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PRYOR MOUNTAIN WILD HORSE RANGE SURVEY AND ASSESSMENT

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ABSTRACT

The Pryor Mountain Wild Horse Range (PMWHR) was created in 1968 by a U.S. Department of the Interior Secretarial Order. This designation was the second of its kind in the United States, and directed that management of the wild horses be within a balanced program that considers all public values without any impairment to the land's productivity.

The PMWHR covers about 39,651 acres managed by the Bureau of Land Management (BLM), U.S. Forest Service (USFS), and the National Park Service (NPS). The area lies within two states, Montana and Wyoming. Due to widespread concern about the ability of the PMWHR to support wild ungulate populations, the BLM, as the lead management agency, asked the USDA-Natural Resources Conservation Service (NRCS) to conduct a comprehensive inventory and assessment of the health of the PMWHR and to determine what a sustainable number of horses would be.

The area is located approximately 47 miles south of Billings, Montana and nine miles north of Lovell, Wyoming. The PMWHR is extremely diverse and complex topographically, geologically, and ecologically. It varies in environment and elevation from a sagebrush / salt-shrub dominated cold desert (six inches MAP-mean annual precipitation) at about 3,850 feet in Wyoming, to a subalpine setting with subalpine fir (*Abies lasiocarpa*) and open meadows (27 inches MAP) in Montana at about 8,750 feet.

NRCS methodology was used to inventory rangeland condition (similarity index), rangeland trend, and health. Ecological sites were identified and mapped in 1981 and provided the baseline for the inventory (BLM and SCS 1981). Thirteen new ecological site descriptions were developed to adequately address the complex and unique nature of the PMWHR. Three transects per section were installed on average to evaluate similarity index, apparent ecological trend, species composition by weight, noxious weed cover, biological crust cover, plant community type, and available forage production. One rangeland health assessment, along with a one hundred-point cover transect, was done per section.

The similarity index averages about 30 percent across the entire PMWHR, apparent trend is down on 76 percent of the transects, severe erosion is occurring on approximately 57 percent of the landscape, and range health is functioning at a moderate to a moderate-extreme departure from the historic climax plant community.

As of 2003 the PMWHR supports 161 feral horses and 100 bighorn sheep year around, along with 350 mule deer during the winter months with most leaving before summer. Dietary overlap between feral horses and other large ungulates is considered minimal.

The present animal unit months (AUMs) of usable forage for feral horses was determined using geographical information system (GIS) and global positioning system (GPS) technology to determine slope classes used and to create grazability models based on travel distances to water. Grazability is the percentage of usable forage in an area allocated for use in order to maintain plant health. It is a relative term considering animals' grazing preference of areas including variables such as distance from water, ecological sites, slope steepness, aspect, and species preference. Slopes over 30 percent were essentially unused during the months of May through

November, while slopes over 50 percent were essentially unused during the months of December through April. Distances to water considered 100 percent grazable without overgrazing the forage resource were set at 1.5 miles in one model and three miles in another. Slopes over 30 percent were considered unused in one model and slopes over 50 percent were considered unused in another.

Based on the grazing scenarios modeled, feral horse carrying capacity varied from 45 horses (considering slopes > 30 percent were unused and distance to water with 100 percent grazability was 1.5 miles) to 142 horses (considering slopes > 50 percent were unused and distance to water with 100 percent grazability was three miles).

The following recommendations are made in light of the 1968 U.S. Department of Interior Secretarial Order creating the PMWHR, the Wild and Free-Roaming Horse and Burro Act of 1971, and the BLM national policy for the Wild Horse and Burro program. In short, these state that the wild horses should be managed as wild and free-roaming on the one hand, and on the other, managed without causing any impairment to the land's productivity. This is an apparent dilemma. Considering this and given the current downward trend, severe erosion, rangeland in the at risk to unhealthy categories, and the very low similarities of the vegetation to potential, the following recommendations are presented for consideration in order to improve the feral horse habitat conditions and reverse habitat deterioration:

1. Consideration could be given to repairing and utilizing the mid-mountain water catchments to provide improved distribution of feral horse grazing.

2. It is recommended that consideration be given to managing the herd within the range given (45 to 142 horses) in the "Results and Discussion" section based on the selected scenario.

3. Consideration could be given to controlling water sources in order to deny or permit access to water by feral horses. This would allow for growing season rest and reproduction of the forage plants, much in the same way that wildlife must be protected from disturbance in order to allow for reproduction and herd health. A type of buck and rail fence may be a possibility for control. This fence is more aesthetically pleasing and more fitting with the wilderness study area environment. In addition, it could provide for the passage of wildlife while controlling water access to feral horses.

