

**A VEGETATION MAP OF THE ROCKING M RANCH,  
UPPER DENNETT CREEK/RAFT CREEK  
WILDLIFE CONSERVATION EASEMENT AREA, WASHINGTON COUNTY, IDAHO**

by

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## Summary

A vegetation map has been prepared for the Rocking M Ranch, Upper Dennett Creek/Raft Creek Wildlife Conservation Easement Area based on field inventories conducted between July 11 and July 14, 1995. The vegetation map is depicted in two formats. One is a color and numerically coded GIS-generated 1:24,000 scale map, and the other uses numerically coded polygons transferred onto the Monroe Butte U.S.G.S. 1:24,000 scale topographic quadrangle covering the study area. This report is the support document for the vegetation map.

The study area is comprised of 3,158 acres of private land under wildlife conservation easement with the Idaho Department of Fish and Game. The study area is located on the western flank of the Hitt Mountains and upper elevations form a major share of the headwaters for Raft, North Fork Dennett and Middle Fork Dennett creeks. It is characterized by steep, dissected topography dominated by grassland, sagebrush and shrubfield vegetation. Conifer stands are restricted to steep, north-facing upper slopes, several of which have been recently logged.

Sixteen cover types form the basis of the vegetation map classification. They describe grassland, bitterbrush, big sagebrush, deciduous shrub and tree and conifer woodland habitats. Cover type circumscription and names are based on published vegetation classifications as much as possible. Floristic and structural criteria were used to develop the cover type classification. Wildlife habitat values were also considered when developing the classification scheme. The vegetation map is comprised of 149 polygons (map units), with five located outside the study area boundaries. Within the study area, polygons range in size from less than 1, to 240 acres. Polygon delineations were based primarily on vegetation pattern homogeneity. Topographic and ecological condition factors were also taken into account. Topographic and associated vegetation variability resulted in some polygons consisting of more than one cover type. Percentages of each were estimated for polygons containing multiple cover types.

Grassland cover types encompass approximately 60% of the vegetation, followed by big sagebrush (25%), deciduous shrub and tree (12%), conifer (3%) and bitterbrush (0.2%) types. Bluebunch wheatgrass/Sandberg's bluegrass (27%), Idaho fescue/prairie Junegrass (14%), annual grassland (15%) and mountain big sagebrush/Idaho fescue (14%) are the only four cover types encompassing more than 10% of the area.

During field work, the ecological condition of most grassland, bitterbrush and big sagebrush communities was assessed. Within the study area, approximately 51% of the vegetation is in mid-seral condition, followed by early seral (25%), very early seral (18%) and late seral (6%). No examples of climax vegetation were observed. Very early seral and early seral plant communities dominate most of the land adjacent to the study area, especially in the Raft Creek and lower Dennett Creek drainages. Many polygons are characterized by a mosaic of variable ecological conditions. Habitat types were also determined where possible.

I conducted a general floristic inventory and compiled a preliminary vascular plant list of 187 species for the study area. Large portions of four occurrences of the federal Category 1 candidate species, Snake River goldenweed (*Haplopappus radiatus*), are located within the study area. They support well over half of all the plants known to occur in Idaho. The conservation of Snake River goldenweed is critically linked to its conservation within the study area. Another rare regional endemic, Snake Canyon milkvetch (*Astragalus vallis*), also occurs in the study area.

Because of their pervasiveness and threats to wildlife habitat values, controlling weeds will be one of the area's primary management challenges. Livestock grazing and related activities are the most widespread disturbance factors leading to weed establishment. Past mining and logging operations have had a more local affect. This report contains both weed control and livestock management recommendations.

### **Acknowledgements**

Bart Butterfield and Lawrence Hartpence produced the GIS vegetation map for the Rocking M Ranch study area and conducted the associated vegetation analysis. They also produced Figures 1 and 4 for this report. Their help throughout this project is greatly appreciated.

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## **ROCKING M RANCH WILDLIFE CONSERVATION EASEMENT AREA**

### **Location**

The Rocking M Ranch, Upper Dennett Creek/Raft Creek Wildlife Conservation Easement Area (henceforth referred to as the Rocking M Ranch study area) is located approximately 26 miles northwest of Weiser, in Washington County, Idaho (Figure 1). The study area includes large portions of the Raft, North Fork Dennett and Middle Fork Dennett creek drainages on the west slope of the Hitt Mountains. The study area's northern boundary approaches Quartz triangulation point (Point 5489) and the ridge separating the Raft and Wayle creek drainages. The southern and western boundaries of the study area are delimited by adjoining Bureau of Land Management (BLM) land, while the Payette National Forest boundary marks most of the study area's eastern edge.

Access to the Rocking M Ranch study area is via the Henley Basin Road (also called the Rock Creek Road) north from Weiser, to Brownlee Reservoir, and continuing north along the Reservoir. The road to Mineral provides access to the 4-wheel drive spur roads leading into the North Fork Dennett Creek and Middle Fork Dennett Creek drainages. Public access to Raft Creek past the Mountain Man Lodge has been acquired as part of the Conservation Easement agreement. Access to the general area is also possible from the east via the Adams Creek road (USFS roads #025) on the Payette National Forest. The Adams Creek road joins USFS road #010, which leads to the steep, 4-wheel drive road down to Mineral, near the open pit gypsum mine. The Mann Creek Road, off of Highway 95, provides access to the Adams Creek road.

### **Land ownership**

The Rocking M Ranch is a large private ranch. The vegetation map project study area includes only a 3,158 acre portion of the Rocking M Ranch property (Figure 2 and Figure 3). This area is covered by a Wildlife Conservation Easement Agreement for the benefit of wildlife and wildlife habitat, between the landowner and the Idaho Department of Fish and Game. A portion of the money to acquire this easement was provided by the Rocky Mountain Elk Foundation. In addition to the 3,158 fee acres, the study area pasture's enclose an estimated 680 acres of BLM land (Western Appraisals 1994).

### **Physical setting**

The study area is located along the steep western flank of the Hitt Mountains. Upper elevations form a major share of the headwaters for Raft, North Fork Dennett and Middle Fork Dennett creeks, which drain westward through the study area into the Snake River (Brownlee Reservoir). The dissected topography is characterized by a series of moderately-sloping, west to southwest-trending primary ridges dividing the three drainages, and associated north and south-trending steep spur ridges, all with steep sideslopes descending to the narrow stream corridors below. Areas of gentle, bench-like topography occasionally interrupt the steep slopes, or are found along the stream corridors. Elevations within the study area range from approximately 5800 to 3000 feet.

Ross and Savage (1967) place the Rocking M Ranch study area within the Wallowa-Seven Devils Section of the Columbia Intermontane Province. It is part of the Seven Devils Unit of the Columbia Division in Ertter and Moseley's (1992) classification of Idaho floristic regions. The study area is considered part of the Blue Mountain Section of the Middle Rocky Mountain Province by McNab and Avers (1994).

Figure 1  
Figure 2

Figure 3

## **Geology**

The Rocking M Ranch study area is located on the western flanks of the Hitt Mountains. The Hitt Mountains lie within an area characterized by north-northwest trending faults and anticlinal uplifts. Several faults are located proximate to the study area. There is no evidence of glaciation in the area.

The pre-Tertiary basement rocks of eastern Oregon and western Idaho were covered by flows of Columbia River basalt during Miocene and early Pliocene time. Subsequent erosion produced several pre-Tertiary "windows", especially near the Snake River Canyon. The study area is an example of one of these "windows" (Henricksen 1975). The study area is dominated by sequences of Jurassic-age sedimentary lithologies that were probably deposited in an island arc environment. Extensive outcrops of Big Hill Wacke rock dominate the study area. Small amounts of Tate Shale and Dennett Creek Limestone also occur. All three of these formations are of Jurassic age (Henricksen 1975; Mitchell and Bennett 1979).

The Big Hill Wacke formation is mostly an undifferentiated assemblage of wackes (a poorly sorted sedimentary rock with particle sizes ranging from 1/16 mm to 2 mm) characterized by a fine-grained slaty cleavage. The formation is at least several thousand feet thick. One of the most common rock types within the study area is phyllite, a cleaved metamorphic rock with a texture between shales and schists. The phyllite is slightly calcareous, light-colored and often with a greenish tinge.

Tate Shale is a black shale that outcrops on hillsides in the south-central part of the study area above the Middle and North forks of Dennett Creek. Access roads to mining drill sites provide good exposures of this rock type. The Dennett Creek Limestone is nearly pure (>95%) carbonate. It is finely crystalline and light-gray in color (Henricksen 1975). It outcrops above the North Fork Dennett Creek at the base of Big Hill in the south-central part of the study area. Unconsolidated Quaternary-age alluvium fills the stream channels and also occurs as terraced deposits in a few places.

Portions of the study area are located within the Mineral-Iron Mountain Mining District. Evidence of past mining for copper, lead and silver surrounds the site of Mineral, located just south of the study area. The southeastern corner of the study area is located next to an open-pit gypsum mine. This mine is presently inactive.

## **Soils**

Soils in the study area are derived from metamorphosed sedimentary rocks, and to a lesser extent from basalt. Oldsferry shaly loam is the major soil unit type on the extensive, steep southerly slopes within the study area. It is a moderately deep, well-drained, shaly-loam textured soil, with very rapid runoff and severe to very severe water erosion hazard properties. The Meland-Riggins complex soil type is less common on south-facing slopes. It is characterized by a stony loam upper and clay loam lower profile, is well-drained, and ranges from shallow to moderately deep. Northerly slopes are dominated by the DeMasters loam soil type. This is a deep, well-drained, dark loam soil and has very rapid water runoff and severe water erosion hazard properties. To a lesser extent, north-facing slopes contain the Gross silt loam soil type. This is a moderately deep, well-drained, silty loam-textured soil (Natural Resources Conservation Service 1995).

## Climate

From late fall to early spring the climate of west-central Idaho is typically influenced by cool and moist Pacific maritime air. Periodically this westerly flow is interrupted by outbreaks of cold, dry continental air from the north. During the summer months, a Pacific high pressure system dominates weather patterns, resulting in minimal precipitation and more continental climatic conditions overall (Ross and Savage 1967). The BLM maintains a rain gauge near Mineral. Precipitation averaged 14.2 inches (361 mm) between 1987 and 1994, with a high of 21.1 inches (536 mm) in 1993 (149% of average) and a low of 8.8 inches (224 mm) in 1992 (62% of average) (Bureau of Land Management 1995). Weather data from Weiser, Idaho, 26 miles to the south gives general climate trends for the area. At Weiser, 49% of the average annual precipitation falls during the November through January winter months. There is a spike of increased precipitation during June before the dry summer months begin, when only 14% of the average annual precipitation falls from July through October. The average annual temperature at Weiser is 54.2<sup>o</sup> F (11<sup>o</sup> C), with December the coldest and July the warmest months of the year (Johnson 1981). Average temperatures at the study area are lower compared to Weiser, and upper elevations have higher annual precipitation than at Mineral.

## Vegetation

The mostly steep and dissected topography of the Rocking M Ranch study is typical of the Hells Canyon region in west-central Idaho. In the Snake River Canyon system, aspect is the dominant feature controlling environmental parameters such as length of season of available water and soil type. As a result, vegetation patterns in the study area often closely correlate to changes in aspect. Bluebunch wheatgrass- (*Agropyron spicatum*) dominated grassland communities, or degraded versions defined by invasive annual grasses are common on southerly-facing slopes. More mesic aspects support Idaho fescue- (*Festuca idahoensis*) dominated communities in areas of steep topography. Mid-slope benches, upper slope bowls and other places of moderate topography, as well as lower and toe slope positions, usually support mountain big sagebrush-dominated communities. The relatively broad bottomland along Raft Creek supports a degraded basin big sagebrush community. Bitterbrush is found in only a few places within the study area, on substrates other than the phyllitic rock. Bands of deciduous shrubs occur in draws that regularly dissect the slopes. Riparian zones are characterized by mixed deciduous shrub communities along middle and lower stream segments, and aspen-dominated vegetation along their upper reaches. Conifer stands are small within the study area and are restricted to steep, north-facing upper slopes. Several stands have been recently logged. Conifer forests are extensive on nearby Payette National Forest land. A large, open stand of western juniper occurs just south of the study area, but these trees are rare within the study area.

The understory of grassland, sagebrush and bitterbrush communities are susceptible to disturbance and subsequent weed invasion, such as the annual brome (*Bromus* spp.) grasses. To varying degrees, extensive areas are now dominated by weedy species and plant communities in better than mid-seral condition are uncommon in the study area. Livestock grazing and associated activities are the most common and widespread disturbance throughout the study area. Past mining operations have been a major disturbance on a more local scale, as have past logging activities.

The entire Raft Creek drainage has obviously been subject to very intensive livestock grazing. Large portions of the Raft Creek drainage are in very early or early seral condition, including extensive stands of scotch thistle. Steep northerly slopes often support relatively intact Idaho fescue communities, however. These sites have received much less livestock grazing than nearby areas with more gentle topography or

easier access. Fire has probably been an important contributing factor in the conversion of native steppe and shrub-steppe plant communities to annual grassland-dominated vegetation. This is especially true in places already depleted from years of livestock disturbance. Cyclical fire is a natural part of the Hells Canyon ecosystem.

Based on the descriptions of various published classifications, eight plant communities have been identified for the Rocking M Ranch study area. Grassland, bitterbrush, sagebrush, deciduous shrub and tree, and conifer forest plant communities are listed in Table 1. There is considerable overlap between this list of plant communities and cover type names used for the vegetation map.

At least 5 additional plant communities occur, but are not represented in Table 1. There are two reasons for this, (1) the plant communities are not described in the regional literature, or (2) I lack sufficient quantitative floristic and structural data to assess their agreement with published descriptions. Plant communities that occur within the study area, but are not linked to published regional classifications include mountain big sagebrush-bitterbrush/bluebunch wheatgrass, basin big sagebrush/basin wild rye, mixed deciduous shrub, aspen/mixed deciduous shrub and chokecherry. The basin big sagebrush/basin wild rye community occurs on the alluvial terrace along Raft Creek and has been severely degraded by livestock grazing. All of these communities will require further study before a more rigorous classification is possible.

## **VEGETATION MAP FOR ROCKING M RANCH WILDLIFE CONSERVATION EASEMENT AREA**

### **Objective**

Our primary goal was to delineate and describe the plant communities occurring within the study area at sufficient scale and detail to help Idaho Department of Fish and Game land managers set, meet and assess wildlife and wildlife habitat management objectives. A related goal was to assess the status of the vegetation's ecological condition. In conjunction with field reconnaissance for the vegetation map, I conducted a general floristic inventory and compiled a vascular plant species list for the study area. Additionally, I surveyed for Snake River goldenweed and Snake Canyon milkvetch, two rare plants known from the study area. These surveys were incorporated into the vegetation map field work.

