montanus</i>	5 - 25
<i>Chrysothamnus nauseosus</i>	1 - 5
<i>Juniperus scopulorum</i>	1 - 5
<i>Symphoricarpos oreophilus</i>	1 - 5
<i>Artemisia frigida</i>	<1
<i>Cynoglossum officinale</i>	<1
<i>Delphinium nuttallianum</i>	<1
<i>Physaria acutifolia</i>	<1
<i>Ribes inerme</i>	<1

*Populus angustifolia*/*Alnus incana* ssp. *tenuifolia*-*Swida sericea* p. a. (Johnston 1987)

*Populus angustifolia* / *Amelanchier alnifolia* / *Smilacina stellata* h. t. (Hess and Wasser 1982)

*Populus angustifolia* -(*Picea pungens*) / *Alnus incana*-*Cornus sericea*, montane riparian forests, is listed as a rare and imperiled natural community (G3S3) by the Colorado Natural Heritage Program (1995a).

***Populus angustifolia* (*Picea pungens*) / *Alnus incana* p. a. G2S2 (Colorado Natural Heritage Program 1995 a)**

Plot 3 (50 X 100 ft.)

Sampled along Perham Creek, just upstream from the confluence with Assignment Creek. This is a typical, pristine, riparian site. (photo 1-18) There are scattered large *Picea pungens* along the creek, although none occurred in this plot, and it does not account for enough cover to place this in the *Picea pungens* series. Only one habitat type in the *Populus angustifolia* series is listed in Hess and Wasser, and this does not give due importance to *Cornus* or the diversity of the shrub and forb layers.

UTM's: 306,300 E / 4,390,000 N

USGS Quadrangle: Mt. Sopris 3910732

Elevation: 7400 feet (2286 m)

Slope: 5 degrees

Aspect: 150 degrees

Rock (0 -1 m)	1 -5 % coverage
Bare ground (litter)	20
<i>Populus angustifolia</i>	25 - 50
<i>Populus tremuloides</i>	5 - 25
<i>Pseudotsuga menziesii</i>	1 - 5
<i>Juniperus scopulorum</i>	5 - 25
<i>Cornus stolonifera</i> ( <i>Swida sericea</i> )	25 - 50
<i>Acer glabrum</i>	5 - 25
<i>Alnus incana</i>	5 - 25

Amelanchier alnifolia	5 - 25
Prunus (Padus) virginiana	5 - 25
Salix monticola	5 - 25
Symphoricarpos oreophilus	5 - 25
Carex geyeri	1 - 5
Maianthemum amplexicaule	1 - 5
Clematis occidentalis	< 1
Mahonia repens	< 1
Noccaea montana	< 1
Rosa woodsii	< 1
Vicia americana	< 1

Juncus arcticus / Carex spp. p.a. (Johnston 1987)

Plot 4 (50 X 50 ft.)

Sampled in a wet meadow clearing by the upstream hunting camp, apparently grazed. The surrounding area is aspen and Gambel oak. Because this was observed so early in the season, most species could not be positively identified, and the list below represents a best guess. This plot is probably not as wet as the p.a. described by Johnston.

UTM's: 305,250 E / 4,348,400 N  
 USGS Quadrangle: Stony Ridge 39110733  
 Elevation: 7960 feet ( 2427 m)  
 Slope: 2 degrees  
 Aspect: 135 degrees

Rock (0 -1 m)	< 1% coverage
Bare ground (litter)	< 1
Juncus sp. (arcticus?)	25 - 50
Equisetum arvense	5 - 25
Mertensia ciliata	5 - 25
Achillea millefolium (lanulosa)	5 - 25
Taraxacum officinale	1 - 5
Sambucus racemosa	< 1

Quercus gambelii / Amelanchier alnifolia p.a. (Johnston 1987)

Also similar to Quercus gambelii / Symphoricarpos oreophilus p. a. (Johnston 1987) and Quercus gambelii / Symphoricarpos oreophilus / Carex geyeri h. t. (Hess and Wasser 1982)

**Quercus gambelii / Paxistima myrsinites p. a. GU S? (Colorado Natural Heritage Program 1995 b)**

This includes Quercus gambelii / Amelanchier alnifolia (Johnston 1987)

Plot 5 (100 X 100 ft.)