4. A grazing rotation is recommended for consideration. Overgrazing is a problem and potentially, undergrazing could be a problem if grazing was eliminated. It could be designed to allow for vegetative recovery following grazing, and seasonality of grazing could be somewhat controlled. This would allow for the greatest range recovery for the benefit of the horses in the shortest period of time.

5. The previous considerations would also increase the noxious weed resistance of the range. Presently, noxious weeds are not a severe problem on the PMWHR, other than Halogeton (*Halogeton glomeratus*) in the areas receiving 10 inches MAP or less. However, the conditions are right for an explosion of noxious weeds.

6. If available, consideration could be given to expanding the range accessible to the feral horses. However, unless recommendations one through three are considered, it is very likely that the present grazing impacts would be extended to the newly acquired lands without improving the existing habitat.

INTRODUCTION

The Pryor Mountain Wild Horse Range (PMWHR) was created in 1968 by a U.S. Department of the Interior Secretarial Order. This designation was the second of its kind in the United States, and directed that management of the wild horses be within a balanced program that considers all public values without any impairment to the land's productivity. The current habitat objective in the Herd Management Area Plan (HMAP) is to manage for slight upward improvement in trend.

The PMWHR encompasses about 39,651 acres managed by three different agencies, the Bureau of Land Management (BLM), U.S. Forest Service (USFS), and National Park Service (NPS). The area lies within two states, Montana and Wyoming. The Montana Department of Fish Wildlife and Parks and the Wyoming Game and Fish Department are primarily responsible for wildlife, fishing, and hunting regulations on the PMWHR. This represents a diversity of management philosophies and objectives for the area. Since the designation, much of the PMWHR has been included within a wilderness study area (three BLM wilderness study areas, of approximately 23,000 acres; and the western edge of the NPS Bighorn Canyon). The topography is characterized by deep, steep-walled canyons, isolated grassy plateaus, and extremely rocky shrub-dominated foothill slopes. The elevation ranges from about 3850 feet in Wyoming at the south end of the range to about 8,750 feet at the north end in Montana; a vertical rise of 4,900 feet in 13 miles.

When the first feral horses arrived in the Pryor Mountains is not known (Harvey 1974, Brownell 1999). Feral horses appear to have occupied the Pryor Mountains and surrounding area in great numbers until the 1930's (Wyman 1946, Brownell 1999) when stockman and the Forest Service sponsored roundup efforts to reduce the competition for forage. These efforts were apparently successful and few feral horses existed in Montana by 1939 (Wyman 1946, Brownell 1999). Evidence exists that a small number of unique feral horses existed in the rugged areas of the Pryors since the late 1800's and were never removed (Brownell 1999). By 1968 they numbered around 200 (BLM 1984).

Preserved records of the Pryors by the BLM (2004) show domestic livestock use, including cattle, sheep, horses, and goats was:

- 6,866 animal units between 1907 and 1920
- 5,270 animal units from 1920 to 1930
- 2,534 animal units from 1930 to 1940
- 2,286 animal units from 1940 to 1950
- today the number is 2,532 animal units

According to these records, domestic horses were not part of the grazing use record from 1930 up to the 1940's when seven permittees ran 40 horses. This period coincides with the feral horse roundup efforts in the 1930's.

In 2003, this remote, very rugged, and extremely complex range area supported 161 feral horses and about 100 bighorn sheep year around, and approximately 350 mule deer from November 1 to April 1 (Coates-Markle 2003, Schoenecker 2004, Stewart 2004, Hyde 2004).

Over the past half century, conditions of the PMWHR have been described as very poor to fair (Firebaugh 1969, Gordon and Coop 1973, Hall 1973, BLM 1984, BLM 1992, BLM 1998). High soil erosion potential has also been described (Cleary and MacIntyre 1973, BLM and SCS 1981). Due to the widespread concern about the ability of the PMWHR to support wild ungulate populations the BLM, as the lead management agency responsible for the PMWHR, and the USFS asked the United States Department of Agriculture Natural Resources Conservation Service (NRCS) to complete a comprehensive inventory and assessment of the health of the PMWHR. This inventory and assessment was the most detailed survey of any national wild horse range done to date. The field survey was initiated in May of 2002 and completed in September of 2003.

Big Horn Canyon National Recreation Area

Entering the Pryor Mountain Wild Horse Range on the Burnt Timber inventory unit.