### **Methods**

#### Vegetation map

The vegetation map for the Rocking M Ranch study area is based on the field inventory method. The study area's small size and network of access roads permitted a systematic and nearly complete field verification of the vegetation. A few small areas around the northeastern and southwestern perimeters were not visited. These were mapped based on aerial photo interpretation. Field work was conducted between July 11 and July 14, 1995. The boundaries of a particular vegetation unit were delineated in the field onto a clear acetate overlay taped to a 1:15,840-scale aerial photograph. The aerial photographs used for this project were taken July 24, 1987, under identification number USDA-F 16 614120. Portions of roll 987 (987 88-92 and 110-114) provides full stereoscopic coverage of the study area. Vegetation and other notes necessary for classification were recorded for each polygon into a field notebook. This notebook is on file at the Conservation Data Center office in Boise.

Table 1. Plant communities occurring within the Rocking M Ranch study area.

Name	<sup>1</sup> Ref.
<b>Grassland</b>	
1. Bluebunch wheatgrass-Sandberg's bluegrass/arrowleaf balsamroot ( <i>Agropyron spicatum</i> - <i>Poa sandbergii</i> / <i>Balsamorhiza sagittata</i> )	1
2. Idaho fescue/bluebunch wheatgrass ( <i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> )	1
3. Idaho fescue/prairie Junegrass ( <i>Festuca idahoensis</i> / <i>Koeleria cristata</i> )	1
<b>Bitterbrush</b>	
4. Bitterbrush/bluebunch wheatgrass <i>Purshia tridentata</i> / <i>Agropyron spicatum</i>	2
<b>Mountain big sagebrush</b>	
5. Mountain big sagebrush/Idaho fescue <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> / <i>Festuca idahoensis</i>	2
6. Mountain big sagebrush-mountain snowberry/Idaho fescue <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> - <i>Symphoricarpos oreophilus</i> / <i>Festuca idahoensis</i>	3
<b>Deciduous shrub</b>	
7. Ninebark <i>Physocarpus malvaceus</i>	2
<b>Conifer woodland</b>	
8. Douglas-fir/ninebark <i>Pseudotsuga menziesii</i> / <i>Physocarpus malvaceus</i>	4

<sup>1</sup>References (Ref.) used to classify the vegetation are: 1 = Tisdale 1986; 2 = Johnson and Simon 1987; 3 = Hironaka *et al.* 1983; 4 = Steele *et al.* 1981

Upon completion of field work, the polygons delineated on aerial photos overlays were transferred to the Monroe Butte 1:24,000 orthophoto map. These were then traced onto the Monroe Butte 1:24,000 U.S.G.S. topographic quadrangle and provides the template for GIS digitization. Figure 4 is a reduced rendition of the Rocking M Ranch study area vegetation map. Polygons are numbered consecutively from 1 to 149 and referenced using their unique number. General cover types descriptions are outlined in the following section. Cover type, acreage, and where appropriate, habitat type and ecological condition are summarized for each polygon (Appendix 1).

The vegetation map classification is based on cover types. Cover types are based on a site's existing vegetation. I used floristic and structural criteria to devise the cover type classification. Wildlife habitat concerns were also considered when developing the cover type classification. Cover type circumscription and names are based on published classifications as much as possible. Each polygon (vegetation mapping unit) on the vegetation map has been assigned a cover type. Polygon boundaries

Figure 4

were delineated primarily on the basis of vegetation pattern homogeneity, although topographic and ecological condition attributes were also taken into account. The vegetation map portrays the extent, distribution and juxtaposition of the grassland, bitterbrush, big sagebrush, deciduous shrub and tree, and conifer woodland habitats comprising the study area. Ecological factors related to aspect determine many of the vegetation patterns in the study area. Because of this relationship, boundaries between many polygons correspond to where changes in aspect occur. The topographic heterogeneity characterizing the study area makes very large units of homogeneous vegetation uncommon. As a result, there are a number of polygons dominated by one cover type, but containing inclusions of one or more other cover types that were too small or dispersed to map separately. Percentages of each cover type were estimated for most polygons containing multiple cover types. The vegetation map is depicted in two formats. One is a color and numerically coded GIS-generated 1:24,000 scale map, and the other uses numerically coded polygons transferred to the 1987 Provisional Edition of the Monroe Butte U.S.G.S. 1:24,000 scale topographic quadrangle covering the study area.

Habitat types, which represent the potential natural climax vegetation at a given site, were determined in the field for most polygons. In many cases, the cover type equals the habitat type. The ecological condition of most grassland, bitterbrush and big sagebrush communities was also assessed during field work. This assessment reveals the variability of habitat conditions within the study area. It also reveals that late seral vegetation is uncommon and restricted to inclusions within larger areas in earlier seral condition.

Cover types are described solely from field reconnaissance methods, no vegetation sampling was conducted. This lack of quantifiable data limits direct comparison concerning the vegetation of other areas or studies, or the ability to confidently calculate vegetation-based parameters such as livestock carrying capacity. Cover type descriptions contain varying levels of composition and structural information that should, however, allow limited evaluation and comparisons for wildlife habitat models and other management tools. My field investigations indicate a general floristic and ecologic agreement between most cover types described for the study area and similar plant communities described in more detail elsewhere in the region (e.g., Tisdale 1986; Johnson and Simon 1987). Cover type descriptions in this report list references for similar plant communities described in other classifications. Slide photographs were taken of many polygons and are on file at IDFG headquarters in Boise. Duplicate slides will be submitted to the Region 3 office. Scientific and vernacular plant names used in this report follow Hitchcock and Cronquist (1973).

#### Floristic inventory

A general floristic inventory was conducted during vegetation map field reconnaissance and a preliminary vascular plant species list for the study area compiled (Appendix 2). I was able to field identify the majority of plant species encountered. Plants I could not field identify were collected and identified at a later date. No formal plant collections were made during the course of this study.

#### Rare plant surveys

Prior to starting field work I queried the CDC data base for a list of rare plants occurring within or near the study area. Based on this query and prior field experience I knew Snake River goldenweed (*Haplopappus radiatus*) and Snake Canyon milkvetch (*Astragalus vallis*) occurred in the study area. Time constraints did not allow intensive or separate rare plant surveys to be conducted. Instead, rare

plants surveys were incorporated with field work for the vegetation map. A CDC rare plant observation form was completed and locations noted on a topographic map for new rare plant population encountered. Known occurrence sites were also visited and location, population and habitat information updated.

### **Vegetation map cover type descriptions**

The Rocking M Ranch vegetation map consist of 16 cover types grouped into five habitat classes - grassland, bitterbrush, big sagebrush, deciduous shrub and tree, and conifer woodland. Aquatic habitats such as creeks and stock ponds are not considered in this classification.

#### Grassland cover types

**Bluebunch wheatgrass-Sandberg's bluegrass (*Agropyron spicatum*-*Poa sandbergii*, AGRSPI-POASAN)** - This type occupies dry, southerly exposures throughout the study area. Where disturbance is not too great, the vegetation is characterized by well-spaced clumps of bluebunch wheatgrass, and relatively low forb diversity and abundance and greater rock/gravel and bare ground cover compared to Idaho fescue communities. Sandberg's bluegrass is the only other native bunchgrass commonly occurring with the bluebunch wheatgrass, and for this reason is recognized in the name of this cover type. Arrowleaf balsamroot (*Balsamorhiza sagittata*) is often the most abundant associated native forb. Other native forbs commonly found within this cover type are hairy milkvetch (*Astragalus inflexus*), Cusick's milkvetch (*Astragalus cusickii*), varileaf phacelia (*Phacelia heterophylla*), tapertip hawksbeard (*Crepis acuminata*), false-yarrow (*Chaenactis douglasii*), fern-leaved desert-parsley (*Lomatium dissectum*), spurred lupine (*Lupinus laxiflorus*), tall annual willow-herb (*Epilobium paniculatum*) and green-band mariposa lily (*Calochortus macrocarpus*). Gray rabbitbrush (*Chrysothamnus nauseosus*) is often present at low density, while other shrub species are rare. Two rare plant species, Snake River goldenweed and Snake Canyon milkvetch also commonly occur. Invasive annual bromes and bulbous bluegrass are usually well established within this cover type.

Bluebunch wheatgrass communities in late seral condition are uncommon within the study area. The few examples are found on steep slopes that limit livestock disturbance. Late seral communities contain intact native species composition and proportions, and only minimal amounts of exotic species. They also possess an intact cryptobiotic soil crust and litter layer, and barring disturbance, should remain resistant to weed invasion.

Mid-seral communities have at least a partially intact bunchgrass and native forb structure. Forbs that tend to increase with disturbance such as yarrow (*Achillea millefolium*) and fiddleneck (*Amsinckia* sp.) often have an increased abundance. Invasive grasses are almost always well established, at least in portions of the community, and exotic forbs may also be present.

Large areas that formerly supported bluebunch wheatgrass communities are now dominated by invasive annual grass species, and are rated as early or very early seral. Cheatgrass (*Bromus tectorum*) seems to be the most frequent invader. Other annual grass invaders include soft brome (*Bromus mollis*), Japanese brome (*Bromus japonicus*) and rattlesnake brome (*Bromus brizaeformis*). In addition, bulbous bluegrass (*Poa bulbosa*) is an invasive perennial grass abundant in many places. The invasive exotic forbs listed under the annual grassland cover type are common in disturbed areas. For purposes of the vegetation map, grassland communities estimated to support 75% or greater early and/or very early seral vegetation, are considered to be the ANNUAL GRASSLAND cover type. The extensive southerly slopes above the main

stream corridors are often a mosaic of bluebunch wheatgrass and annual grass-dominated communities. In polygons containing this mosaic, the ratio of each seral stage was estimated whenever possible. The hot, dry, steep slopes supporting the AGRSPI-POASAN cover type are the most prone to weed invasion of all the grassland types in the study area.

Using the classification of Tisdale (1986), the bluebunch wheatgrass communities at the Rocking M Ranch study area equate to his *Agropyron spicatum*-*Poa sandbergii*/*Balsamorhiza sagittata* habitat type. Bluebunch wheatgrass communities within the study area are similar to other regional plant community types described by Daubenmire (1970), Johnson and Simon (1987) and Johnson and Clausnitzer (1992).

**Idaho fescue-bluebunch wheatgrass (*Festuca idahoensis*-*Agropyron spicatum*, FESIDA-AGRSPI) -**

This cover type is distinguished by the presence of Idaho fescue and the co-dominance of bluebunch wheatgrass. Bluebunch wheatgrass coverage usually equals and often exceeds that of Idaho fescue. Except for Sandberg's bluegrass, other perennial grasses are rare. Species diversity, graminoid and forb foliage cover values and litter are greater, while rock/gravel and bare ground cover are less than for bluebunch wheatgrass sites. Native forbs are more abundant and invasive annuals, including the bromes, less abundant than in bluebunch wheatgrass communities. Associated forbs for the FESIDA-AGRSPI cover type include arrowleaf balsamroot, yarrow, tapertip hawksbeard, spurred lupine, deer horn (*Clarkia pulchella*) and goose-grass cleavers (*Galium aparine*). Like other regional studies (Tisdale 1986; Johnson and Simon 1987), we found rattlesnake brome to be an abundant invader on disturbed Idaho fescue sites. Snake River goldenweed is a commonly associated species in some places. Snake Canyon milkvetch does not occur in Idaho fescue habitats within the study area. Mountain big sagebrush and/or rabbitbrush shrubs are sometimes scattered within this cover type.

Late seral examples are nearly weed-free. Mid-seral communities are characterized by decreased Idaho fescue cover and increased bluebunch wheatgrass abundance. Invasive grasses are usually established in mid-seral conditions, although they are not as common as in mid-seral AGRSPI-POASAN communities. The FESIDA-AGRSPI cover type is more resistant to weed invasion compared to AGRSPI-POASAN, but less so than FESIDA-KOECRI. Native forb composition shows a marked abundance of spurred lupine, arrowleaf balsamroot and others species capable of increasing under the disturbance patterns these grasslands are subject to. Some mid-seral and most early seral communities lack Idaho fescue in any appreciable amount and are mapped as either AGRSPI-POASAN or ANNUAL GRASSLAND cover types.

The FESIDA-AGRSPI cover type corresponds to the *Festuca idahoensis*-*Agropyron spicatum* habitat type described by Tisdale (1986) for the canyon grasslands of west-central Idaho and adjacent areas. It occurs on eastern and western aspects and lower-elevation northerly exposures throughout the study area. Other northerly aspects support Idaho fescue-prairie Junegrass communities, while southerly exposures contain the bluebunch wheatgrass cover type. Changes from one cover type to another can be abrupt, corresponding to changes in aspect across the face of a dissected slope. Because the topography is so dissected, FESIDA-AGRSPI inclusions are common within the other grassland cover types, but generally are not mapped separately. In draw positions, the FESIDA-AGRSPI cover type is commonly part of the shrubfield/grassland mosaic occurring above the band of deciduous shrubs in the draw bottom.

Beside Tisdale (1986), there are several other regional classifications for Idaho fescue-bluebunch wheatgrass plant communities, including Campbell (1962), Daubenmire (1970), Hall (1973), Mueggler and Stewart (1980), Johnson and Simon (1987) and Johnson and Clausnitzer (1992).

**Idaho fescue-prairie Junegrass (*Festuca idahoensis-Koeleria cristata*, FESIDA-KOECRI)** - The most mesic canyon and ridgecrest grasslands support the FESIDA-KOECRI cover type. It is characterized by a clear dominance of Idaho fescue, the tendency for at least some of the bluebunch wheatgrass to be rhizomatous, a very conspicuous and diverse forb component, and minimal bare ground or rock cover. Prairie Junegrass is always present, although usually in only small amounts. The FESIDA-KOECRI cover type occurs on northerly aspects in areas of relatively gentle topography or stable steeper slopes. It is most extensive along the various main ridgecrests and associated upper slopes.

Many of the perennial forbs common in the other grassland types also occur in the FESIDA-KOECRI cover type. In addition, a distinctive suite of mesic forbs are common, including western hawkweed (*Hieracium albertinum*), Rocky Mountain helianthella (*Helianthella uniflora*), slender cinquefoil (*Potentilla gracilis*), harsh paintbrush (*Castilleja hispida*), sticky penstemon (*Penstemon glandulosus*), big pod mariposa (*Calochortus eurycarpus*) and nettle-leaved horse-mint (*Agastache urticifolia*). Snake River goldenweed is uncommon within this cover type. Scattered mountain big sagebrush and/or rabbitbrush shrubs are often present.