This plot is located north of Perham Creek, between the two meadow hunting camps. There is more *Amelanchier alnifolia* than *Symphoricarpos* in this plot. Otherwise, it is a fairly good fit.

UTM's: 305,300 E / 4,347,400 N  
 USGS Quadrangle: Stony Ridge 39110733  
 Elevation: 7950 feet (2422 m)  
 Slope: 25 degrees  
 Aspect: 80 degrees

Rock (0 -1 m)	0	% coverage
Bare ground	0	
Quercus gambelii	50 -75	
Amelanchier alnifolia	25 - 50	
Carex geyeri	25 - 50	
Symphoricarpos oreophilus	5 - 25	
Balsamorhiza sagittata	1 - 5	
Pseudotsuga menziesii	1 - 5	
Lathyrus leucanthus	< 1	
Collinsia parvifolia	< 1	
Lupinus sp. (ammophilus?)		< 1
Mahonia repens	< 1	
Ligusticum porteri	< 1	

Grazed meadow, mixed forbs and unidentified grasses (unclassified)

See Bourgeron and Engelking (1994) Achillea millefolium series, ref. 1217, in Appendix II, Anthropogenic Series.

Plot 6 (1 m X 5 m)

This plot was sampled by averaging five plots, one square meter each. Although it was sampled early in the season, it appears that weedy species are dominant. This is not the case in any other part of the potential RNA.

UTM's: 305,350 E / 4,348,750 N

USGS Quadrangle: Stony Ridge 39110733

Elevation: 7920 feet ( 2410 m)

Slope: 5 degrees

Aspect: 140 degrees

Rock (0 -1 m)	0	% coverage
Bare ground (litter)	25 - 50	
Achillea lanulosa	25 - 50	
Bromus sp? (unid. grass)	5 - 25	
Taraxacum officinale	5 - 25	
Rosa woodsii	< 1	
Lathyrus leucanthus	< 1	
Lupinus sp.	< 1	
Agoseris glauca	< 1	
Trifolium sp.	< 1	

Artemisia tridentata / Symphoricarpos oreophilus p.a. (Johnston 1987)

Plot 7 (50 X 30 ft.)

This plot is adjacent to plot 6, on slightly higher ground at the edge of the meadow. It also shows the effects of grazing, in the high percentage of Achillea lanulosa.

UTM's: E 305,300 / 4,348,750 N

USGS Quadrangle: Stony Ridge 39110733

Elevation: 7920 feet (2410 m)

Slope: 5 degrees

Aspect: 140 degrees

Rock (0 -1 m)	< 1	% coverage
Bare ground (litter)	5 - 25	
Artemisia tridentata	25 - 50	
Achillea lanulosa	25 - 50	
Unidentified grass	25 - 50	
Symphoricarpos oreophilus	5 - 25	
Chrysothamnus nauseosus	5 - 25	
Taraxacum officinale	1 - 5	
Antennaria rosea	< 1	
Delphinium ramosum	< 1	
Galium septentrionalis	< 1	
Lupinus sp.	< 1	
Mertensia sp.	< 1	
Noccaea montana	< 1	
Potentilla pulcherrima	< 1	
Viola praemorsa	< 1	

Populus tremuloides / Amelanchier alnifolia - Padus virginiana p. a. (Johnston 1987)

Similar to Populus tremuloides / Symphoricarpos oreophilus/Carex geyeri h.t. (Hess and Wasser 1982)

This may be close to Populus tremuloides / Acer glabrum which is listed as a rare and imperiled natural community by the Colorado Natural Heritage Program (1995a).

**Populus tremuloides / Amelanchier alnifolia-Symphoricarpos oreophilus / Thalictrum fendleri p. a. G5S3S4 (Bourgeron and Engelking, 1994)**

Plot 8 (100 X 100 ft.)

This plot is located north of Perham Creek, just past the meadow areas in plots 6 and 7. It is typical of the patches of aspen in the area. (Photo 23).