STUDY AREA

The Pryor Mountain Wild Horse Range (PMWHR) is located approximately 47 miles south of Billings, Montana and nine miles north of Lovell, Wyoming. It occupies an area of about 39,651 acres in northern Big Horn County Wyoming and Southeastern Carbon County, Montana (Figure 1, page 46). The land is managed by the Bureau of Land Management (BLM), the lead agency responsible for management of the feral horses, National Park Service (NPS), and the United States Forest Service (USFS).

The PMWHR is an extremely diverse and complex area topographically, geologically, and ecologically. It varies in environment and elevation from a sagebrush / salt-shrub dominated cold desert at about 3,850 feet in Wyoming, to a subalpine setting with subalpine fir (*Abies lasiocarpa*) and open meadows in Montana at about 8,750 feet.

Mean annual precipitation (MAP) varies from six inches in Wyoming to 27 inches at the highest point on the PMWHR in Montana (Figure 2, page 47). This difference occurs over a 13-mile span. Much of this precipitation falls April through June, with rain in the summer and snow in the winter. Temperatures vary between about 104 degrees F in the summer to about -30 degrees F in the winter (NRCS National Water and Climate Center 2002, Western Regional Climate Center 2002).

Three Floristic provinces meet in this area, the Great Plains province to the north and east of the PMWHR, the Great Basin province to the south, and the Rocky Mountain province to the west (Cronquist 1982). Each of these provinces possesses a unique climate and resulting floristic character. At Horseshoe Bend, the southern end of Bighorn Lake and just off of the PMWHR, the elevation is 3600 feet and the MAP is 5.5 inches. Traveling 27 miles northeast to Yellowtail dam, the elevation is 300 feet lower yet the MAP is 13.5 inches greater (19 inches MAP) (Historical Montana precipitation data 1961-1990). Within this relatively short distance, the vegetation has changed from the Great Basin Floristic province (salt desert shrubs) to the Great Plains Floristic province (mid and short grass prairies) in dramatic fashion.

In the Pryor Mountains an intermixture of limestone, sandstone, and shale have weathered to form mostly very shallow (<10 inches) to moderately deep (20-40 inches), loamy soils that are calcareous. Most of the soils contain 35 to 70 percent coarse fragments. Rock outcrops comprise up to 35 percent of the landscapes in the mountains (BLM and SCS 1981). The white Madison limestone formation (Alt 1986) is a characteristic geologic formation.

The soils on footslopes, fans, and terraces along the south side of the Pryor Mountains are forming in an amalgamated mixture of alluvium from limestone, sandstone, and shale. These soils are mainly deep (>40 inches), have high coarse fragments, and are highly calcareous (BLM and SCS 1981).

Just south of the Madison limestone geologic formations and beyond the fans, footslopes, and terraces influenced by them, and from east to west along the state line, the geologic formations are mainly late Paleozoic and Mesozoic (BLM and SCS 1981, Alt 1986). The red Chugwater formation (Alt 1986) is a characteristic geologic formation. The materials in this area are mostly interbedded sandstones, siltstones, and shale. The uplifting, tilting, and erosional processes have

given rise to highly dissected landscapes with numerous narrow intermittent drains. The uplifted backsides of these formations have resulted in the formation of a complex of mainly very shallow to moderately deep, loamy, clayey, and sandy soils that contain from five to 80 percent coarse fragments. Five to 25 percent of these areas consist of rock outcrop or geologic sediments (BLM and SCS 1981). This area contains many fossilized remains.

The uplifted surfaces of the formations have eight to 25 percent slopes. The soils on these surfaces are very shallow to moderately deep. They are clayey, loamy, or sandy depending on the dominant influence of sandstone, siltstone, or shale. The soils on the footslopes, fans, and in the drainage bottoms are mostly deep and loamy. These soils have a high vegetative production potential. To varying degrees they are salt and alkali affected (BLM and SCS 1981).

Soils in the study area have a high hazard for both wind and water erosion. Weather records show that wind gusts up to 70 miles per hour are not uncommon (Montana Climate Information 2002, Western Regional Climate Center 2002). Soils that are sparsely vegetated and only slightly disturbed are subject to a high blowing hazard. Soils high in calcium carbonate (lime) are especially vulnerable to soil blowing (BLM and SCS 1981). Lime contributes to the flocculation of soil particles. This encourages particle detachment from the soil mass allowing particles to become airborne.

During the two summers of the field study, we witnessed four events at the lower elevations during which red, white, or tan dust clouds moved across the area on windy days.