FESIDA-KOECRI is the most resistant of the grassland cover types to invasive grasses, but rattlesnake brome can be locally common in places. Instead, disturbed sites tend to have a skewed abundance of "increaser" native forbs, such as yarrow and spurred lupine. Because of this relative resistance, most areas supporting this cover type are in mid-seral or better ecological condition. Heavily disturbed sites can have many of the same weeds as the annual grassland type, however.

The FESIDA-KOECRI cover type is similar to the *Festuca idahoensis-Koeleria cristata* habitat type found in Tisdale's (1986) classification. Hall (1973) and Johnson and Simon (1987) also describe similar vegetation.

**Annual grasslands** - Throughout the Rocky M Ranch study area there are disturbed areas dominated by invasive grasses. On bluebunch wheatgrass sites, cheatgrass seems to be the most abundant invader, although other annual bromes such as soft brome, Japanese brome and rattlesnake brome, as well as and the perennial grass, bulbous bluegrass, can also be common. Native bunchgrasses are often present, but only in remnant amounts compared to less disturbed sites. Remnant native forbs tend to be those that increase with disturbance, such as tessellate fiddleneck (*Amsinckia tessellata*), yarrow, grey-green thistle (*Cirsium canovirens*) and arrowleaf balsamroot. Exotic forbs are often common and include tumbling mustard (*Sisymbrium altissimum*), desert alyssum (*Alyssum desertorum*), salsify (*Tragopogon dubius*), dragon sagewort (*Artemisia dracuncululus*) and scotch thistle (*Onopordum acanthium*). Scotch thistle can form horrible thickets in places and is especially bad in the Raft Creek drainage. All annual grassland sites are either in early or very early seral condition. Disturbances associated with livestock grazing, past mineral exploration and exploitation, logging and road building have all contributed to the widespread establishment of invasive plant species and consequent habitat degradation in the study area.

#### Bitterbrush cover types

**Bitterbrush/bluebunch wheatgrass (*Purshia tridentata/Agropyron spicatum*, PURTRI/AGRSPI)** - Bitterbrush stands are uncommon and constitute a minor cover type within the study area. Bitterbrush occurs locally on dry, rocky, gentle toeslope and steep sideslope positions near the confluence of North

Fork Dennett and Middle Fork Dennett creeks, and on a steep sideslope in the Raft Creek drainage. These sites are on non-phyllitic substrates. A few shrubs are found confined to small basalt outcrops along the Raft Creek - North Fork Dennett Creek divide, but these are too small to map. The PURTRI/AGRSPI cover type is characterized by an open bitterbrush canopy, estimated to be approximately 20%, with a bluebunch wheatgrass-dominated understory. Sandberg's bluegrass and cheatgrass are also present. Forb diversity and abundance is similar to nearby bluebunch wheatgrass communities. Associated forbs include arrowleaf balsamroot, yarrow, fern-leaved desert-parsley, spurred lupine, hairy milkvetch and Snake Canyon milkvetch. Bitterbrush communities in better than mid-seral condition are absent from the study area. Bitterbrush communities with an early or very early seral stage understory are mapped as PURTRI/BROMUS cover type.

PURTRI-AGRSPI within the study area resembles the *Purshia tridentata/Agropyron spicatum* plant association described by Johnson and Simon (1987) for the Wallowa-Snake Province. Daubenmire (1970), Hironaka *et al.* (1983), and Mueggler and Stewart (1980) describe PURTRI/AGRSPI habitat types that are somewhat similar. Hall (1973) describes a *Purshia tridentata/Agropyron spicatum-Festuca idahoensis* habitat type that allows Idaho fescue to be absent.

**Bitterbrush/annual bromes (*Purshia tridentata/Bromus* spp., PURTRI/BROMUS)** - Bitterbrush communities estimated to be 75% or greater in early or very early seral condition are mapped as this type. This is a very minor cover type within the study area, restricted to a single polygon. The dry, rocky slopes supporting bitterbrush are susceptible to invasive grasses when disturbed. The primary difference separating this cover type is the early seral understory dominated by cheatgrass. Dragon sagewort and gray rabbitbrush are also common. Remnant native forbs are scattered and Snake Canyon milkvetch appears to be absent. Bitterbrush structure is the same as for the PURTRI/AGRSPI cover type. The area mapped as a PURTRI/BROMUS cover type belongs to the bitterbrush/bluebunch wheatgrass habitat type.

#### Big sagebrush cover types

**Mountain big sagebrush/Idaho fescue (*Artemisia tridentata* ssp. *vaseyana/Festuca idahoensis*, ARTTRV/FESIDA)** - Mountain big sagebrush most commonly occurs on sites with gentle topography such as toe and lower slopes, benchlands, and terraces above stream channels. On large sideslopes the typical pattern is for sagebrush coverage to be highest along a lower slope strip and gradually thinning further upslope until it is replaced by grassland vegetation. Deciduous shrub patches are common within the ARTTRV/FESIDA cover type.

The presence of mountain big sagebrush with Idaho fescue in the understory distinguishes this cover type. Sagebrush cover is often variable within a given polygon, from dense clusters with 50% cover, to a more open, savanna-like appearance, to portions with very sparse coverage. A polygon must average greater than 5% sagebrush canopy cover to be considered a sagebrush cover type. Slopes supporting only very widely scattered individual sagebrush plants are considered bunchgrass cover types.

Idaho fescue abundance is variable, dominating the understory of some communities, but bluebunch wheatgrass can be co-dominant to significantly more abundant. Sandberg's bluegrass is always present and can be common in disturbed stands. Prairie Junegrass is usually present. Invasive grasses are abundant in disturbed areas. A rich forb component is part of most communities. Some common associates include arrowleaf balsamroot, yarrow, tapertip hawksbeard, spurred lupine and harsh paintbrush. Gray rabbitbrush and green rabbitbrush (*Chrysothamnus viscidiflorus*) are commonly associated shrubs, especially in

disturbed places.

Mid-seral communities show a relative increase in bluebunch wheatgrass and Sandberg's bluegrass, and "increaser" forbs such as yarrow and curly-gup gumweed (*Grindelia squarrosa*). Annual bromes, bulbous bluegrass and Kentucky bluegrass (*Poa pratensis*) can be common, but exotic forbs tend to be uncommon. Earlier seral conditions are distinguished by the clear dominance of invasive grasses and weedy forbs in the understory. Nearly all ARTTRV/FESIDA communities within the study area contain substantial portions in early seral condition, generally as a result of livestock disturbance. Estimates for the amount of each seral stage are provided for most stands. Sagebrush communities estimated to have 75% or more early and/or very early seral understory are mapped as the mountain big sagebrush/annual bromes cover type (ARTTRV/BROMUS).

Schlatterer (1972), Mueggler and Stewart (1980), Hironaka *et al.* (1983), Nelson and Jensen (1987), Johnson and Simon (1987) and Johnson and Clausnitzer (1992) have all classified regional *Artemisia tridentata* ssp. *vaseyana*/*Festuca idahoensis* types. The description of Johnson and Simon's seems to be the most applicable to the study area.

**Mountain big sagebrush/mountain snowberry (*Artemisia tridentata* ssp. *vaseyana*/*Symphoricarpos oreophilus*, ARTTRV/SYMORE)** - This type occurs above approximately 4800 feet elevation. It is restricted to relatively gentle, northerly-facing upper slopes that often have a bowl-like appearance. Mountain big sagebrush cover is variable, but averages an estimated 35%. Mountain snowberry is the main secondary shrub. It also has variable coverage throughout the vegetation, averaging an estimated 5%. However, portions of the vegetation typically have mountain snowberry and mountain big sagebrush sharing community dominance, and in places (especially in what appear to be moister microsites) mountain snowberry forms nearly pure stands. Other shrubs such as Wood's rose (*Rosa woodsii*), serviceberry (*Amelanchier alnifolia*) and squaw currant (*Ribes cereum*) occur at low density, and green rabbitbrush (*Chrysothamnus viscidiflorus*) is locally common in disturbed areas. This type is also characterized by a lush and colorful forb component. Some common forbs include spurred lupine, western hawkweed, Rocky Mountain helianthella, arrowleaf balsamroot, tapertip hawksbeard, hispid paintbrush, slender cinquefoil, *Silene* sp., western larkspur (*Delphinium occidentale*), Wyeth's buckwheat (*Eriogonum heracleoides*) and big-pod mariposa lily. Nearly all of these perennial forbs are 'increasers' under grazing pressure. Idaho fescue is usually the dominant bunchgrass where disturbance has not been too severe. Swards of pinegrass (*Calamagrostis rubescens*), or Kentucky bluegrass in disturbed places are common inclusions. Bluebunch wheatgrass, mountain brome, prairie Junegrass and bulbous bluegrass are other common grasses. Annual bromes are infrequent. The ARTTRV-SYMORE cover type is transitional between Douglas-fir forest and grassland communities.

Johnson and Simon (1987) describe a *Artemisia tridentata* ssp. *vaseyana*-*Symphoricarpos oreophilus*/*Bromus carinatus* plant community type for the Wallowa-Snake Province. Jensen *et al.* (1988) describe a *Artemisia tridentata* ssp. *vaseyana*-*Symphoricarpos oreophilus*/*Bromus carinatus* plant community for northern Nevada. The *Artemisia tridentata* ssp. *vaseyana*-*Symphoricarpos oreophilus*/*Festuca idahoensis* habitat type described by Hironaka *et al.* (1983) for southern Idaho has *Stipa* spp. and not Kentucky bluegrass as main indicators of past disturbance, but otherwise is similar.

**Mountain big sagebrush-bitterbrush (*Artemisia tridentata* ssp. *vaseyana*/*Purshia tridentata*, ARTTRV/PURTRI)** - A very minor type confined to single polygon within the study area. It occurs on a dry, rocky slope of Dennett Creek Limestone facing south-southwest near the confluence of the North Fork and Middle Fork Dennett creeks. It is characterized by approximately equal amounts of mountain big

sagebrush and bitterbrush, totalling about 20% shrub cover. Well-spaced bluebunch wheatgrass clumps are common, but Idaho fescue is absent. Cheatgrass is present, but not abundant. Some of the same forbs found in the AGRSPI-POASAN cover type occur at low density. This one site is judged to be in mid-seral condition.

Hall (1973) includes big sagebrush in his bitterbrush-bunchgrass plant association as an increasing climax species on drier sites. Otherwise, the ARTTRV-PURTRI cover type seems to be unrelated to other described sagebrush or bitterbrush plant communities.

**Mountain big sagebrush/annual bromes (*Artemisia tridentata* ssp. *vaseyana*/*Bromus* spp., ARTTRV/BROMUS)** - Mountain big sagebrush stands with a 75% or more early and/or very early seral condition understory are classified as this type. Gentle topography and ease of accessibility have made several sagebrush stands susceptible to habitat depletion due to intensive livestock use.

The cover type is dominated by annual, invasive grasses in the understory. Except for Sandberg's bluegrass and/or squirreltail which may be locally common, native bunchgrasses are reduced to remnant status. Weedy forbs are often very common. Native perennial forbs are uncommon. Mountain big sagebrush/bluebunch wheatgrass communities may have formerly occurred in the study area on southerly exposures presently supporting ARTTRV/BROMUS.

**Basin big sagebrush/annual bromes (*Artemisia tridentata* ssp. *tridentata*/*Bromus* spp., ARTTRV/BROMUS)** - Basin big sagebrush is much less common than mountain big sagebrush within the study area, noted only from the Raft Creek drainage. It occurs on deep soils (clearly evident in the many places where severe downcutting has taken place) as a band alongside Raft Creek. Like Raft Creek itself, the adjacent sagebrush vegetation has been severely affected by intensive livestock grazing and an access road. It is difficult to tell the original composition of the vegetation, but it appears to have been a basin big sagebrush/Great Basin wild rye (*Elymus cineris*) community. This cover type is characterized by a very weedy understory beneath variable coverage of basin big sagebrush. For the most part, squirreltail (*Sitanion hystrix*) and Great Basin wild rye have been replaced by invasive grasses. Weedy forbs such as scotch thistle, curly-gup gumweed, tumbling mustard and madwort (*Asperugo procumbens*) are abundant. Snake River goldenweed occurs sporadically in this habitat, occasionally in locally dense clumps.

#### Deciduous shrub and tree cover types

**Mixed deciduous shrub** - This cover type is characterized by a diverse assemblage of deciduous shrubs that includes Rocky Mountain maple (*Acer glabrum*), chokecherry (*Prunus virginiana*), ninebark (*Physocarpus malvaceus*), bittercherry (*Prunus emarginata*), serviceberry and Wood's rose. Portions of mixed deciduous shrub communities are often dominated by one of these species, although the ratio of any of these shrubs can vary considerably from one site to the next. Polygon descriptions note when a particular community is dominated by only one species. Common snowberry (*Symphoricarpos albus*), mountain snowberry, syringa (*Philadelphus lewisii*) and elderberry (*Sambucus cerulea*) are other deciduous shrubs sometimes present. This cover type predominately occurs as a band in draw positions or following ephemeral watercourses, or as small patches within grassland or sagebrush communities. The herbaceous layer is sometimes dominated by annuals such as miner's lettuce (*Montia perfoliata*) and goose-grass cleavers. Mixed deciduous shrub habitats provide important structural diversity to the landscape. Ecological condition was not assessed for any of the deciduous shrub and tree cover types.

The riparian vegetation within the study area received only cursory investigation. Riparian vegetation

occurs as a narrow band along the major stream channels that support perennial water flows. Riparian vegetation is usually structurally and compositionally diverse. Strips of mixed deciduous shrub vegetation in riparian areas often contain red-osier dogwood (*Cornus stolonifera*) and occasionally Watson's willow (*S. rigida*) and black hawthorne (*Crataegus douglasii*), in addition to the shrubs already mentioned. Large water birch shrubs dominate some riparian segments and have a mixed shrub understory. Aspen trees occur locally in some riparian area supporting the mixed deciduous shrub cover type.

Huschle (1975) describes a "heterogenous shrub mixture" vegetation type containing many of the same shrub species. Elsewhere in the Hells Canyon area, similar mixed deciduous shrub cover types have been described for Brownlee WMA (Mancuso and Moseley 1995) and for Craig Mountain WMA (Mancuso and Moseley 1994).