UTM's: 305,150 E / 4,348,700 N

USGS Quadrangle: Stony Ridge 39110733

Elevation: 8080 feet ( 2460 m)

Slope: 30 degrees

Aspect: 240 degrees

Rock (0 -1 m)	< 1	% coverage
Bare ground (litter)	1 - 5	
Populus tremuloides	50 - 75	
Amelanchier alnifolia	25 - 50	
Lathyrus leucanthus	5 - 25	
Padus virginiana	5 - 25	
Pteridium aquilinum	5 - 25	
Symphoricarpos oreophilus	5 - 25	
Acer glabrum	1 - 5	
Achillea lanulosa	1 - 5	
Bromus sp.	1 - 5	
Disporum	1 - 5	
Ligusticum porteri	1 - 5	
Thalictrum fendleri	1 - 5	
Geranium richardsonii	< 1	
Viola adunca	< 1	

Pseudotsuga menziesii / Symphoricarpos oreophilus p.a. (Johnston 1987)

Pseudotsuga menziesii / Symphoricarpos oreophilus / Carex geyeri h.t. (Hess and Wasser 1982)

**Pseudotsuga menziesii / Symphoricarpos oreophilus p. a. G5S4  
or Pseudotsuga menziesii / Acer glabrum p. a. G? S? (Colorado Natural Heritage Program 1995 b)**

Plot 9 (100 X 100 ft.) (Photo 1-24)

Sampled on the south side of Perham Creek, about 0.35 mi. upstream from the confluence with Assigination Creek. This site has a good diversity of understory shrub species with nearly equal dominance. In this plot *Arnica cordifolia* accounted for a higher percent cover than *Carex geyeri*; *Acer glabrum* was most abundant on the wetter concave slopes.

UTM's: 306,000 E / 4,348,650 N

USGS Quadrangle: Mt. Sopris 3910732

Elevation: 7700 feet ( 2348 m)

Slope: 45 degrees

Aspect: 320 degrees

Rock (0 -1 m)	< 1
Bare ground (litter)	25 - 50
<i>Pseudotsuga menziesii</i>	50 - 75
<i>Acer glabrum</i>	5 - 25
<i>Amelanchier alnifolia</i>	5 - 25
<i>Arnica cordifolia</i>	5 - 25
<i>Carex geyeri</i>	5 - 25
<i>Juniperus scopulorum</i>	5 - 25
<i>Prunus (Padus) virginiana</i>	5 - 25
<i>Symphoricarpos oreophilus</i>	5 - 25
<i>Abies lasiocarpa</i>	1 - 5
<i>Juniperus communis</i>	1 - 5
<i>Mahonia repens</i>	1 - 5
<i>Pachystima myrsinites</i>	1 - 5
<i>Picea pungens</i>	1 - 5
<i>Thalictrum fendleri</i>	1 - 5
<i>Calypso bulbosa</i>	< 1
<i>Disporum trachycarpum</i>	< 1
<i>Maianthemum amplexicaule</i>	< 1

*Pinus edulis-Juniperus osteosperma / Cercocarpus montanus* h.t. (Hess and Wasser 1982)

***Pinus edulis / Cercocarpus montanus* p. a. G5S4 (Colorado Natural Heritage Program 1995 b)**

Plot 10 (100 X 100 ft.)(no photo)

Sampled on a southwest facing slope north of Perham Creek. Although no *Juniperus osteosperma* occurred in this plot, the *Pinus edulis-Juniperus osteosperma / Cercocarpus montanus* h.t. is otherwise an excellent fit. Thin red sandy soils and sandstone strata slope steeply to the southwest.

UTM's: 306,650 E / 4,349,200 N

USGS Quadrangle: Mt. Sopris 3910732

Elevation: 7600 feet (2316 m)

Slope: 50 degrees

Aspect: 242 degrees

Rock (0 -1 m)	25 - 50
Bare ground (litter)	50 - 75
Pinus edulis	5 - 25
Cercocarpus montanus	5 - 25
Quercus gambelii	1 - 5
Mahonia repens	< 1
Arabis drummondii	< 1
Penstemon commarhenus	< 1
Oryzopsis hymenoides	< 1
Streptanthus cordatus	< 1

Populus angustifolia / Amelanchier alnifolia p.a. (Johnston 1987)

**Populus angustifolia / Amelanchier utahensis / Smilacina stellata p. a. G3S3 (Colorado Natural Heritage Program 1995 b)** (includes Poan / Amal above)

Plot 11 (100 X 100 ft.) (photo 13)

Sampled in the riparian area of Assignment Creek, about 1/4 mile from mouth. The riparian area is about 200 ft. wide. This is about at the upper limit of perennial water in the stream. Most of the large trees were aspen, with the cottonwood cover derived from young trees. The diversity of the understory may be partly due to the ecotonal location between the cottonwood and aspen dominated riparian areas.