The hazard of water erosion on the PMWHR is high even though the mean annual precipitation is low in the southern and eastern areas of the range (Figure 2, page 47). Most of the precipitation falls from April through June with a high probability of intense rain storms (greater than or equal to two inches of rain per hour) during this period (Montana Climate Information 2002). At this time the very shallow (<10 inches) and shallow (10-20 inches), sparsely vegetated soils with slopes greater than eight percent are subject to a very high hazard of water erosion. The reason these soils are especially vulnerable to water erosion is because they have the capacity to hold less than 0.5 inch to a maximum of four inches of water (BLM and SCS 1981). In many years, these soils reach a maximum of water they can store early in April, resulting in a high runoff potential with additional precipitation, thus creating the high water erosion hazard. Other soils on slopes greater than about 25 percent are also subject to a high water erosion hazard if the vegetative cover is inadequate.

During our field survey a severe rain event occurred in June of 2002. This event filled the drainages with water, piled sediment up to three feet deep across the Sykes fish hatchery road, and created visible rill erosion throughout the desert landscape. Prior to this event, rills were not visible.

Chugwater formation in the Britton Springs inventory unit with rills and erosion flow patterns.

Wind erosion in the National Park inventory unit.

METHODS

Objectives

The objective of the PMWHR assessment is to provide the BLM, USFS, and NPS with a detailed comprehensive inventory of rangeland condition, trend, and health in order to assess the overall health of the PMWHR soil and vegetative resources. In addition, NRCS is to provide a management recommendation as to the range in number of feral horses the PMWHR could support without causing deterioration to their habitat.

Summary of Methods

This inventory was conducted using NRCS methodology for performing Production and Species Composition, Similarity Index, Rangeland Health, and Apparent Ecological Trend, in accordance with the NRCS National Range and Pasture Handbook, 1997.

Ecological sites were identified and mapped in 1981 and provided the baseline for the inventory (BLM and SCS 1981). A copy of this inventory is on file at the Billings BLM field office. Thirteen new Ecological Site descriptions were developed to adequately address the complex and unique ecological nature of the area (Appendix A, page 77). Exclosures on the PMWHR and areas excluded from grazing near the PMWHR, such as Horseshoe Bend, were evaluated to provide a basis for the Historic Climax Plant Communities (HCPCs) described in the ecological site descriptions (Figure 3, page 48; Appendices B-E, page 79-85; and Appendix L, page 98). Horseshoe Bend is estimated to have been excluded from significant horse and cattle grazing since approximately 1967 (Padden 2002 personal communication).

On average, three transects were installed per section to evaluate similarity index, apparent ecological trend, species composition by weight, noxious weed cover, biologic crust cover, plant community type, and available forage production (Figure 4, page 49). Each transect location was identified with universal transverse mercator coordinates using a global positioning system unit (GPS). A visual appraisal of soil erosion was done at each transect and recorded if erosion was readily apparent. In addition, one rangeland health assessment was done per section at one of the transect locations. This included measuring a 100-point basal and canopy cover transect.

Transect locations within an inventory unit were generally selected based on the percent composition of a particular ecological site within the site complex itself, and the section as a whole. Once the general location was determined, the transect was placed in a stratified random fashion making sure it remained on one ecological site. Generally, ten 9.6 sq. ft. or ten 4.8 sq. ft. circular frames were placed at either 10-foot or 20-foot intervals along a 100-foot or 200-foot tape. A soil pit was also dug at most transect locations to verify the ecological site.