**Chokecherry (*Prunus virginiana*, PRUVIR)** - Thickets dominated by chokecherry are common at upper elevations within the study area. Thickets often appear to be clonal and are usually local in extent. Other deciduous shrubs may be present, but at low density. This cover type occurs as a band in small draws. It also occurs as irregular patches, most commonly on northerly-facing slopes from lower to mid-slope positions. Chokecherry stands tend to be heavily impacted by livestock grazing. Shrub damage and a weedy understory are common. Chokecherry communities are not described in any of the regional classifications.

**Aspen/mixed deciduous shrub (*Populus tremuloides*/mixed deciduous shrub, POPTRE)** - This cover type is characterized by aspen dominating the canopy, an open, but often diverse mixture of understory deciduous shrubs, and a lush herbaceous layer. Stands contain all size (age) classes of aspen and regeneration is usually evident. Rocky Mountain maple, chokecherry, ninebark, Wood's rose, bittercherry, serviceberry, and syringa are the commonly associated shrubs. Rocky Mountain maple is probably the most consistently common of these. Common forbs include stinging nettle (*Urtica dioica*), mountain sweet-cicely (*Osmorhiza chilensis*), dandelion (*Taraxacum officinale*), miners lettuce, goose-grass cleavers and moth mullein (*Verbascum thapsus*). Kentucky bluegrass is the dominant grass in most places. Mountain brome and blue wildrye (*Elymus glaucus*) are also usually present. Livestock and wildlife use aspen stands heavily and associated disturbances are reflected in the composition of the herbaceous layer. Douglas-fir trees may be scattered within the aspen and represents the potential natural community type at several sites.

Aspen occurs above 4200 feet elevation in the study area. Stands occur in north-facing draws that are the headwaters for side tributaries to the main creeks within the study area. These stands are typically widest near the top and narrow downslope. Aspen communities also occur as riparian bands in upper North Fork Dennett and Middle Fork Dennett creeks. In riparian habitats, thin-leaf alder may occur with the aspen and mixed deciduous shrubs.

The *Populus tremuloides*/*Symphoricarpos oreophilus*/*Poa pratensis* community type described for the Intermountain region (Mueggler 1988) is similar in most regards, although shrubs other than mountain snowberry are the most common within the study area. The *Populus tremuloides*/*Poa pratensis* community type described by Crowe and Clausnitzer (1995) also shares a level of similarity. The aspen communities described by Johnson and Simon (1987), Daubenmire (1970) and Hall (1973) seem to be less applicable to the study area.

#### Conifer Woodland cover types

**Douglas-fir/deciduous shrub (*Pseudotsuga menziesii*, PSEMEN)** - Just east of the study area, Payette National Forest land supports conifer forests at higher elevations in the Hitt Mountains. Within the study area, conifer stands are restricted to a few steep north-facing slopes in upper portions of the main drainages. These stands are characterized by an open to partially closed Douglas-fir canopy, and trees mostly about 10 meters tall. The understory is dominated by ninebark in places, but other shrubs can also be common. The shrub layer is thickest where the canopy is most open. These forest habitats are representative of the Douglas-fir/ninebark habitat type described by Steele *et al.* (1981).

**Douglas-fir/deciduous shrub - logged (*Pseudotsuga menziesii*, PSEMEN-L)** - Douglas-fir stands on Rocking M Ranch property in the upper forks of Dennett Creek have been logged in recent years and are mapped separately. A road to access these small stands connects with the network of Forest Service roads in the southeastern corner of the study area. Logging stopped right at the Forest Service boundary. Stands were thinned and presently consist of an open canopy of small diameter Douglas-fir trees averaging about 10 meters tall. A few widely scattered larger Douglas-fir remain. A diverse mixture of deciduous shrubs including Rocky Mountain maple, ninebark, Scouler's willow (*Salix scouleri*), common and mountain snowberry, and Wood's rose occur in the understory. This shrub layer varies from fairly dense to open. A few aspen trees may also be found. The herbaceous layer is dominated by weedy taxa. Weeds are well established along the entire logging road route. Slash piles are still present.

### Vegetation map analysis

Portions of many polygons extend beyond the study area boundaries. Only those portions within the study site were used for analysis. Hard copies of the vegetation map show the full extent of the polygons. The study area is 3,158 acres in size. However, analysis of the vegetation map for Table 2 is based on 2,971 acres (94%). This discrepancy is due to inconsistencies in the mapping process and transfer of polygon boundaries, and inadvertent omissions.

Analysis of the vegetation map is possible using GIS. Table 2 summarizes cover type information concerning the vegetation map. Grassland cover types encompass 60% of the study area, followed by big sagebrush (25%), deciduous shrub (12%), conifer (3%) and bitterbrush (0.2%) cover types. Bluebunch wheatgrass-Sandberg's bluegrass is the most extensive cover type, encompassing 27% of the study area. Idaho fescue-prairie Junegrass (14%), Annual grassland (15%) and Mountain big sagebrush/Idaho fescue (14%) are the other cover types encompassing more than 10% of the study area.

Table 2. Summary of vegetation map cover type data.

Cover type group	<sup>1</sup> Cover type	<sup>2</sup> Acres	<sup>3</sup> % coverage in cover type group	<sup>4</sup> % coverage within study area	<sup>5</sup> Frequency (# / %)
Grassland	G1	808	46	27	28 / 16
	G2	130	7	4	11 / 6
	G3	411	23	14	16 / 9
	G4	419	24	15	12 / 7
		1768	-	60	67 / 38
Bitterbrush	B1	7	88	0.2	4 / 2
	B2	1	12	<0.1	1 / 1

		8	-	0.2	5 / 3
Sagebrush	S1	427	57	14	28 / 16
	S2	14	2	0.4	1 / 1
	S3	140	19	5	4 / 2
	S4	123	16	4	10 / 6
	S5	44	6	2	1 / 1
		748	-	25	44 / 25
Deciduous	D1	209	61	7	29 / 17
	D2	32	9	1	5 / 3
	D3	105	30	4	8 / 4
		346	-	12	42 / 24
Conifer	C1	61	60	2	14 / 8
	C2	40	40	1	3 / 2
		101	-	3	17 / 10

<sup>1</sup>G1=AGRSPI-POASAN; G2=FESIDA-AGRSPI; G3=FESIDA-KOECRI; G4=Annual grassland; B1=PURTRI/AGRSPI; B2=PURTRI/BROMUS; S1=ARTTRV/FESIDA; S2=ARTTRV-PURTRI; S3=ARTTRV-SYMORE; S4=ARTTRV/BROMUS; S5=ARTTRV/BROMUS; D1=Mixed deciduous shrub; D2=PRUVIR; D3=POPTRE; C1=PSEMEN; C2=PSEMEN-L.

<sup>2</sup>Analysis based on 2971 acres. Only acreage located within IDFG study site boundaries used. Portions of many polygons extend beyond these boundaries.

<sup>3</sup>Percentage of the number of acres containing a given cover type divided by the total acres for the type.

<sup>4</sup>Percentage of the number of acres containing a given cover type divided by the total acreage of the study site.

<sup>5</sup>Frequency refers to the number of polygons (or portions of polygons) a given type is assigned in the vegetation map, including as an inclusion. Expressed as both a number and percent.

There are 149 polygons for the vegetation map, but five are located entirely outside the study area boundaries. Average size for these 144 polygons is 21.3 acres. Median size is 16.7 acres. Polygons range in size from 240 acres, to less than 1 acre within the study area boundaries. Large polygons are uncommon, with 13 polygons larger than 50 acres. Only four of these are larger than 100 acres.

### **Vegetation map organization**

The Rocking M Ranch study area vegetation map consists of 149 polygons, numbered 1 to 149. Five polygons are located entirely outside the study area boundaries. The numbering sequence begins in the northwestern part of the study area, in upper Raft Creek, and scrolls south, ending in the southeastern corner of the study area. Therefore, polygons numerically close, are also close to each other on the vegetation map.

### **Cover types**

Classification of the vegetation within the study area is based on 16 cover types. A cover type, or in some cases a group of cover classes, has been assigned for each polygon. Percentages for each cover type in polygons containing multiple cover types are based on field estimates and aerial photo interpretation. Inclusions comprise less than 10% of the polygon in which they are noted.

Information on ecological condition, inclusions and descriptive comments are included for many polygons. The vegetation for a particular area covered by the vegetation map can be determined by referencing the appropriate polygon description. It is necessary to have a copy of the vegetation map to determine which polygon describes a particular area.

A list of the 16 cover types and their associated acronyms used for the 149 polygon descriptions are provided below. Acronyms are derived from the scientific name of the dominant species characterizing the cover type.

#### Grassland Cover Types

Bluebunch wheatgrass-Sandberg's bluegrass	AGRSPI-POASAN
Idaho fescue-bluebunch wheatgrass	FESIDA-AGRSPI
Idaho fescue-prairie Junegrass	FESIDA-KOECRI
Annual grassland	ANNUAL GRASSLAND

#### Bitterbrush Cover Types

Bitterbrush/bluebunch wheatgrass	PURTRI/AGRSPI
Bitterbrush/annual bromes	PURTRI/BROMUS

#### Big Sagebrush Cover Types

Mountain big sagebrush/Idaho fescue	ARTTRV/FESIDA
Mountain big sagebrush/mountain snowberry	ARTTRV/SYMORE
Mountain big sagebrush-bitterbrush	ARTTRV/PURTRI
Mountain big sagebrush/annual bromes	ARTTRV/BROMUS
Basin big sagebrush/annual bromes	ARTTRT/BROMUS

#### Deciduous Shrub and Tree Cover Types

Mixed deciduous shrub	MIXED DECIDUOUS SHRUB
Chokecherry	PRUVIR
Aspen/mixed deciduous shrub	POPTRE

#### Conifer woodland

Douglas-fir/deciduous shrub	PSEMEN
Douglas-fir/deciduous shrub - logged	PSEMEN-L

#### **Ecological condition assessment**

Ecological status of most map units (polygons) supporting grassland, bitterbrush and mountain big sagebrush cover types were assessed during field work. Polygons were assigned an ecological rank, or several ranks were proportioned if, as was often the case, a composite of conditions characterized the vegetation. These proportions may either be estimated percentage figures or simply noted as a mix of conditions. A summary of ecological conditions for grassland, bitterbrush and sagebrush cover types is contained in Table 3. Within the study area, approximately 51% of the vegetation is in mid-seral condition, followed by early seral (25%), very early seral (18%) and late seral (6%). No examples of climax vegetation were observed. Very early seral and early seral plant communities dominate the land adjacent to the study area, especially in the Raft Creek and lower Dennett Creek drainages.

Ecological ranks are based on sequential stages of retrogression from the sites natural potential vegetation (climax). The natural potential vegetation equates to the habitat type for a given site, which was also assessed during field work when possible. The ecological ranks are slightly modified from Johnson and Simon (1987) and are defined as follows:

Climax - The stable state when species composition and density do not change over time and dominant species are reproducing.

Late seral stage - Climax species are present, but not at climax density and composition levels. Exotic species are present in only trace amounts.

Mid seral stage - The major climax species are present, but at reduced density and composition. Associated species sensitive to disturbance have a reduced abundance or may be missing, while species tending to increase with disturbance often occur in skewed abundance. Invading species are usually common.

Early seral state - Major climax species are present, but in peril of loss to the community. Native species that tend to increase with disturbance may be common. Invading species are abundant and usually dominate the vegetation. A disclimax will likely result if degradation continues.

Very early seral - Climax species are absent or so few to make natural recolonization highly unlikely. Invading species strongly dominate the vegetation. A disclimax exists and only manipulative change can reintroduce native dominants.

Table 3. Summary of ecological condition assessments for grassland, bitterbrush and sagebrush cover types.

<sup>1</sup> Cover Type	<sup>2</sup> Acres	<sup>3</sup> Acres % Class.	<sup>4</sup> Ecological Condition Acres / %				
			Very Early	Early	Mid	Late	Climax
G1	795	98	100 / 13	188 / 24	461 / 58	46 / 6	0 / 0
G2	119	92	0 / 0	25 / 21	82 / 69	11 / 9	0 / 0
G3	411	100	0 / 0	60 / 15	271 / 66	81 / 19	0 / 0
G4	419	100	204 / 49	171 / 41	45 / 10	0 / 0	0 / 0
G1 - G4	1744	99	304 / 17	444 / 26	859 / 49	138 / 8	0 / 0
B1	7	100	2 / 29	2 / 29	3 / 42	0 / 0	0 / 0
B2	1	100	1 / 100	0 / 0	0 / 0	0 / 0	0 / 0
B1 - B2	8	100	3 / 38	2 / 25	3 / 38	0 / 0	0 / 0
S1	359	84	19 / 5	97 / 27	243 / 68	0 / 0	0 / 0
S2	14	100	0 / 0	0 / 0	14 / 100	0 / 0	0 / 0
S3	140	100	4 / 3	13 / 9	108 / 77	15 / 11	0 / 0
S4	123	100	85 / 69	32 / 27	5 / 4	0 / 0	0 / 0
S5	44	100	22 / 50	22 / 50	0 / 0	0 / 0	0 / 0
S1 - S5	680	91	130 / 19	164 / 24	370 / 54	15 / 2	0 / 0

<sup>1</sup>G1=AGRSPI-POASAN; G2=FESIDA-AGRSPI; G3=FESIDA-KOECRI; G4=Annual grassland; B1=PURTRI/AGRSPI; B2=PURTRI/BROMUS; S1=ARTTRV/FESIDA; S2=ARTTRV-PURTRI; S3=ARTTRV-SYMORE; S4=ARTTRV/BROMUS; S5=ARTTRT/BROMUS.

<sup>2</sup>Acreage of the cover type within the study area used for analysis. In a few cases, this is less acreage than the total acreage of the cover type within the study area because not every polygon received an ecological condition assessment.

<sup>3</sup>The acreage of each cover type that received an ecological condition assessment, divided by the total acreage of the cover type, expressed as a percent.

<sup>4</sup>Ecological condition classes are expressed in both acres and percentage, relative to the cover type.