UTM's: 306,350 E / 4,349,350 N

USGS Quadrangle: Mt. Sopris 3910732

Elevation: 7600 feet ( 2316 m)

Slope: 2 degrees (downstream); 35 degrees on sides.

Aspect: 170 degrees

Rock (0 -1 m)	1 - 5% coverage
Bare ground (litter)	1 - 5
Populus tremuloides	5 - 25
Populus angustifolia	5 - 25
Picea pungens	1 - 5
Acer glabrum	1 - 5
Salix exigua	1 - 5
Salix monticola	1 - 5
Symphoricarpos oreophilus	1 - 5
Amelanchier sp.	1 - 5
Prunus (Padus) virginiana	1 - 5
Juniperus scopulorum	1 - 5
Quercus gambelii	1 - 5
Rosa woodsii	1 - 5
Poa fendleriana	5 - 25
Poa pratensis	5 - 25
Juncus sp.	< 1
Heracleum lanatum (spondylium)	< 1
Erigeron flagellaris	< 1
Senecio multilobatus	< 1
Lathyrus leucanthus	< 1
Vicia americana	< 1

Quercus gambelii / Symphoricarpos oreophilus p.a. (Johnston 1987)

Quercus gambelii / Symphoricarpos oreophilus / Carex geyeri h.t. (Hess and Wasser 1982)

**Quercus gambelii / Symphoricarpos oreophilus p.a. GU S3S4 (Colorado Natural Heritage Program 1995 b)**

Plot 12 (100 X 100 ft.) (photo 14)

Sampled on a bench above the west side of Assignment Creek, 0.7 mi. from mouth.

This differs from the Hess and Wasser description in the absence of *Carex geyeri*.

UTM's: 306,000 E / 4,350,100 N

USGS Quadrangle: Mt. Sopris 3910732

Elevation: 7760 feet (2366 m)

Slope: 25 degrees

Aspect: 115 degrees

Rock (0 -1 m)	< 1
Bare ground (litter)	5 - 25
<i>Quercus gambelii</i>	5 - 25
<i>Symphoricarpos oreophilus</i>	25 - 50
<i>Balsamorhiza sagittata</i>	5 - 25
<i>Juniperus scopulorum</i>	1 - 5
<i>Poa pratensis</i>	1 - 5
<i>Lupinus</i> sp.	1 - 5
<i>Chrysothamnus viscidiflorus</i>	1 - 5
<i>Collomia linearis</i>	< 1
<i>Agoseris glauca</i>	< 1
<i>Lomatium triternatum</i>	< 1
<i>Agropyron smithii</i>	< 1
<i>Lathyrus leucanthus</i>	< 1
<i>Purshia tridentata</i>	< 1
<i>Erigeron flagellaris</i>	< 1
<i>Delphinium nuttallianum</i>	< 1
<i>Crepis acuminata</i>	< 1
<i>Amelanchier utahensis</i>	< 1
<i>Prunus (Padus) virginiana</i>	< 1
<i>Potentilla pulcherrima</i>	< 1
<i>Penstemon caespitosus</i>	< 1
<i>Lappula redowskii</i>	< 1
<i>Bromus tectorum</i>	< 1

Quercus gambelii / Amelanchier alnifolia p.a. (Johnston 1987)

**Quercus gambelii / Paxistima myrsinites p. a. GU S? (Colorado Natural Heritage Program 1995 b)**

(This includes Quga / Amal (Johnston 1987))

Plot 13 (100 X 100 ft.) (no photo?)

Sampled in area of burned oak, uphill from plot 12.. Higher on the same hillside, mountain mahogany becomes more frequent, with a reduction in snowberry.

UTM's: 305,800 E / 4,350,200 N

USGS Quadrangle: Stony Ridge 3910733

Elevation: 7960 feet (2426 m)

Slope: 30 degrees  
Aspect: 135 degrees

	% coverage
Rock (0 -1 m)	< 1
Bare ground (litter)	5 - 25
Quercus gambelii	50 - 75
Amelanchier alnifolia	25 - 50
Balsamorhiza sagittata	5 - 25
Symphoricarpos oreophilus	5 - 25
Poa pratensis	5 - 25
Chrysothamnus sp.	1 - 5
Agoseris glauca	< 1
Collomia linearis	< 1
Delphinium nuttallianum	< 1
Lathyrus leucanthus	< 1
Achillea lanulosa	< 1
Senecio integerrimus	< 1
Pseudostellaria jamesii	< 1

Pinus edulis / Quercus gambelii p.a. (Johnston 1987)  
similar to Quercus gambelii / Amelanchier alnifolia p.a. (Johnston 1987).