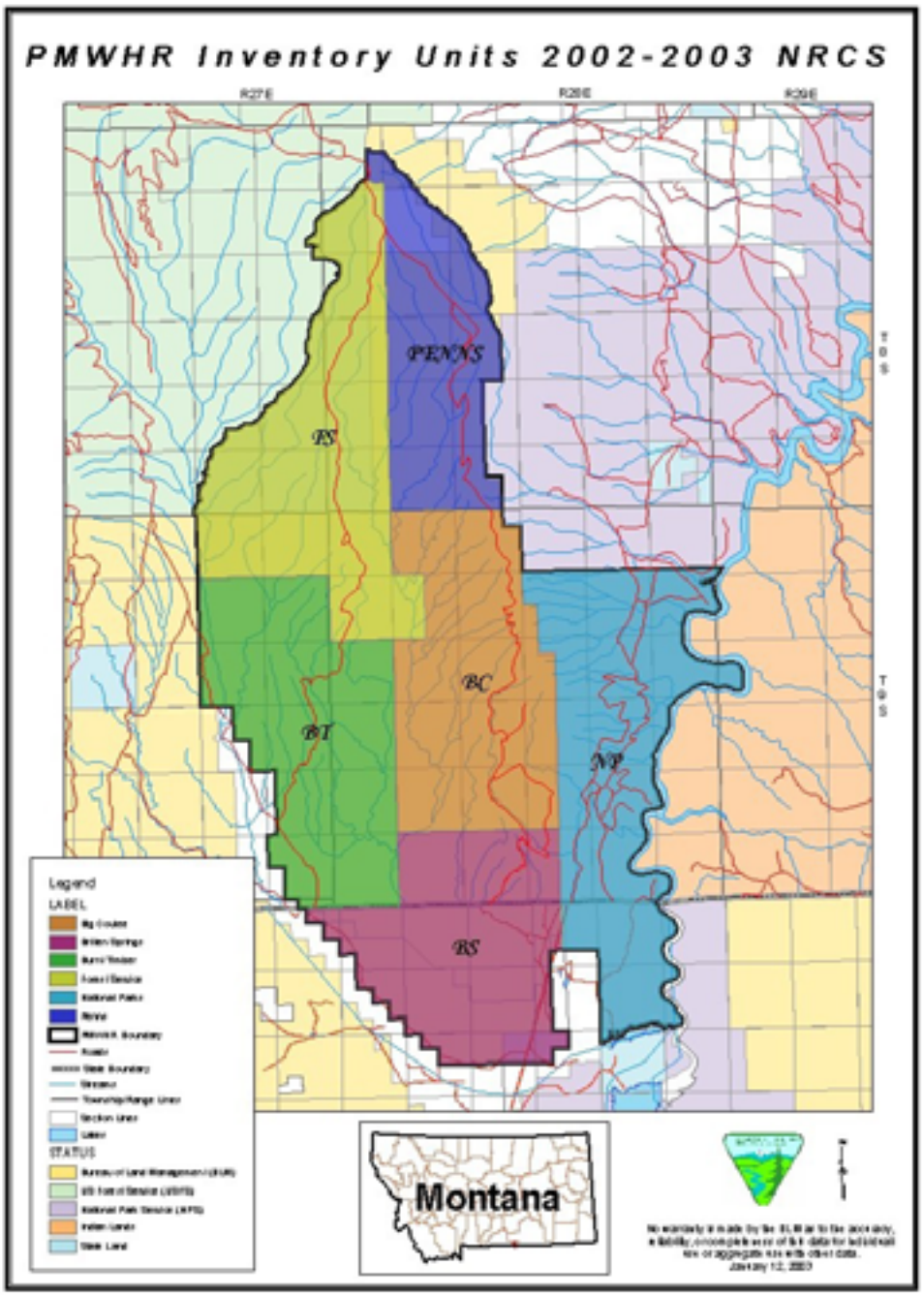
A detailed description of the inventory procedures is described in the "Summary of Rangeland Inventory Procedures" (Appendix M, page 99). For curl-leaf mountain mahogany (*Cercocarpus ledifolius*) and Utah juniper (*Juniperus osteosperma*) we did not clip current year's growth, but rather used indirect measurements utilizing the NRCS zigzag transect methodology (Ricketts 1992 unpublished data, NRCS National Range and Pasture Handbook 1997).

The inventory data was recorded on topographical maps and entered into a geographical information system (GIS) format.

The large ungulate populations were inventoried for numbers, along with an evaluation of forage requirements and potential dietary overlap.

Inventory Units

The PMWHR was divided into six inventory units (Figure 1, page 46) for survey management purposes. The units are Forest Service (FS), Penn's Cabin (Penn's), Burnt Timber (BT), Big Coulee (BC), National Park (NP), and Britton Springs (BS). The inventory units were not necessarily divided according to administrative ownership, but rather according to road accessibility, similar topography, and unit size. The remainder of this report will refer to these inventory units.



Looking north across the Burnt Timber inventory unit.

Penn's cabin.

Looking north across the sub alpine meadows at the north end of the Penn's Cabin inventory unit.

Looking across the Big Coulee to the forested south end of the Penn's Cabin inventory unit.

Looking from the road to Britton Springs at the Big Coulee inventory unit below Sykes ridge.

Ecological Sites

An ecological site is a distinct kind of land that differs from other ecological sites in its ability to produce a certain kind and amount of vegetation. There are four major factors that differentiate an ecological site: topography/geology, climate, soils, and vegetation.

The topographical / geological area is described using rangeland resource units (RRUs). The PMWHR can be divided into two RRUs, as described in the Montana Field Office Technical Guide (NRCS 1993). They are the desertic basins and the Northern Rocky Mountains, south.