## **Polygon descriptions**

<u>Polygon #</u>	<u>Polygon description</u>
1.	AGRSPI-POASAN cover type, 40% mix of very early and early seral and 60% mid-seral.
2.	ANNUAL GRASSLAND cover type; 90% early seral, and 10% mid-seral bluebunch wheatgrass community associated with rock outcrops near base of slope.
3.	MIXED DECIDUOUS SHRUB cover type; strongly dominated by serviceberry.
4.	PRUVIR cover type.
5.	AGRSPI-POASAN cover type, mix of early and mid-seral.
6.	ARTTRV/FESIDA cover type; with scattered deciduous shrub patch inclusions, especially serviceberry, chokecherry and ninebark.
7.	ARTTRT/BROMUS cover type; Sandberg's bluegrass is common, but other native bunchgrasses are rare; remnant forbs include scattered Snake Canyon milkvetch and Snake River goldenweed plants; large patches of scotch thistle occur within polygon.
8.	AGRSPI-POASAN cover type; mix of early and mid-seral, with mid-seral vegetation confined to upper slopes.
9.	75% FESIDA-AGRSPI cover type, mostly mid-seral; 15% PRUVIR cover type; with deciduous shrub patch inclusions dominated by bittercherry or ninebark; and AGRSPI-POASAN inclusions on westerly-facing slopes.
10.	ANNUAL GRASSLAND cover type; 85% mix of early and very early seral and 15% mid-seral bluebunch wheatgrass vegetation; large stands of scotch thistle within polygon.
11.	ARTTRV/BROMUS cover type; with sagebrush cover averaging approximately 20%; two-track road and associated thick stands of scotch thistle occur within polygon.
12.	Raft Creek - MIXED DECIDUOUS SHRUB cover type.
13.	PRUVIR cover type; the chokecherry shrubs strongly impacted by livestock.
14.	ANNUAL GRASSLAND cover type; inclusions of mid-seral grassland vegetation; deciduous shrub patch inclusions dominated by chokecherry and lesser amounts of Rocky Mountain maple.
15.	FESIDA-KOECRI cover type; needs field verification.
16.	AGRSPI-POASAN cover type; needs field verification.
17.	FESIDA-AGRSPI cover type, mix of early, and lesser amounts of mid-seral vegetation;

inclusions of MIXED DECIDUOUS SHRUB cover type.

18. ARTTRV/FESIDA cover type, mix of early and mid-seral; bluebunch wheatgrass is present, but not Idaho fescue.
19. AGRSPI-POASAN cover type, mix of early and lesser amounts mid-seral.
20. PRUVIR cover type.
21. PRUVIR cover type.
22. FESIDA-AGRSPI cover type, mid-seral; widely scattered mountain big sagebrush and deciduous shrub patches are present.
23. AGRSPI-POASAN cover type, mix of mostly early and mid-seral, with very early seral vegetation along the mid-slope ridgeline; PRUVIR cover type inclusions.
24. PSEMEN cover type.
25. FESIDA-AGRSPI cover type; needs field verification.
26. PSEMEN cover type.
27. FESIDA-AGRSPI cover type; with mountain big sagebrush patches; needs field verification.
28. FESIDA-AGRSPI cover type, mid-seral; inclusions of small chokecherry and bittercherry clones; a few widely scattered mountain big sagebrush shrubs are present.
29. PSEMEN cover type; with open canopy Douglas-fir trees averaging roughly 10 meters tall and understory dominated by ninebark and other deciduous shrubs.
30. PSEMEN cover type; with open canopy Douglas-fir trees averaging roughly 10 meters tall and understory dominated by ninebark and other deciduous shrubs; conifers absent or very sparse in portions of polygon.
31. ARTTRV/FESIDA cover type; sagebrush density varies from open to dense; deciduous shrub patch inclusions.
32. PSEMEN cover type; with open canopy Douglas-fir trees averaging roughly 10 meters tall and understory dominated by ninebark and other deciduous shrubs; conifers absent or very sparse in portions of polygon.
33. PSEMEN cover type; with very open canopy Douglas-fir trees averaging roughly 10 meters tall and understory dominated by ninebark and other deciduous shrubs.
34. FESIDA-AGRSPI cover type, mid-seral; transitional to bluebunch wheatgrass community; a few very small dwarf clones of chokecherry and scattered small clumps of mountain big sagebrush

occur within polygon.

35. MIXED DECIDUOUS SHRUB cover type; bittercherry patch with portions of clone(?) dead.
36. PSEMEN cover type; Douglas-fir trees average about 10 meters tall; mix of open and more closed canopy; ninebark and other deciduous shrubs in the understory.
37. PSEMEN cover type; Douglas-fir trees average about 10 meters tall; mix of open and more closed canopy; ninebark and other deciduous shrubs in the understory.
38. PSEMEN cover type; Douglas-fir trees average about 10 meters tall; mostly with a closed canopy; ninebark and other deciduous shrubs in the understory.
39. ARTTRV/FESIDA cover type; sagebrush cover averaging approximately 10%; PSEMEN cover type inclusion.
40. FESIDA-KOECRI cover type, mid-seral; with scattered mountain big sagebrush shrubs averaging less than 5% coverage.
41. Mosaic of 50% MIXED DECIDUOUS SHRUB cover type (with ninebark, chokecherry and others in patches), 25% FESIDA-KOECRI cover type, and 25% ARTTRV/FESIDA cover type; a few Douglas-fir and aspen trees also occur within polygon.
42. POPTRE cover type; with diverse mix of deciduous shrubs in understory.
43. ARTTRV/FESIDA cover type, mix of early and mid-seral understory; with FESIDA-KOECRI and MIXED DECIDUOUS SHRUB inclusions.
44. MIXED DECIDUOUS SHRUB cover type; Rocky Mountain maple is very common in places; a few western juniper trees occur near bottom of draw; patches of sapling and small pole-sized Douglas-fir trees mixed with aspen occur at upper end of polygon; ninebark and chokecherry patches are common on slopes adjacent to draw.
45. ARTTRV/FESIDA cover type, mix of early and mid-seral understory; with FESIDA-KOECRI and MIXED DECIDUOUS SHRUB inclusions.
46. AGRSPI-POASAN cover type, mostly mid-seral; with scattered individual or small clumps of mountain big sagebrush extending part way up slope.
47. MIXED DECIDUOUS SHRUB cover type; Rocky mountain maple and ninebark are most abundant shrubs.
48. POPTRE cover type; mostly with an open aspen canopy and ninebark very common in understory.
49. FESIDA-KOECRI cover type, mid-seral; weeds well established.

50. ARTTRV/FESIDA cover type, mid-seral; sagebrush cover averaging roughly 30%, except towards upper slope positions where sparse.
51. ARTTRV/FESIDA cover type, 80% mid-seral and 20% early seral; sagebrush cover averaging roughly 30%, with only a few scattered sagebrush shrubs on upper slopes.
52. FESIDA-KOECRI cover type, mid-seral; diverse and abundant forb component; with inclusions of ninebark patches.
53. MIXED DECIDUOUS SHRUB cover type; ninebark is the dominant shrub species.
54. AGRSPI-POASAN cover type, 80% mid-seral, 20% early seral; a few spotted knapweed (?) rosettes observed; mountain big sagebrush shrubs along lower slope, becoming very sparse above mid-slope.
55. MIXED DECIDUOUS SHRUB cover type; shrubs dominated by Rocky Mountain maple and chokecherry; mixed with aspen trees in upper one-third of polygon.
56. FESIDA-KOECRI cover type, 75% mid-seral and 25% early seral; deciduous shrub patch inclusions; sagebrush is rare.
57. FESIDA-AGRSPI cover type 60% mid-seral and 40% early seral; with inclusions of MIXED DECIDUOUS SHRUB cover type in draws and scattered patches on slopes; sagebrush present in places.
58. AGRSPI-POASAN cover type, mid-seral, with some early seral spots; with FESIDA-AGRSPI cover type inclusions on more westerly exposures.
59. MIXED DECIDUOUS SHRUB cover type.
60. AGRSPI-POASAN cover type.
61. ARTTRV/BROMUS cover type; sagebrush cover averages approximately 50% in many places, although less in very weedy openings; inclusions of mid-seral understory; deciduous shrub inclusion in draw.
62. FESIDA-KOECRI cover type, mix of mid and late seral; a few small deciduous shrub patch inclusions.
63. AGRSPI-POASAN cover type, 75% mid and 25% early seral; with FESIDA-AGRSPI inclusion where upper slope becomes west-facing.
64. ARTTRV/FESIDA cover type, early and mid-seral; sagebrush cover averaging nearly 50%.
65. PURTRI/AGRSPI cover type.
66. AGRSPI-POASAN cover type; very steep and unstable in places with abundant bare ground and

rock.

67. MIXED DECIDUOUS SHRUB cover type.
68. ARTTRV/FESIDA cover type, early and mid-seral; sagebrush cover averaging nearly 50%.
69. FESIDA-KOECRI cover type, 25% early and 75% mix of mid and late seral; with inclusions of FESIDA-AGRSPI cover type on west, and AGRSPI-POASAN cover type on southwest exposures.
70. AGRSPI-POASAN cover type, 20% early seral especially near lower end, and 70% mid and 10% late seral.
71. ARTTRV/FESIDA cover type, mix of early and mid-seral; variable sagebrush cover averaging approximately 35%.
72. MIXED DECIDUOUS SHRUB cover type.
73. ARTTRV/FESIDA cover type, mix of early and mid-seral; variable sagebrush density averaging approximately 35%, but as high as 50% cover in places.
74. ARTTRV/FESIDA cover type, mostly mid-seral; variable sagebrush cover averaging approximately 35%.
75. ANNUAL GRASSLAND cover type; most of mountain big sagebrush lost from this site, with only widely scattered individual and small clumps remaining.
76. MIXED DECIDUOUS SHRUB cover type; with ninebark prevalent in places.
77. FESIDA-AGRSPI cover type, mostly mid-seral; scattered mountain big sagebrush shrubs occur.
78. FESIDA-KOECRI cover type, mix of mid and late seral; with inclusions of FESIDA-AGRSPI on westerly aspects.
79. Mosaic of FESIDA-KOECRI and FESIDA-AGRSPI cover types, with the FESIDA-KOECRI restricted to northerly aspects; mid-seral.
80. AGRSPI-POASAN cover type, 15% very early, 20% early, 55% mid-seral, 10% late seral; lower slopes and frequent, scattered patches higher up slope are very weedy.
81. ARTTRV/BROMUS cover type; sagebrush cover is approximately 50%, with a few clusters of bitterbrush shrubs.
82. MIXED DECIDUOUS SHRUB cover type; poison ivy and weeds such as scotch thistle are common.
83. ARTTRV/PURTRI cover type, mid-seral; 20% shrub cover comprised of approximately equal

amounts of sagebrush and bitterbrush; bluebunch wheatgrass is main bunchgrass; occurs on Dennett Creek Limestone substrate.

84. PURTRI/BROMUS cover type.
85. North Fork Dennett Creek - MIXED DECIDUOUS SHRUB cover type; upper section of narrow riparian polygon dominated by chokecherry and Rocky Mountain maple, with a more mixed shrub composition continuing downstream, with occasional short segments containing aspen or dominated by red-osier dogwood; several gaps with minimal shrub cover.
86. AGRSPI-POASAN cover type, 40% mix of very early and early seral, 50% mid-seral, and 10% late seral; early seral vegetation most common near road, fences and portions of ridgeline.
87. ARTTRV/BROMUS cover type.
88. AGRSPI-POASAN cover type, mid-seral.
89. ARTTRV/BROMUS cover type.
90. POPTRE cover type; Rocky Mountain maple most prevalent associated shrub; chokecherry also common; occasional thinleaf alder; the aspen represented by various size (age) classes.
91. PSEMEN cover type; entirely on the Payette National Forest.
92. PSEMEN-L cover type; logged (thinned) Douglas-fir stand, with most remaining trees skinny, 10 meters tall, and with a roughly 25% canopy; understory is weedy; plenty of slash debris; weeds well established along skid tracts and road.
93. MIXED DECIDUOUS SHRUB cover type; bittercherry patch.
94. ARTTRV/FESIDA cover type, mostly mid-seral; mountain snowberry is present, but at low cover (<5%); sagebrush cover varies from 30% to 50% throughout most of polygon, except very upper slopes where it is less than 10%.
95. Mix of POPTRE and PSEMEN-L cover types; logging has removed some of the Douglas-fir trees, the remaining trees average about 10 meters tall and form a very open canopy (<20%); diverse and lush deciduous shrubs component throughout polygon.
96. ARTTRV/FESIDA cover type; with deciduous shrub, mainly ninebark shrubs mixed in.
97. ARTTRV/FESIDA cover type; sagebrush density is low.
98. ARTTRV-SYMORE cover type; with sagebrush dominating sideslopes and mountain snowberry dominating concavities and creases; estimated 50% shared shrub cover; mostly mid-seral, but inclusions of late seral.
99. POPTRE cover type; with a few Douglas-fir mixed in.

100. FESIDA-KOECRI cover type; with scattered mountain big sagebrush shrubs; mostly mid-seral.
101. PSEMEN cover type; with diverse shrub understory (ninebark, Rocky Mountain maple, mountain snowberry and various rosaceous shrubs); open Douglas-fir canopy of approximately 20%, discounting conifer saplings.
102. ARTTRV/FESIDA cover type, mid-seral; sagebrush cover approximately 25%.
103. MIXED DECIDUOUS SHRUB cover type; the shrubs not forming a thicket; with grassland and sagebrush openings.
104. MIXED DECIDUOUS SHRUB cover type; Rocky Mountain maple, serviceberry, ninebark, Wood's rose, and mountain snowberry the most common shrubs; a few aspen in lower portion of polygon.
105. FESIDA-KOECRI cover type, mix of early and mid seral; with mountain big sagebrush widely scattered throughout.
106. ARTTRV/FESIDA cover type; sagebrush averaging about 30% cover, mix of very early, early and mid-seral; the sagebrush thinning out along upper end of polygon.
107. ANNUAL GRASSLAND cover type; inclusions of mid-seral bluebunch wheatgrass grassland; with a few small patches of mountain big sagebrush.
108. AGRSPI-POASAN cover type, mostly mid-seral, with late seral inclusions, and also early seral portions, especially near road.
109. ARTTRV/BROMUS cover type; sagebrush cover is highest near base of slope averaging about 25%, but is reduced further upslope, grading into grassland vegetation characterizing upper half of slope.
110. MIXED DECIDUOUS SHRUB cover type, with chokecherry and ninebark the dominant shrubs.
111. FESIDA-KOECRI cover type, mid-seral; inclusions of FESIDA-AGRSPI; mountain big sagebrush shrubs are widely scattered (1% cover) across the slope.
112. AGRSPI-POASAN cover type, 65% mix of very early and early seral, including all lower slope areas, and 35% mid-seral; PRUVIR inclusions; logging access road bisects slope and adjacent portions of slope are very weedy.
113. PRUVIR cover type.
114. ANNUAL GRASSLAND cover type; with inclusions of mid-seral bluebunch wheatgrass-dominated grassland.
115. AGRSPI-POASAN cover type, 25% mix of very early and early seral, 65% mid-seral, 10% late seral.