**Pinus edulis / Quercus gambelii p. a. G5S5 (Colorado Natural Heritage Program 1995 b)**

Plot 14 (100 X 100 ft.) (Photo 15)

Sampled just below the top of the ridge on the west side of the headwaters of Assignment Creek (the divide between Assignment Creek and the Thompson Creek drainage).

Photos 17 and 18 are views to the northeast and north from this location. Photo 19 is the view downstream along Assignment Creek. Although this plot has more Cercocarpus montanus than Amelanchier, the Quga/Amal p.a. is a better overall fit than Quga/Cemo as described in Johnston.

UTM's: 305,200 E / 4,351,375 N  
USGS Quadrangle: Stony Ridge 3910733  
Elevation: 8670 feet (2643 m)  
Slope: 55 degrees  
Aspect: 90 degrees

	% coverage
Rock (0 -1 m)	
Bare ground (litter)	5 - 25
Quercus gambelii	25 - 50
Cercocarpus montanus	25 - 50
Pinus edulis	5 - 25
Amelanchier utahensis	5 - 25
Symphoricarpos oreophilus	1 - 5
Juniperus osteosperma	1 - 5
Poa fendleriana	1 - 5
Balsamorhiza sagittata	< 1
Carex geeyeri	< 1
Pachystima myrsinites	< 1
Penstemon caespitosus	< 1
Mahonia repens	< 1

Pseudotsuga menziesii / Symphoricarpos oreophilus p. a. (Johnston 1987)

Also similar to Pseudotsuga menziesii / Amelanchier alnifolia p. a. (Johnston 1987)

**Pseudotsuga menziesii / Symphoricarpos oreophilus p. a. G5S4 (Colorado Natural Heritage Program 1995 b)**

Plot 15 (100 X 100 ft.) (photo 20)

Sampled in a small patch of Douglas fir in a draw above the upper end of Assinuation Creek.

The largest tree was 17 inches dbh. There were many small dead and down, but no large standing dead. nearby hillsides were dominated by *Quercus gambelii*.

UTM's: 305,500 E / 4,351,250 N

USGS Quadrangle: Stony Ridge 3910733

Elevation: 8240 feet (2512 m)

Slope: 40 degrees

Aspect: 90 degrees

Rock (0 -1 m)	<1 % coverage
Bare ground (litter)	1 - 5
<i>Pseudotsuga menziesii</i>	50 - 75
<i>Amelanchier alnifolia</i>	5 - 25
<i>Symphoricarpos oreophilus</i>	5 - 25
<i>Juniperus scopulorum</i>	5 - 25
<i>Pseudostellaria jamesii</i>	1 - 5
<i>Carex geyeri</i>	1 - 5
<i>Prunus (Padus) virginiana</i>	1 - 5
<i>Quercus gambelii</i>	1 - 5

*Quercus gambelii* / *Amelanchier utahensis* p.a. (Johnston 1987)

***Quercus gambelii*-*Cercocarpus montanus* / *Carex geyeri* p. a. G3S3 (Colorado Natural Heritage Program 1995 b)**

This includes Quga / Amut (Johnston 1987)

Plot 16 (100 X 100 ft.) (no photo)

Sampled on the southeast facing slope at the upper end of Assinuation Creek, below gullies, about two thirds of the way down the slope from the ridge. This plot was grassier than most, and unusual in the absence of snowberry.