The desertic basins are areas typically receiving less than 10 inches of MAP and producing predominantly a sagebrush / salt-shrub plant community, and are interior to the mountains at relatively high altitudes. In Montana, this RRU occurs only in southern Carbon County, south of the towns of Bridger and Belfry near the Wyoming state line. This is the only area where Utah juniper exists in Montana, and is the northern most extent (McCarthy 1996). The desertic basins RRU occupies the lower sixth of the BT unit, most of the BS unit except for one and one half sections in the northeast corner, and about a section in the southwest corner of the NP unit. The remainder of the PMWHR is a part of the Northern Rocky Mountains, south RRU.

The Northern Rocky Mountains, south RRU are areas where the soils are associated with the mountain geology and have formed in place. In general, slopes tend to be 20 percent or greater and MAP is 15 inches or more. On the PMWHR, the Madison limestone formation generally marks the beginning of this RRU and the MAP begins between nine to 10 inches, with one exception being the south end of the NP unit where MAP is slightly less. The “south” designation denotes a region of the Northern Rocky Mountains in Montana that produces a different historical climax plant community (HCPC) than other Northern Rocky Mountain regions in Montana. In the “south”, spike fescue (*Leucopoa kingii*) becomes a dominant grass in

the 15 inches+ MAP HCPC, while rough fescue (*Festuca scabrella*) is not a component of the HCPC.

Climate integrates a number of factors such as MAP, temperature, growing season, and Chinook frequency. Except for MAP, these factors are integrated into the RRUs. The MAP varies across the PMWHR. Utilizing information from BLM and USFS remote access weather stations (RAWS) located at Britton Springs (4,100 feet, 58N 95W Sec.19 NW), Pryor mountain (6,186 feet, 6S 26E Sec.3 NE), south Bridger (4,725 feet, 7S 24E Sec.20 SW), and a NPS weather station located at the Sorenson ranch, a mean annual precipitation (MAP) map was developed for the PMWHR (Figure 2, page 47).

The soil name of each ecological site is characterized in Appendix A. For example, a complete ecological site name would be "very-shallow-limy, Northern Rocky Mountains, South 10-14 inches MAP". Described is the soil, RRU, and climate (MAP). In this study we used the MAP map which correlated to elevation to indicate what the MAP was at each transect location. The MAP was then used to adjust the HCPC production for that site.

In summary, vegetation kind and amount is a product of its environment. This is the reason a "very-shallow-limy" soil in Arizona does not produce the same kind and amount of vegetation as a "very-shallow-limy" soil in Montana. Different topography / geology and a different climate mean different vegetation, even on a similar soil.

List of Transects

A list of transects sampled for each inventory unit is located in Appendices F through K. The tables provide information for each transect including:

- ecological site name
- mean annual precipitation (MAP)
- soil map unit
- dominant plant community
- total annual production in dry weight pounds per acre
- annual forage production in dry weight pounds per acre
- initial stocking rate in animal unit months/acre (AUMs)
- similarity index rating
- apparent ecological trend
- vegetation and litter basal cover percent
- coarse fragment and bare ground percent

Similarity Index

Similarity index is a rating comparing the present plant species composition by weight to that of the historic climax plant community (HCPC), and is synonymous with range condition. The higher the similarity index rating, the closer the plant community is to the historic or reference plant community. Similarity index is a quantitative and repeatable measurement. In many ways it is a quantifiable index of health relative to the potential native plant community.

Ecological Trend

Ecological trend is defined as the direction of change in an existing plant community relative to the historic climax plant community. Data collected for this inventory is apparent trend, that is a point in time determination of the direction of change either towards (upward) or away (downward) from the historic community. If no change is detectable, the rating 'not apparent' is given.

Rangeland Health

The purpose of determining rangeland health is to provide information on the functioning of the ecological processes and the stability of the site. This information can then be used to better understand the integrity of the site and its potential to respond to treatment or management.

Rangeland health data was collected for one transect per section, and results are divided into three categories:

A. Factors which mostly influence soils and site stability: rills, pedestalling, gullies, wind erosion, and soil surface

B. Factors which influence the watershed and hydrologic cycle: water flow patterns, bare ground, infiltration and runoff, litter distribution, and litter amount

C. Factors which influence plant community integrity: cryptobiotic crusts, plant mortality, plant functional groups, plant stress, production, invasive plants, and recruitment and reproduction

The ecological site description for each ecological site provides the basis of comparison for rangeland health ratings (refer to BLM and SCS 1981 and Appendices B-E. pages 79-85). All seventeen attributes were rated using a numerical score one through five, with one being the lowest condition and five being the highest condition. A copy of the rangeland health indicator evaluation matrix appears in Appendix N (page 105).