116. ANNUAL GRASSLAND cover type; with inclusions of mid-seral bluebunch wheatgrass-dominated grassland.
117. ARTTRV/BROMUS cover type; mosaic of dense sagebrush stands along lowermost slopes and flats, grading into widely scattered individuals or small clumps, with occasional small dense clusters in concavities along the lower slopes of spur knolls and ridges.
118. AGRSPI-POASAN cover type, patchwork of early and mid-seral vegetation; inclusions of FESIDA-AGRSPI on northerly aspects.
119. Lower Middle Fork Dennett Creek - MIXED DECIDUOUS SHRUB cover type; portions dominated by water birch with a diverse mixture of other shrubs; some localized aspen patches occur; openings and flats adjacent to riparian zone are very weedy. Downstream from confluence with the North Fork Dennett Creek the riparian vegetation consist of an open black cottonwood (*Populus trichocarpa*) canopy, with a mixed deciduous shrub understory (chokecherry, red-osier dogwood, elderberry, Wood's rose), and an occasional aspen tree; water birch dominates short stretches; there are gaps in the shrub and tree coverage dominated by weeds.
120. ARTTRV/FESIDA cover type, early and mid-seral; with a few bitterbrush shrubs near ridgeline; deciduous shrub patch inclusions; old road cuts through polygon.
121. ANNUAL GRASSLAND cover type, mostly very early seral; better condition grasslands above mine access road in upper part of polygon; bottomlands along Dennett Creek riparian zone support dense scotch thistle stands; outcrops of Tate Shale present.
122. PURTRI/AGRSPI cover type; old road cuts through polygon; outcrops of Tate Shale present.
123. MIXED DECIDUOUS SHRUB cover type; old road cuts through polygon.
124. PURTRI/AGRSPI cover type; with approximately 20% cover of bitterbrush; old road cuts through polygon.
125. ARTTRV/FESIDA cover type, mostly mid-seral; sagebrush cover averages roughly 25% along lower one-half of slope and scattered clusters higher upslope, but substantial portions of upper one-half of slope supports only sparse sagebrush; deciduous shrub patch inclusions.
126. MIXED DECIDUOUS SHRUB cover type; chokecherry, bittercherry and ninebark are major shrub species; a few aspen in middle section of draw.
127. ARTTRV/FESIDA cover type, mostly mid-seral; with bluebunch wheatgrass more abundant than Idaho fescue; sagebrush cover averaging 20% along lower slope, but with reduced coverage further upslope, becoming sparse (1%) along upper slopes; deciduous shrub patch inclusions.
128. MIXED DECIDUOUS SHRUB cover type; largely dominated by ninebark.
129. AGRSPI-POASAN cover type, early and mid-seral; with a few scattered mountain big sagebrush shrubs.

130. ARTTRV/FESIDA cover type, variable condition probably mostly mid-seral; sagebrush cover averaging approximately 35%; deciduous shrub inclusions, mostly ninebark, along lower slopes.
131. MIXED DECIDUOUS SHRUB cover type; dominated by Rocky Mountain maple; a few aspen also present.
132. ARTTRV-SYMORE cover type, mostly mid-seral, but early seral in places; less mountain snowberry than higher elevations; several clusters of sapling/seedling Douglas-fir trees; deciduous shrub patch inclusions dominated by ninebark; old road cuts through polygon.
133. POPTRE cover type; the aspen represented by all age classes and forming a closed canopy throughout most of polygon; deciduous shrub layer is diverse; Kentucky bluegrass is the dominant graminoid.
134. POPTRE cover type.
135. POPTRE cover type.
136. AGRSPI-POASAN cover type, mid-seral; with scattered mountain big sagebrush shrubs.
137. ARTTRV/BROMUS cover type.
138. MIXED DECIDUOUS SHRUB cover type; dominated by bittercherry, with Wood's rose and mountain snowberry.
139. ANNUAL GRASSLAND cover type.
140. MIXED DECIDUOUS SHRUB cover type; ninebark is most abundant shrub; with a few scattered small clumps of Douglas-fir and of mountain big sagebrush.
141. Upper Middle Fork Dennett Creek - POPTRE cover type; with deciduous shrub understory.
142. POPTRE cover type; with abundant Rocky Mountain maple in the understory; with a few Douglas-fir trees at bottom end of polygon; with a few small open inclusions supporting grassland or sagebrush vegetation.
143. PSEMEN-L cover type; logged portion of Douglas-fir stand, with most remaining trees under 10" dbh; Rocky Mountain maple is the most common regenerating shrub; weedy herbaceous understory; some slash piles remain; logged right up to adjacent Payette National Forest land.
144. PSEMEN cover type; mixed age Douglas-fir stand (with some old trees present) located on the Payette National Forest.
145. ARTTRV-SYMORE cover type; sagebrush averages about 35% cover; mountain snowberry cover averages approximately 5%, but in places co-dominates with the sagebrush, each with at least 20% cover; other shrubs are relatively uncommon, except for rabbitbrush which is common in disturbed areas; several roads traverse through polygon; large disturbed vegetation inclusion

associated with stockpond and cabin area, but overall polygon is mid-seral.

146. ARTTRV/SYMORE cover type, mostly mid-seral, but with some early seral inclusion; with deciduous shrub patch inclusions, including bittercherry.
147. PSEMEN cover type; band of pole and mostly sapling sized Douglas-fir trees; largely on the Payette National Forest.
148. ARTTRV-SYMORE cover type; with mountain snowberry co-dominant in many places and forming dense patches in topographic concavities; deciduous shrub patch inclusions; several weedy openings; polygon is largely on Payette National Forest land.
149. AGRSPI-POASAN cover type; very weedy in spots.

### **Rare plants**

Two rare plant species, Snake River goldenweed (*Haplopappus radiatus*) and Snake Canyon milkvetch (*Astragalus vallis*) are known to occur within the Rocking M Ranch study area.

#### Snake River goldenweed

Snake River goldenweed is endemic to the dry, rolling hills, canyons and lower mountain slopes near the Snake River in Washington County, Idaho, and adjacent eastern Oregon, where it occurs within bunchgrass and sagebrush-bunchgrass communities. Snake River goldenweed is a U.S. Fish and Wildlife Service Category 1 candidate species for listing under the Endangered Species Act (U.S. Fish and Wildlife Service 1993). It has been recommended for federal Threatened status (Kaye *et al* 1990; Mancuso and Moseley 1993). In light of new field inventory information, these recommendations are being reevaluated as part of a Conservation Strategy presently being prepared for this species.

The Rocking M Ranch study area is located in the heart of the species' range in Idaho and supports the largest known populations in the state. Major portions of four occurrences (001, 009, 013, 014) are located within the study area (Appendix 3). These occurrences contain an estimated minimum of 28,000 plants, well over half of all the Snake River goldenweed plants known in Idaho. Loss of high quality canyon grassland and sagebrush habitat, primarily associated with livestock grazing, has been identified as a major threat to the species throughout its range (Mancuso and Moseley 1993). Conservation of Snake River goldenweed in Idaho is critically linked to its conservation within the study area. Snake River goldenweed is found in portions of the following vegetation map polygons: 1, 7, 8, 9, 12, 14, 17, 18, 19, 22, 23, 28, 31, 34, 39, 49, 50, 51, 52, 54, 57, 58, 62, 63, 69, 70, 80, 86, 88, 108, 112, 114, 115, 149.

The Conservation Data Center assigns a reference three digit code (e.g., 001) to each occurrence of a particular tracked species. Additional location, population, habitat and other information are contained in the appropriate Element Occurrence Record (formatted data base records - Appendix 4).

#### Snake Canyon milkvetch

Snake Canyon milkvetch is endemic to the grassland and sagebrush slopes of the Snake River Canyon and its tributaries in Washington and Adams counties, Idaho, and adjacent parts of Oregon. Snake Canyon

milkvetch is tracked by the Conservation Data Center and is considered a conservation concern by the Idaho Native Plant Society (INPS - sponsors of the annual Idaho Rare Plant Conference and Interagency Rare Plant Meeting). The Conservation Data Center state rank for Snake Canyon milkvetch is S3 (Conservation Data Center 1994). This rank is designated for taxa considered rare or uncommon, but not imperiled. It is an INPS Monitor species (Idaho Native Plant Society 1995), a designation pertaining to taxa common within a limited range, as well as those which are uncommon, but have no identifiable threats.

Two occurrences of Snake Canyon milkvetch have been documented for the study area (Appendix 3). An occurrence vaguely reported from near Mineral prior to 1995, is likely part of the extensive population I found in the North Fork Dennett Creek and Middle Fork Dennett Creek drainages (004). This occurrence is comprised of several subpopulations and is estimated to contain 5000 or more plants. A population in upper Raft Creek (016) was discovered while completing field work for this project and is estimated to support 2000 plants. Snake Canyon milkvetch occurs on southerly-facing slopes or benches supporting bluebunch wheatgrass, bitterbrush/bluebunch wheatgrass or sagebrush communities. It appears to be absent from more mesic Idaho fescue sites. It is rare or absent from depleted sites dominated by invasive grasses and suggests susceptibility to habitat degradation. Additional location, population, habitat and other information are contained in the appropriate Element Occurrence Records (Appendix 5). Snake Canyon milkvetch occurs in portions of the following ten polygons: 7, 8, 10, 70, 86, 88, 112, 121, 124, 136.

## **Floristics**

A vascular plant species list has been compiled for the study area (Appendix 2). This list is not complete for several reasons. Field work did not commence until mid-July, and many spring ephemerals and other early flowering plants were missed. Mid-July is prior to the flowering period for several late-flowering species, especially in the Asteraceae (Aster family), and these were also missed. Finally, time constraints did not allow a thorough floristic inventory of all habitats in all areas.

The plant list contains a total of 187 species in 44 families. Asteraceae, with 37 taxa (20%), and Poaceae (grass family) with 21 taxa (11%), are the most common families. The plant list contains 44 (24%) introduced species.

## **Recommendations**

### Weed Control

Like at Brownlee WMA, weed control will be one of the primary management challenges in the Rocking M Ranch area. Polygons or portions of polygons described as Annual Grassland, Bitterbrush/annual bromes, Mountain big sagebrush/annual bromes, and Basin big sagebrush/annual bromes cover types are weedy areas in very early and/or early seral condition. In grassland, bitterbrush and sagebrush habitats, disturbance is a primary factor for weed establishment and subsequent increase. Therefore, control of disturbance will be an important management tool. Livestock grazing and associated activities are the most widespread disturbances presently occurring within the WMA. We recommend weed management focus on preventive measures. In addition, a priority system should be developed based on habitat vulnerability and wildlife and conservation values. This shifts weed control emphasis away from particular species toward the ecosystem (Hobbs and Humphries 1995). Foremost in this regard is the prevention of weed

invasions into areas of intact and relatively intact native vegetative. It is probably too late to do much good on steep slopes strongly dominated by weedy vegetation. Restoration efforts may be possible on some accessible, fairly flat areas along Raft Creek and North Fork Dennett Creek. Native plant materials should be used for restoration plans as much as possible. Current technology does not exist for restoration of the extensive dry, steep canyon slopes presently in poor ecological condition. These sites are lost.

The following recommendations are similar to those for Brownlee WMA (Mancuso and Moseley 1995) and Craig Mountain WMA (Mancuso and Moseley 1994).

1. A weed management plan should be written with the consultation of people familiar with local weed management problems and options. Prevention should be the focus of the weed management plan and priority should be given to areas which are currently weed-free or minimally infested.
2. Coordination with the BLM, Payette National Forest and private land owners should be part of the weed management plan. It will take a coordinated effort for weed control to be efficient and effective.
3. Changing long-standing livestock grazing practices will help control a main vector of weed spread. Livestock overgrazing has been a chronic disturbance factor and will jeopardize weed control efforts in many areas. This will be important in preventing the establishment of weeds not yet occurring within the study area [such as yellow starthistle (*Centaurea solstitialis*) and leafy spurge (*Euphorbia escula*), but probably poised to do so.
4. Roads and trails are important weed dispersal conduits, and access and road improvement plans should take this into account. This includes road maintenance activities which leave open spaces for invasion. Former logging and mining access roads may be places where restoration is possible.
5. Ground disturbing management actions should evaluate the potential for spread or establishment of weeds. This is especially important in areas where infestations are presently not too severe.
6. Presently, scotch thistle (*Onopordum acanthium*) is a serious noxious weed in disturbed areas. Habitat along the entire length of the Raft Creek bottomlands has been severely impacted by scotch thistle. The roadways and adjacent lower slopes along the Dennett Creek drainages (especially the North Fork Dennett Creek) support serious extensive infestations. In addition, spot infestations occur on disturbed sites throughout the study area. Control efforts should focus on large as well as satellite spot infestations. For all serious weeds, controlling satellite populations will be very important in decreasing the rate and degree of invasion into susceptible, but presently non-invaded habitat. This is because most invasions radiate from multiple, disjunct points, not from a single expanding area. With current technology, it is extremely difficult, if not impossible to reduce infestations once well established on canyon slope habitats.
7. IDFG personnel working at the Rocking M Ranch should learn to identify noxious and other potentially serious weeds that have a high potential of invading the study area in the foreseeable future, including leafy spurge, yellow starthistle, spotted knapweed (*Centaurea maculosa*), Russian knapweed (*C. repens*), Canada thistle (*Cirsium arvense*), sulphur cinquefoil (*Potentilla recta*), Dalmatian toadflax (*Linaria dalmatica*), hoary whitetop (*Cardaria draba*) and bur buttercup (*Ranunculus testiculatus*). Pamphlets discussing each of these weeds, including identification, are available from the Agricultural Publications Office at the University of Idaho. If questions arise concerning the identification of a suspected weed, verification can be obtained from Agricultural Extension Agents or weed specialists associated with the

University of Idaho or Washington State University.

8. Weed surveys should be conducted periodically to note and assess any new invasions. This type of vigilance will be especially important to combat weeds that are not yet well established within the study area. One limitation of my field work for the vegetation map was that it was conducted either earlier or later in the season than prime flowering period for several potential weeds (e.g., hoary whitetop). If new infestations are discovered they should be controlled immediately while still manageable.

9. Vegetative rosettes of what may be spotted knapweed were observed in a few places along roads and adjacent lower slopes. This identification is tentative because no old stem skeletons were found, nor were any flowering plants seen, although by mid-July, I would expect low-elevation sites beginning to flower. My tentative identification needs verification and I recommend a weed reconnaissance be conducted in early August to search for later flowering weed species, such as the knapweeds.