UTM's: 305,800 E / 4,350,875 N

USGS Quadrangle: Stony Ridge 3910733

Elevation: 7920 feet (2415 m)

Slope: 10 degrees

Aspect: 135 degrees

Rock (0 -1 m)	< 1 % coverage
Bare ground (litter)	< 1
<i>Quercus gambelii</i>	5 - 25
<i>Balsamorhiza sagittata</i>	5 - 25
<i>Poa pratensis</i>	5 - 25
<i>Poa fendleriana</i>	5 - 25
<i>Amelanchier alnifolia</i>	1 - 5

Chrysothamnus sp.	1 - 5
Penstemon commarhenus	< 1
Juniperus scopulorum	< 1
Lathyrus leucanthus	< 1
Senecio multilobatus	< 1
Agoseris glauca	< 1
Antennaria rosea	< 1

Quercus gambelii / Symphoricarpos oreophilus p.a. (Johnston 1987)

Quercus gambelii / Symphoricarpos oreophilus / Carex geeyeri h.t. (Hess and Wasser 1982)

**Quercus gambelii / Symphoricarpos oreophilus p.a. GU S3S4 (Colorado Natural Heritage Program 1995 b)**

Plot 17 (100 X 100 ft.) (photo 22 and 23, looking NE and SE from plot)

Sampled on the top and east slope of the ridge on the east side of Assignment Creek, in a thick stand of large oaks. The ridge top is level, with red sandy soil, and has pinyon, juniper, oak and *Balsamorhiza*. This plot, a little downslope, is more mesic with more organic soil.

UTM's: 306,650 E / 4,351,000 N

USGS Quadrangle: Mt. Sopris 3910732

Elevation: 8520 feet (2598 m)

Slope: 20 degrees

Aspect: 90 degrees

Rock (0 -1 m)	< 1% coverage
Bare ground (litter)	1 - 5
<i>Quercus gambelii</i>	50 - 75
<i>Amelanchier alnifolia</i>	5 - 25
<i>Symphoricarpos oreophilus</i>	5 - 25
<i>Carex geeyeri</i>	5 - 25
<i>Mentha arvensis</i>	1 - 5
<i>Ligusticum porteri</i>	1 - 5
<i>Poa pratensis</i>	1 - 5
<i>Draba</i> sp.	< 1
<i>Delphinium nuttallianum</i>	< 1
<i>Noccaea montana</i>	< 1
<i>Valeriana capitata</i>	< 1
<i>Hydrophyllum capitatum</i>	< 1
<i>Fragaria virginiana</i>	< 1
<i>Potentilla pulcherrima</i>	< 1
<i>Galium boreale</i>	< 1
<i>Vicia americana</i>	< 1
<i>Collomia linearis</i>	< 1
<i>Balsamorhiza sagittata</i>	< 1

Pinus edulis / Quercus gambelii p.a. (Johnston 1987)

Pinus edulis / Quercus gambelii / Carex geeyeri h.t. (Hess and Wasser 1982).

Also similar to Quercus gambelii / Cercocarpus montanus p.a. (Johnston 1987); and Quercus gambelii-  
Cercocarpus montanus/Carex geeyeri p. a. (Bourgeron and Engelking, 1994)

**Pinus edulis / Quercus gambelii p. a. G5S5 (Colorado Natural Heritage Program 1995 b)**

Plot 18 (100 X 100 ft.) Photo 22

Sampled at the northeast end of the potential RNA, above the Crystal River, Oct. 2, 1995

UTM's: 308,500 E / 4,352,250 N

USGS Quadrangle: Mt. Sopris 3910732

Elevation: 7120 ft.

Slope: 35 degrees

Aspect: 72 degrees

Bare ground		1 - 5
Rock		1 - 5
Cercocarpus montanus	true mountain mahogany	25 - 50
Quercus gambelii	Gambel's oak	25 - 50
Opuntia polyacantha	hairspine pricklypear	5 - 25
Oryzopsis hymenoides	Indian rice grass	5 - 25
Pinus edulis	Pinyon pine	5 - 25
Amelanchier utahensis	Utah serviceberry	1 - 5
Chrysothamnus nauseosus	rabbitbrush	1 - 5
Festuca thurberi	Thurber fescue	1 - 5
Machaeranthera bigelovii	Bigelow's tansyaster	1 - 5
Mahonia repens	Oregongrape	1 - 5
Artemisia frigida	fringed sagewort	< 1
Artemisia ludoviciana	sagewort	< 1
Carex geeyeri	elk sedge	< 1
Chrysothamnus viscidiflorus	green rabbitbrush	< 1
Elymus elymoides	bottlebrush squirreltail	< 1
Poa pratensis	Kentucky bluegrass	< 1
Stipa lettermanii	Letterman's needlegrass	< 1