Worksheet scores of four to five are considered healthy, with attributes closely resembling those of the historic climax plant community. Scores of 2.6 to 3.9 are considered at risk for site deterioration, and may be vulnerable to additional disturbances, such as strong climatic events, or excessive grazing pressure. Scores of 2.5 or less are unhealthy, and reflect attributes within the plant community which may not be able to recover from degradation without energy input, such as mechanical alteration.

Forage Value Rating

Forage value rating is a classification indicating the grazing value of important plant species for specific types of livestock or wildlife (Appendices O and P). The classification is based on the preference of the animal for a plant species, in relation to other available plants, and the relative abundance of the plant. Five forage categories are recognized:

A. Preferred: plants which are highly palatable and sought out by animals

B. Desirable: plants which are useful forage, but not highly preferred

C. Undesirable: plants which are basically unpalatable and rarely consumed

D. Nonconsumed: plants which are never consumed

E. Toxic: plants which are poisonous to animals if ingested

Initial Stocking Rates

The best method to determine whether or not current stocking rates are appropriate and are meeting resource objectives is by measured trend of the resource condition. In units where resource concerns are identified, an analysis of overall carrying capacity and animal requirements should be made to determine if livestock forage demand is balanced with available forage. On the PMWHR we evaluated total forage demand by feral horses, dietary overlap with Bighorn sheep and mule deer, forage availability, and forage grazability. Grazability is the percentage of usable forage in an area allocated for use in order to maintain plant health. It is a relative term considering animals' grazing preference of areas including variables such as distance from water, ecological sites, slope steepness, aspect, and species preference.

Total forage availability can be used to determine an initial stocking rate value, per ecological site by using the following equation:

$$\frac{\text{Total Available Forage (pounds per acre) X 30\% Harvest Efficiency for Preferred and Desirables and 10\% Harvest Efficiency for Undesirables}}{\text{793 air-dry pounds forage per Animal Unit Month (AUM)}} = \text{AUMs/Acre}$$

Example: Silty Range Site with 287 air-dry lbs/acre of preferred forage and 20 air-dry lbs/acre of undesirable forage (HE=Harvest Efficiency)

$$\frac{287 \text{ lbs/acre} \times 30\% \text{ HE}) + (20 \text{ lbs/acre} \times 10\% \text{ HE})}{793 \text{ lbs/AUM}} = .111 \text{ AUMs/Acre}$$

When using pounds of forage production to determine initial stocking rates, a range of numbers should be considered based on annual climatic fluctuations. It is best to look at a range from 20 percent below average precipitation to 20 percent above average precipitation. For example, 287 lbs/acre should be looked at as a range from 230 to 350 lbs/acre.

To determine a total carrying capacity for a unit, it must first be determined how livestock are grazing the unit, and if there are any areas which are not accessible due to distance from drinking water or steep slopes. These areas must be assigned a lower initial stocking rate if animals are not actually using them. Different ecological sites within a unit will have different productivity, and must be taken into account also. On the PMWHR we have mapped ecological sites, and modeled distance from water and slope steepness in order to make adjustments to available forage.

Feral Horse, Bighorn Sheep, and Mule Deer Inventory

The number and demographics of feral horses were obtained directly from the BLM. A literature search was conducted to evaluate the nutritional requirements of the horses. The numbers and nutritional requirements of bighorn sheep and mule deer were obtained from the United States

Geological Survey – Biological Research Division (USGS-BRD); Montana Fish, Wildlife, and Parks Department; and the Wyoming Game and Fish Department.

The potential for forage competition between feral horses, bighorn sheep, and mule deer was evaluated using studies by Kissell and others (1996) and the USGS-BRD (2004).

Sykes Ridge looking across the Bighorn Canyon to the Bighorn Mountains.

RESULTS AND DISCUSSION

Forage Requirements

As of 2003, 161 feral horses occupy the PMWHR (Coates-Markle 2003). The herd demographics from 1971 through 2003 are shown in Appendix Q (page 131). Presently, there are 22 foals, 22 lactating mares, 32 non-lactating mares, 28 two to three year olds, and 57 stallions (Figure 5, page 50). Based on a review of the literature and personal communications, Table 1 (page 40) was developed to calculate the amount of forage necessary to sustain the 161 horses on the PMWHR (Demment 1979, NRC 1989, Lawrence 1996, Gagnon 2003, Coates-Markle 2003, Holechek et al 2004). Based on these assumptions, 1,189 animal unit months (AUMs) of forage is required to sustain these horses on a twelve-month basis.