10. Properly chosen and applied herbicides may be a control choice in areas where there is access. Timing is absolutely critical when using herbicides, especially if they are used in conjunction with other management tools such as prescribed burning or reseeding.

11. The sponsorship of a graduate student to more fully evaluate weed control options and make more site specific recommendations was recommended for Brownlee WMA. If such a study is initiated, it should also include the Rocking M Ranch study area.

12. Monitoring should be an integral part of any weed management plan.

### Livestock Management

When evaluated in terms of ecological condition (seral stage), livestock grazing has adversely impacted grassland, sagebrush, bitterbrush, deciduous shrub and aspen habitats throughout the study area. These affects are worse in readily accessible areas, such as near roads and streams, benchlands, and gentle slopes. Several less accessible places are in good ecological condition and should be off-limits to livestock grazing. This includes (1) upper and mid-slopes below the North Fork Dennett Creek - Raft Creek divide ridge (polygons 62, 63, 69, 70, 78, 79), (2) the northerly-facing upper and mid-slopes below the ridge dividing the North and Middle forks of Dennett Creek (polygons 98, 100, 108), (3) a section of the south-facing slope above the Middle Fork Dennett Creek (polygon 115). Beside maintaining intact wildlife habitat, this restriction will also serve as an important conservation measure for Snake River goldenweed populations in these areas.

Gentle to moderately steep upper elevations in the southeastern part of the study area are weedy in places (especially in aspen understories), but mostly support mid-seral vegetation. Livestock grazing in these important mountain big sagebrush and aspen wildlife habitats should be re-evaluated. At a minimum, I recommend no developments encouraging more prolonged or concentrated livestock use. Reducing a major source of disturbance such as livestock grazing will enable these mid-seral plant communities to improve, or at least minimize further retrogression to earlier seral stages. The Raft Creek drainage has been subject to intensive livestock over the years, apparently mostly as winter pasture. I recommend late fall-winter continue to be the season of use, although at reduced livestock numbers. This period is during the dormant season for native bunchgrasses and after seed dispersal by Snake River goldenweed, which is subject to flower and fruit head herbivory by cows earlier in the year.

### Other Recommendations

1. A relatively new roadcut in upper Raft Creek is a serious erosion and weed control problem. Rehabilitation of this cut is in order. Severe downcutting has also occurred along other portions of the Raft Creek road. Livestock management options should address this problem as well.
2. The boundary fence separating Rocking M Ranch and Forest Service land along the Raft Creek - Sturgill Creek divide is in need of repair. Trespass cows were observed during field work.
3. The western juniper stand located just south of the study area above Mineral, should be a priority in further wildlife conservation easement agreements. The stand is located on both BLM and private land and agreements may be complicated by mineral claims in the area. This is the only extensive western juniper habitat I know about in west-central Idaho.

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## APPENDIX 1

### Summary of Rocking M Ranch Vegetation Map polygon data (Lotus 1-2-3 Windows, Release 5 file).

#### Interpretation of Appendix 1

Appendix 1 list the size, cover type, cover type percentage, inclusions, and where known, the ecological condition and habitat type for each of the 149 polygons comprising the vegetation map. This is the data matrix used for GIS-analysis of the vegetation. These data are contained in Lotus 1-2-3 Windows (Release 5) and GIS data files stored on diskette and on file at IDFG, Natural Resources Policy Bureau, Boise.

Poly # = Polygon number (1-149). The few polygons located entirely outside the study area are depicted in bold.

Size = Acreage of polygon within study area boundaries. Many polygons are larger in size than shown in Appendix 1, overlapping onto land outside the study area. Only portions within the study area boundaries have been included in the analysis. The cumulative size of polygons 1 to 149 is 3,070 acres within the study area. This is 88 acres less than the 3,158 "true" acres of the study area, and results primarily from inevitable inconsistencies in the mapping and GIS-digitizing processes. The few polygons located entirely outside the boundaries of the study area are noted as "out" in the matrix.

C.T. = Cover type for polygon. Each cover type has a corresponding alphanumeric code within the Grassland (G), Bitterbrush (B), Sagebrush (S), Deciduous shrub and tree (D) or Conifer (C) habitat classes. Cover types and corresponding codes are listed in the chart below.

% = Percentage of cover type comprising a polygon. 95% is used for polygons dominated by one cover type, but containing minor amounts (<10%) of one or more other cover types inclusions.

Ecological Condition: V = very early seral; E = early seral; M = mid-seral; L = late seral; C = climax. Percentage figures are based on field estimates. Where a mix of conditions were noted in the field, but proportions not estimated, an "X" infers some portion of the vegetation is that particular seral stage. For purposes of GIS analysis, all "X's" for a given polygon carry equal weight in deciding proportions of ecological condition.

Inclusions = List of cover types occurring in minor amounts (<10%) within a polygon and, therefore, not listed in the C.T. column. The same cover type alphanumeric codes are used.

H.T. = The habitat type for the polygon. Cover types are linked to the appropriate habitat type via a numeric coded (1-7). These are listed in the chart below. Habitat types are based on the following references: 1 = *Agropyron spicatum-Poa sandbergii/Balsamorhiza sagittata* (Tisdale 1986); 2 = *Festuca idahoensis-Agropyron spicatum* (Tisdale 1986); 3 = *Festuca idahoensis-Koeleria cristata* (Tisdale 1986); 4 = *Purshia tridentata/Agropyron spicatum* (Johnson and Simon 1987); 5 = *Artemisia tridentata* ssp. *vaseyana/Festuca idahoensis* (Johnson and Simon 1987); 6 = *Artemisia tridentata* ssp. *vaseyana-Symphoricarpos oreophilus/Festuca idahoensis* (Hironaka *et al.* 1983); 7 = *Pseudotsuga menziesii/Physocarpus malvaceus* (Steele *et al.* 1981).

List of cover types and their corresponding cover type (C.T.) and habitat type (H.T.) codes.

<u>Cover type</u>	<u>C.T.</u>	<u>H.T.</u>
Bluebunch wheatgrass-Sandberg's bluegrass	G1	1
Idaho fescue-bluebunch wheatgrass	G2	2
Idaho fescue-prairie Junegrass	G3	3
Annual grassland	G4	1 or 2
Bitterbrush/bluebunch wheatgrass	B1	4
Bitterbrush/annual bromes	B2	4
Mountain big sagebrush/Idaho fescue	S1	5
Mountain big sagebrush-bitterbrush	S2	-
Mountain big sagebrush-mountain snowberry	S3	6
Mountain big sagebrush/annual bromes	S4	5
Basin big sagebrush/annual bromes	S5	-
Mixed deciduous shrub	D1	-
Chokecherry	D2	-
Aspen/mixed deciduous shrub	D3	-
Douglas-fir/deciduous shrub	C1	7
Douglas-fir/deciduous shrub - logged	C2	7

Rocking M Ranch Vegetation Map - Data File for Polygons 1 to 149

Poly #	Size	C.T.	%	Ecological Condition					Inclusions	H.T.
				V	E	M	L	C		
1	25.7	G1	100	X	X	60			1	
2	23	G4	100		90	10			1	
3	2.6	D1	100							
4	7.7	D2	100							
5	4.1	G1	100		X	X			1	
6	47	S1	95					D1	5	
7	44.3	S5	100	X	X					
8	31.7	G1	100		X	X			1	
9	20.6	G2	75			X			2	
9		D2	15							
9		G1	10			X				
10	127.6	G4	100	X	X	15			1	
11	6.3	S4	100	X	X					
12	5.9	D1	100							
13	9.7	D2	100							
14	45.2	G4	95	X	X	20		D1	2	
15	0.5	G3	100						3	
16	13.1	G1	100						1	
17	20	G2	95		X	X		D1	2	
18	2.5	S1	100		X	X			5	
19	28.4	G1	100	X	X	X			1	
20	1.2	D2	100							
21	7.7	D2	100							
22	16.3	G2	100			100			2	
23	21.2	G1	95	20	X	X		D2	1	
24	4.4	C1	100						7	
25	2.3	G2	100						2	
26	1.5	C1	100						7	
27	8.3	G2	100						2	
28	12	G2	95				100	D2	2	
29	5.2	C1	100						7	
30	3.4	C1	100						7	
31	16.7	S1	95					D1	5	
32	6	C1	100						7	
33	1.4	C1	100						7	
34	5.6	G2	100			100			2	

Rocking M Ranch Vegetation Map - Data File for Polygons 1 to 149

Poly #	Size	C.T.	%	Ecological Condition					Inclusions	H.T.
				V	E	M	L	C		
35	1.6	D1	100							
36	15.6	C1	100							7
37	7.3	C1	100							7
38	4.7	C1	100							7
39	25.8	S1	95			100			C1	5
40	25.8	G3	95			100			S1	3
41	12.5	D1	50							7
41	12.5	G3	25							
41		S1	25							
42	23.3	D3	100							
43	8.4	S1	95		X	X			G3 D1	5
44	16.2	D1	100							
45	13.8	S1	95		X	X			G3 D1	5
46	39.7	G1	100		20	80				1
47	5.8	D1	100							
48	15.2	D3	100							
49	11.4	G3	100			100				3
50	24.4	S1	100			100				5
51	15.7	S1	100		20	80				5
52	18.1	G3	100			100				3
53	3.1	D1	100							
54	18.8	G1	100		20	80				1
55	17.5	D1	100							
56	20.5	G3	95		25	75			D1	3
57	41.9	G2	95		40	60			D1	2
58	25.9	G1	95		20	80			G2	1
59	0.8	D1	100							
60	out	G1	100							1
61	10.3	S4	95	X	X	10			S1	5
62	32.9	G3	95			X	X		D1	3
63	44.3	G1	95		25	75			G2	1
64	7.6	S1	100		X	X				5
65	2	B1	100							4
66	0.4	G1	100							1
67	19.7	D1	100							
68	7.5	S1	100		X	X				5
69	157	G3	95		25	X	X		G1 G2	3

Rocking M Ranch Vegetation Map - Data File for Polygons 1 to 149

Poly #	Size	C.T.	%	Ecological Condition					Inclusions	H.T.
				V	E	M	L	C		
70	121.6	G1	100		20	70	10			1
71	13.8	S1	100		X	X				5
72	18.4	D1	100							
73	57.6	S1	100		X	X				5
74	10.4	S1	100		20	80				5
75	62.8	G4	100	X	X					5
76	14.4	D1	100							
77	11.7	G2	100			100				2
78	19.2	G3	95			X	X		G2	3
79	50.8	G3	50			100				3
79		G2	50			100				
80	34.3	G1	100	15	20	55	10			1
81	9.5	S4	100	X	X					
82	0.6	D1	100							
83	14.3	S2	100			100				
84	1.3	B2	100	X						4
85	9.3	D1	100							
86	240.6	G1	100	X	X	50	10			1
87	10.4	S4	100	X						
88	7.2	G1	100			100				1
89	4.9	S4	100	X	X					5
90	9.1	D3	100							
91	out	C1	100			X	X			7
92	14.7	C2	100							7
93	4.1	D1	100							
94	27.6	S1	100		X	X				6
95	27.3	C2	50							7
95		D3	50							
96	2.1	S1	100							5
97	4.3	S1	100							5
98	41.1	S3	100			80	20			6
99	10.3	D3	100							
100	29.8	G3	100			100				3
101	10	C1	100							7
102	11.5	S1	100			100				5
103	4.3	D1	100							
104	6.3	D1	100							

Rocking M Ranch Vegetation Map - Data File for Polygons 1 to 149

Poly #	Size	C.T.	%	Ecological Condition					Inclusions	H.T.
				V	E	M	L	C		
105	35.2	G3	100		X	X				3
106	58.1	S1	100	X	X	X				5
107	11.3	G4	100	X	X	10				1
108	26.7	G1	100	X	X	70	10			1
109	22	S4	100	X	X	20				5
110	4.4	D1	100							
111	50.3	G3	95			100			G2	3
112	52.7	G1	95	X	X	35			D2	1
113	5.2	D2	100							
114	43.8	G4	100	X	X	10				1
115	32.8	G1	100	X	X	65	10			1
116	74.8	G4	100	70	20	10				1
117	52.4	S4	100	90	10					
118	7.5	G1	95		X	X			G2	1
119	20.6	D1	100							
120	8.1	S1	100		X	X				5
121	23.8	G4	100	80	10	10				1
122	4.8	B1	100	X	X	X				4
123	3.2	D1	100							
124	0.3	B1	100	X	X	X				4
125	0.1	S1	95		20	80			D1	5
126	0.3	D1	100							
127	33.1	S1	100			100				5
128	13.2	D1	100							
129	20.1	G1	100		X	X				1
130	38.7	S1	95			100			D1	5
131	8.9	D1	100							
132	30.3	S3	95		20	80			D1	6
133	41.4	D3	100							
134	1.7	D3	100							
135	0.9	D3	100							
136	3.3	G1	100			100				1
137	8.1	S4	100	X	X					5
138	5.5	D1	100							
139	8.4	G4	100	X	X					1
140	7.4	D1	100							
141	9.8	D3	100							

Rocking M Ranch Vegetation Map - Data File for Polygons 1 to 149

Poly #	Size	C.T.	%	Ecological Condition					Inclusions	H.T.
				V	E	M	L	C		
142	2.4	D3	100							
143	11.5	C2	100							7
144	out	C1	100			X	X	X		7
145	63.4	S3	100	5	10	75	10			6
146	7.1	S3	95	X	X	75			D1	6
147	out	C1	100							7
148	out	S3	95	X	X	90			D1	6
149	15.1	G1	100	X	X	40				1

## APPENDIX 2

### Vascular plant species list for Brownlee WMA.

**Note:** The species list is arranged alphabetically by family. Common names are provided for all species. Taxonomy follows that in *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973).

The list contains the common habitat(s) for each species within the study area. The habitats are coded as "G" = grassland (includes bitterbrush habitats as well); "S" = big sagebrush; "D" = deciduous shrub and aspen; "C" = conifer. Only the common habitat(s) is listed and a particular species may sometimes occur in a habitat not checked.