## APPENDIX 2

### PLANT SPECIES OBSERVED AT ASSIGNATION CREEK POTENTIAL RNA SITE

Scientific names follow the USDA Soil Conservation Service (1994). Synonyms used by Weber (1987) are included in parentheses (small differences such as slight changes by Weber in spelling or the difference between ssp. and var. are not noted). If either of these names differs from those used in Johnston (1987), the name in Johnston is also included in parentheses with an \*. Common names follow the U. S. D. A. Soil Conservation Service PLANTS list. Species listed by the Colorado Natural Heritage Program as Colorado Species of Special Concern are followed by CSSC. Adventive species are followed by ADV.

SCIENTIFIC NAME	COMMON NAME
<u>Trees</u>	
<i>Abies lasiocarpa</i>	subalpine fir
<i>Juniperus osteosperma</i>	Utah juniper
<i>Juniperus scopulorum</i>	Rocky Mountain juniper
<i>Picea pungens</i>	Blue spruce
<i>Pinus edulis</i>	Pinyon pine
<i>Populus angustifolia</i>	narrowleaf cottonwood
<i>Populus tremuloides</i>	quaking aspen
<i>Pseudotsuga menziesii</i>	Douglas fir
<u>Shrubs</u>	
<i>Acer glabrum</i>	Rocky Mountain maple
<i>Amelanchier alnifolia</i>	Saskatoon serviceberry
<i>Amelanchier utahensis</i>	Utah serviceberry
<i>Artemisia frigida</i>	fringed sage
<i>Artemisia ludoviciana</i>	sagewort
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	mountain big sagebrush
<i>Cercocarpus montanus</i>	mountain mahogany
<i>Chrysothamnus nauseosus</i>	rabbit brush
<i>Chrysothamnus viscidiflorus</i>	green rabbitbrush
<i>Cornus stolonifera</i> ( <i>Swida sericea</i> )	red-osier dogwood
<i>Crataegus erythropoda</i>	cerro hawthorn
<i>Juniperus communis</i>	common juniper
<i>Mahonia repens</i>	Oregongrape
<i>Prunus</i> ( <i>Padus</i> ) <i>virginiana</i> var. <i>melanocarpa</i>	black chokecherry
<i>Purshia tridentata</i>	antelope bitterbrush
<i>Quercus gambelii</i>	Gambel oak
<i>Ribes inerme</i>	whitestem gooseberry
<i>Rosa woodsii</i>	Woods' rose
<i>Salix monticola</i>	park willow
<i>Symphoricarpos rotundifolius</i> ( <i>S.oreophilus</i> *)	roundleaf snowberry

### Graminoids

<i>Elymus smithii</i> (Pascopyrum)	Western wheatgrass	
<i>Bromus tectorum</i>	cheat grass	ADV
<i>Carex microptera</i>	smallwing sedge	
<i>Carex geyeri</i>	elk sedge	
<i>Elymus glaucus</i>	blue wildrye	
<i>Elymus elymoides</i>	bottlebrush squirreltail	
<i>Festuca thurberi</i>	Thurber fescue	
<i>Juncus balticus</i>	mountain rush	
<i>Koeleria macrantha</i>	prairie Junegrass	
<i>Oryzopsis hymenoides</i>	Indian rice grass	
<i>Poa fendleriana</i>	muttongrass	
<i>Poa pratensis</i>	Kentucky bluegrass	ADV
<i>Stipa lettermanii</i>	Letterman's needlegrass	

### Forbs

<i>Achillea millefolium</i> var. <i>occidentalis</i> ( <i>A. lanulosa</i> )	western yarrow	
<i>Androsace septentrionalis</i>	pygmyflower rockjasmine	
<i>Angelica pinnata</i>	smallleaf angelica	
<i>Antennaria rosea</i>	rosy pussytoes	
<i>Arabis drummondii</i> ( <i>Boechera</i> )	Drummond's rockcress	
<i>Arabis selbyi</i>	Selby's rockcress	
<i>Balsamorhiza sagittata</i>	arrowleaf balsamroot	
<i>Chaenactis douglassii</i>	pincushion	
<i>Chaetopappa ericoides</i> ( <i>Leucelene</i> )	rose heath	
<i>Clematis columbiana</i> ( <i>Atragene occidentalis</i> )	blue clematis	
<i>Collinsia parviflora</i>	blue-eyed Mary	
<i>Comandra umbellata</i>	bastard toadflax	
<i>Chorispora tenella</i>	purple mustard	ADV
<i>Crepis</i> ( <i>Psilochenia</i> ) <i>acuminata</i>	hawksbeard	
<i>Cryptantha gracilis</i>	narrowstem catseye	
<i>Cynoglossum officinale</i>	hound's tongue	ADV
<i>Delphinium ramosum</i>	larkspur	
<i>Descurainia incana</i> ( <i>D. richardsonii</i> ) ( <i>D. richardsonii</i> *)	mountain tansymustard	
<i>Disporum trachycarpum</i>	bellflower	
<i>Equisetum arvense</i>	horsetail	
<i>Erigeron flagellaris</i>	trailing fleabane	
<i>Erysimum capitatum</i>	wallflower	
<i>Fragaria virginiana</i>	Virginia strawberry	
<i>Galium boreale</i> ( <i>G.septentrionale</i> )	northern bedstraw	
<i>Geranium richardsonii</i>	Richardson's geranium	
<i>Heracleum lanatum</i> ( <i>sphondylium</i> )	cow parsnip	
<i>Ipomopsis aggregata</i>	skyrocket gilia	
<i>Lappula occidentalis</i> var. <i>occidentalis</i> ( <i>L.redowskii</i> )	desert stickseed	
<i>Ligusticum porteri</i>	Porter's licoriceroot (osha)	
<i>Lomatium simplex</i> ( <i>L. triternatum</i> )	Great Basin desertparsley	
<i>Lupinus</i> sp.	Lupine	
<i>Maianthemum amplexicaule</i>	False Solomonseal	
<i>Maianthemum stellatum</i>	Starry False Solomonseal	
<i>Medicago lupulina</i>	black medic	ADV
<i>Mentha arvensis</i>	wild mint	

Mertensia fusiformis	spindleroot bluebells	
Oenothera caespitosa**	evening primrose	
Penstemon caespitosus	mat penstemon	
Penstemon commarhenus	dusty beardtongue	
Physaria floribunda	pointtip twinpod	
Pseudostellaria jamesiana	tuber starwort	
Sedum lanceolatum ssp. lanceolatum (Amerosedum)	spearleaf stonecrop	
Senecio integerrimus	lambstongue groundsel	
Senecio multilobatus (Packera)	manylobed groundsel	
Senecio wernerifolius (Packera)	hoary groundsel	
Solidago velutina (S. sparsiflora*)	threenerve goldenrod	
Streptanthus cordatus	heartleaf twistflower	
Taraxacum officinale	common dandelion	ADV
Trifolium pratense	red clover	ADV
Vicia americana ssp. minor	mat vetch	
Viola adunca	hookedspur violet	
Viola praemorsa ssp. linguifolia	upland yellow violet	

**COVER TYPES OF THE  
ASSIGNATION RIDGE POTENTIAL RESEARCH NATURAL AREA**

**Legend**

- df Interior Douglas fir forest (SAF 210)**  
**includes plant association:**  
***Pseudotsuga menziesii* / *Symphoricarpos oreophilus***
- as Aspen (SAF 217)**  
**includes plant association:**  
***Populus tremuloides* / *Amelanchier alnifolia*-*Padus virginiana***
- sh Shrublands**  
**includes plant associations:**  
***Quercus gambelii* / *Symphoricarpos oreophilus***  
***Quercus gambelii* / *Amelanchier alnifolia***  
***Quercus gambelii* / *Amelanchier utahensis***  
***Quercus gambelii*-*Padus virginiana* / *Paxistima myrsinites***  
***Artemisia tridentata* ssp. *vaseyana* / *Symphoricarpos oreophilus***
- cw Cottonwood-willow (SAF 235)**  
**includes plant associations:**  
***Populus angustifolia* / *Alnus incana*-*Cornus stolonifera***  
***Populus angustifolia* / *Amelanchier alnifolia*.**
- pj Pinyon-Juniper woodlands**  
**includes plant associations:**  
***Pinus edulis*-*Juniperus osteosperma* / *Cercocarpus montanus***  
***Pinus edulis* / *Quercus gambelii*.**
- ro Rock outcrops with little or no vegetation.**
- Potential RNA boundary**