**VASCULAR PLANT LIST FOR ROCKING M RANCH**

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>G</b>	<b>S</b>	<b>D</b>	<b>C</b>
<b>Aceraceae</b>	<b>Maple family</b>				
Acer glabrum	Rocky Mtn. maple			x	x
<b>Anacardiaceae</b>	<b>Sumac family</b>				
Rhus radicans	poison ivy			x	
<b>Apiaceae</b>	<b>Parsley family</b>				
Conium maculatum	poison-hemlock			x	
L. dissectum multifidum	fern-leaved desert-parsley	x			
Lomatium grayi	Gray's lomatium	x			
Osmorhiza chilensis	mountain sweet-cicely			x	x
<b>Apocynaceae</b>	<b>Dogbane family</b>				
Apocynum androsaemifolium	spreading dogbane	x			
<b>Asclepiadaceae</b>	<b>Milkweed family</b>				
Asclepias cryptoceras	Humbolt milkweed	x			
<b>Asteraceae</b>	<b>Aster family</b>				
Achillea millefolium	common yarrow	x	x	x	
Agoseris glauca	pale agoseris	x	x		
Antennaria microphylla	rosy pussy-toes		x	x	
Arnica cordifolia	heart-leaved arnica				x
Arnica sororia	twin arnica	x	x	x	
Artemisia dracunculus	dragon sagewort	x	x		
Artemisia ludoviciana	Louisiana mugwort	x	x	x	
Art. tridentata tridentata	basin big sagebrush		x		
Art. tridentata vaseyana	mountain big sagebrush	x	x		
Balsamorhiza sagittata	arrowleaf balsamroot	x	x	x	
Blepharipappus scaber	blepharipappus	x			
Centaurea maculosa	spotted knapweed	x	x		
Chaenactis douglasii	false yarrow	x			
Chichorium intybus	chicory	x			
Chrysothamnus nauseosus	gray rabbitbrush	x	x		

SCIENTIFIC NAME	COMMON NAME	G	S	D	C
<i>Chrysothamnus viscidiflorus</i>	green rabbitbrush	x	x		
<i>Cirsium arvense</i>	Canada thistle			x	
<i>Cirsium canovirens</i>	gray-green thistle	x			
<i>Cirsium vulgare</i>	bull thistle			x	
<i>Conzya canadensis</i>	horseweed	x			
<i>Crepis acuminata</i>	long leaved hawksbeard	x	x		
<i>Erigeron linearis</i>	desert yellow daisy	x			
<i>Erigeron pumilus</i>	shaggy fleabane	x			
<i>Erigeron sp</i>	fleabane	x	x		
<i>Grindelia squarrosa</i>	curly-gup gumweed	x	x		
<i>Haplopappus radiatus</i>	Snake River goldenweed	x	x		
<i>Helianthella uniflora douglasii</i>	Rocky Mtn. helianthella x	x	x		
<i>Helianthus annuus</i>	common sunflower	x			
<i>Hieracium albertinum</i>	western hawkweed	x	x		
<i>Lactuca serriola</i>	prickly lettuce	x			
<i>Madia gracilis</i>	slender tarweed	x			
<i>Onopordum acanthium</i>	Scotch thistle	x	x	x	
<i>Senecio streptanthifolius</i>	Rocky Mtn. butterweed	x			
<i>Solidago canadensis</i>	Canada goldenrod	x	x		
<i>Taraxacum officinale</i>	common dandelion	x	x	x	x
<i>Tetradymia canescens</i>	spineless horse-brush		x		
<i>Tragopogon dubius</i>	yellow salsify	x	x		
<b>Betulaceae</b>	<b>Birch family</b>				
<i>Alnus incana</i>	thinleaf alder			x	
<i>Betula occidentalis</i>	water birch			x	
<b>Boraginaceae</b>	<b>Borage family</b>				
<i>Amsinckia tessellata</i>	tessellate fiddleneck	x			
<i>Asperugo procumbens</i>	madwort	x			
<i>Cryptantha affinis</i>	slender cryptantha	x			
<i>Cryptantha intermedia</i>	common cryptantha	x			
<i>Hackelia micrantha</i>	blue stickseed		x	x	
<i>Lithospermum arvense</i>	corn gromwell	x	x		
<i>Lithospermum ruderales</i>	wayside gromwell	x			
<b>Brassicaceae</b>	<b>Mustard family</b>				
<i>Alyssum desertorum</i>	desert alyssum	x	x		
<i>Arabis glabra</i>	towermustard	x			

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>G</b>	<b>S</b>	<b>D</b>	<b>C</b>
Camelina microcarpa	hairy falseflax	x			
Capsella bursa-pastoris	shepherds purse			x	
Descurania pinnata	western tansymustard	x	x		
Draba verna	spring whitlow-grass	x	x	x	
Euclidium syriacum	euclidium	x	x		
Lepidium perfoliatum	clasping pepperweed	x			
Physaria oregana	Oregon twinpod	x			
Rorippa nasturium-aquaticum	water-cress			x	
Sisymbrium altissimum	tumbling mustard	x	x		
Thlaspi arvense	field pennycress			x	
<b>Caprifoliaceae</b>	<b>Honeysuckle family</b>				
Sambucus cerulea	blue elderberry		x		
Symphoricarpos albus	common snowberry			x	x
Symphoricarpos oreophilus	mountain snowberry		x	x	
<b>Caryophyllaceae</b>	<b>Pink family</b>				
Silene sp.	catchfly		x		
Stellaria media	chickweed	x			
Stellaria sp.	chickweed	x			
Vaccaria segetalis	cowcockle	x			
<b>Chenopodiaceae</b>	<b>Goosefoot family</b>				
Chenopodium album	lambsquarter	x			
<b>Convolvulaceae</b>	<b>Morning glory family</b>				
Convolvulus arvensis	field bindweed	x			
<b>Cornaceae</b>	<b>Dogwood family</b>				
Cornus stolonifera	red-osier dogwood			x	
<b>Cupressaceae</b>	<b>Cypress family</b>				
Juniperus occidentalis	western juniper	x		x	

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>G</b>	<b>S</b>	<b>D</b>	<b>C</b>
<b>Cuscutaceae</b>	<b>Dodder family</b>				
Cuscuta approximata	clustered dodder		x		
<b>Cyperaceae</b>	<b>Sedge family</b>				
Carex geeyeri	elk sedge		x		
Carex hoodii	Hood's sedge			x	
<b>Euphorbiaceae</b>	<b>Spurge family</b>				
Euphorbia serpyllifolia	thyme-leaved spurge	x			
<b>Fabaceae</b>	<b>Pea family</b>				
Astragalus cusickii cusickii	Cusick's milkvetch	x			
Astragalus inflexus	hairy milkvetch	x	x		
Astragalus vallis	Snake Canyon milkvetch	x			
Lupinus laxiflorus	spurred lupine	x	x	x	
Medicago sativa	alfalfa	x	x		
Medicago lupulina	black medic	x			
Melilotus officinalis	yellow sweet-clover	x		x	
Trifolium repens	white clover		x	x	
<b>Geraniaceae</b>	<b>Geranium family</b>				
Erodium cicutarium	filaree	x			
Geranium viscosissimum	sticky geranium			x	
<b>Grossulariaceae</b>	<b>Currant family</b>				
Ribes cereum	squaw currant	x	x	x	
<b>Hydrangeaceae</b>	<b>Hydrangea family</b>				
Philadelphus lewisii	syringa		x		
<b>Hydrophyllaceae</b>	<b>Waterleaf family</b>				
Hydrophyllum capitatum	waterleaf woolly breeches			x	
Phacelia hastata	silverleaf phacelia	x			
Phacelia heterophylla	varileaf phacelia	x			

SCIENTIFIC NAME	COMMON NAME	G	S	D	C
Phacelia linearis	threadleaf phacelia	x			
Nemophila breviflora	Great Basin nemophila			x	
<b>Lamiaceae</b>	<b>Mint family</b>				
Agastache urticifolia	nettle-leaf horse-mint	x	x	x	
Nepeta cataria	catnip			x	
Scutellaria angustifolia	narrow-leaved skullcap	x			
<b>Liliaceae</b>	<b>Lily family</b>				
Brodiaea douglasii	Douglas' brodiaea	x	x		
Calochortus eurycarpus	big pod mariposa lily	x	x		
C. macrocarpus macrocarpus	green-band mariposa lily	x			
Smilacina stellata	star-flowered solomon-plume			x	x
Trillium ovatum	western trillium		x	x	
<b>Loasaceae</b>	<b>Blazing star family</b>				
Mentzelia albicaulis	white-stemmed mentzelia	x			
<b>Malvaceae</b>	<b>Mallow family</b>				
Malva neglecta	poverty weed	x			
<b>Onagraceae</b>	<b>Evening primrose family</b>				
Circaea alpina	enchanter's nightshade			x	
Clarkia pulchella	deer horn	x	x		
Epilobium angustifolium	fireweed	x	x		
Epilobium paniculatum	tall annual willow-herb	x	x		
Epilobium watsonii	Watson's willow-herb			x	
Oenothera caespitosa	desert evening-primrose	x			
Oenothera hookeri	Hooker's evening-primrose			x	
<b>Pinaceae</b>	<b>Pine family</b>				
Pinus ponderosa	ponderosa pine				x
Pseudotsuga menziesii	Douglas-fir			x	x

SCIENTIFIC NAME	COMMON NAME	G	S	D	C
<b>Plantaginaceae</b>	<b>Plantain family</b>				
Plantago patagonica	Indian-wheat	x	x		
<b>Poaceae</b>	<b>Grass family</b>				
Agropyron spicatum	bluebunch wheatgrass	x	x		
Bromus brizaeformis	rattlesnake brome	x	x		
Bromus carinatus	mountain brome	x	x	x	
Bromus inermis	smooth brome	x			
Bromus japonicus	Japanese brome		x	x	
Bromus mollis	soft brome	x	x		
Bromus tectorum	cheatgrass	x	x		
Calamagrostis rubescens	pinegrass		x		x
Deschampsia elongata	slender hairgrass			x	
Elymus caput-medusea	medusahead rye	x			
Elymus cinerus	basin wildrye	x	x		
Elymus glaucus	blue wildrye		x	x	x
Festuca idahoensis	Idaho fescue	x	x		
Koeleria cristata	prairie junegrass	x	x		
Melica bulbosa	oniongrass		x	x	
Phleum pratense	common timothy	x			
Poa bulbosa	bulbous bluegrass	x	x		
Poa pratensis	Kentucky bluegrass	x	x	x	x
Poa sandbergii	Sandberg's bluegrass	x	x		
Polypogon monspeliensis	rabbitfoot polypogon			x	
Sitanion hystrix	squirrel-tail	x	x		
<b>Polemoniaceae</b>	<b>Phlox family</b>				
Collomia grandiflora	large-flowered collomia	x			
Collomia linearis	narrow-leaf collomia	x			
Phlox longifolia	long-leaved phlox	x	x		
<b>Polygonaceae</b>	<b>Buckwheat family</b>				
Eriogonum compositum	northern buckwheat	x			
Eriogonum heracleoides	Wyeth's buckwheat	x	x		
Eriogonum strictum	strict buckwheat	x			
Polygonum aviculare	prostrate knotweed	x			
Polygonum douglasii	Douglas' knotweed	x	x		
Rumex crispus	curly dock			x	

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>G</b>	<b>S</b>	<b>D</b>	<b>C</b>
<b>Polypodiaceae</b>	<b>Common fern family</b>				
Cysopteris fragilis	brittle bladder-fern	x			
<b>Portulacaceae</b>	<b>Purslane family</b>				
Montia perfoliata	miner's lettuce		x	x	x
<b>Ranunculaceae</b>	<b>Buttercup family</b>				
Aquilegia formosa	red columbine			x	
Clematis ligusticifolia	western clematis			x	
Delphinium nuttallianum	Nutthall's larkspur		x		
Delphinium occidentale	western larkspur			x	
Ranunculus inamoenus	unlovely buttercup			x	
Thalictrum occidentale	western meadowrue			x	x
<b>Rosaceae</b>	<b>Rose family</b>				
Amelanchier alnifolia	serviceberry		x	x	x
Crataegus douglasii douglasii	black hawthorn		x		
Physocarpus malvaceus	mallow ninebark			x	x
Potentilla gracilis	slender cinquefoil	x	x		
Prunus emarginata	bitter cherry		x	x	x
Prunus virginiana	chokecherry	x	x	x	x
Purshia tridentata	bitterbrush	x	x		
Rosa woodsii ultramontana	Wood's rose		x	x	
<b>Rubiaceae</b>	<b>Madder family</b>				
Galium aparine	goose-grass cleavers	x	x	x	
Galium multiflorum	shrubby bedstraw	x			
<b>Salicaceae</b>	<b>Willow family</b>				
Populus tremuloides	quacking aspen		x	x	
Populus trichocarpa	black cottonwood			x	
Salix babylonica	weeping willow		x		
Salix rigida	Watson's willow			x	
Salix scouleriana	Scouler's willow			x	

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>G</b>	<b>S</b>	<b>D</b>	<b>C</b>
<b>Saxifragaceae</b>	<b>Saxifrage family</b>				
Lithophragma parviflora	small flowered prairie star	x	x		
<b>Scrophulariaceae</b>	<b>Figwort family</b>				
Castilleja hispida	harsh paintbrush	x	x		
Collinsia parviflora	blue-eyed Mary	x	x		
Mimulus cusickii	Cusick's monkeyflower	x			
Mimulus guttatus guttatus	yellow monkeyflower			x	
Penstemon deustus	hot rock penstemon	x			
Penstemon glandulosus	sticky penstemon	x	x		
Penstemon venustus	Blue Mtn. penstemon	x			
Penstemon wilcoxii	Wilcox's penstemon				x
Verbascum blattaria	moth mullein		x		
Verbascum thapsus	flannel mullein	x	x	x	
Veronica anagallis-aquatica	water pimpernel			x	
Veronica biloba	bilobed speedwell			x	
<b>Urticaceae</b>	<b>Nettle family</b>				
Urtica dioica	stinging nettle			x	
<b>Verbenaceae</b>	<b>Verbena family</b>				
Verbena bracteata	bracted verbena	x			
<b>Zygophyllaceae</b>	<b>Caltrop family</b>				
Tribulus terrestris	puncture vine		x		

### APPENDIX 3

Map locations for Snake River goldenweed (*Haplopappus radiatus*) and Snake Canyon milkvetch (*Astragalus vallis*) within the Rocking M Ranch study area.

- Map 1. Mineral East (001), Middle Fork Dennett Creek (009), Raft Creek (013) and Upper Raft Creek Ridges (014) populations of Snake River goldenweed. Portion of Monroe Butte 7.5' USGS quadrangle.
- Map 2. Upper Dennett Creek (004) and Raft Creek (016) populations of Snake Canyon milkvetch. Portion of Monroe Butte 7.5' USGS quadrangle.

### APPENDIX 4

Element Occurrence Records for Snake River goldenweed (*Haplopappus radiatus*) at Rocking M Ranch.

### APPENDIX 5

Element Occurrence Records for Snake Canyon milkvetch (*Astragalus vallis*) at Rocking M Ranch.