Dietary Overlap

The dietary overlap was evaluated by Kissel and others (1996) between feral horses, bighorn sheep, and mule deer. As shown in Table 2 (page 40), it appears there is little overlap between feral horses and mule deer, except potentially during the summer for grass. Mule deer surveys conducted by Montana Fish, Wildlife, and Parks (Stewart 2004 and Pack 2004) indicate that most of the 350 mule deer that occupy the PMWHR during the winter months leave the PMWHR before summer, so competition for forage is not a concern.

The dietary overlap between feral horses and bighorn sheep has the greatest potential in spring and summer for grasses, and potentially in the fall for shrubs. However, a recently completed study, unpublished by the USGS-BRD (Schoenecker 2004), indicated that the approximately 100 bighorn sheep occupying the PMWHR do not range in areas frequented by horses.

Dietary overlap between bighorn sheep and mule deer for grass is greatest in the summer, and for shrubs from summer through winter.

Due to the apparent minimal competition for forage and space between feral horses and bighorn sheep / mule deer, forage requirements and carrying capacity models were developed only for feral horses. Further consideration may be necessary in order to support a larger bighorn sheep population.

Stallions sparring.

Proper Forage Utilization

The conventional wisdom has been that at 50 percent or less use of the current year's growth of a preferred forage plant, plant productivity can be maintained (Crider 1955). Holechek and others (1999) conducted a thorough review of the literature and found that 35-45 percent use may be more appropriate in order to maintain preferred forage plants in desert and semi-desert environments.

Preferred plants are ones that generally are more nutritious and more productive (Ricketts 1994, Ricketts 2002, Holechek et al. 2004). Briske and Richards (1994) noted that some preferred species develop grazing tolerant morphological characteristics. It appears that bluebunch wheatgrass (*Pseudoroegneria spicata*), a dominant preferred species on the PMWHR, has developed a lower growth form on the PMWHR in response to heavy use. Research has consistently demonstrated that on most rangelands, if range improvement is to take place, no more than 30-35 percent use is needed and 40-45 percent use is needed for maintenance of rangeland vegetation (Holechek et al. 1999).

Based on this information, we used harvest efficiencies of 30 percent for preferred and desirable species, and 10 percent for undesirable species when calculating initial stocking rates (the harvest efficiency is the planned actual amount of forage ingested by the animal).

Severely grazed and pedestalled Indian ricegrass.

Plant Communities

The PMWHR was divided into 30 different dominant plant communities (Table 3, page 41). These communities are organized in the table from driest to wettest environments. The spatial distribution of these communities is displayed for each inventory unit in Figure 6 (page 51). The mean annual precipitation (MAP) for the PMWHR can be found in Figure 2 (page 47). Subalpine fir shows up around 25 inches MAP and the solid timberline for Douglas fir (*Pseudotsuga menziesii*) appears to be around 20 inches MAP. Douglas fir first appears at as low as 14-15 inches MAP in the deep coulees, especially on north aspects.

A plant list for the PMWHR by common and scientific names, along with the feral horse grazing preferences and ecological response for each species is shown in Appendices O and P.

The Forest Service and Penn's Cabin units are dominated by bluebunch wheatgrass / sage and Douglas fir / forb and mountain snowberry (*Symphoricarpos oreophilus*) communities, transitioning into subalpine fir / forb and Idaho fescue (*Festuca idahoensis*) / forb communities to the north. The Burnt Timber unit is dominated by Utah juniper / bluebunch wheatgrass and bluebunch wheatgrass / sage communities, while the Big Coulee unit is dominated by Utah juniper / black sage (*Artemisia nova*) / bluebunch wheatgrass, Douglas fir / spike fescue, and bluebunch wheatgrass / sage communities. The Britton Springs unit is dominated by a Wyoming big sage (*Artemisia tridentata ssp. wyomingensis*) / shortstem buckwheat (*Eriogonum brevicaule*) community, with the administrative pasture being dominated by a Wyoming big sage / rubber rabbitbrush (*Ericameria nauseosa*) community. The National Park unit is dominated by a Utah juniper / curl-leaf mountain mahogany / low forb / needle and thread (*Hesperostipa comata*) community.

Forest Service inventory unit; transect location number 1.

Border between the Forest Service and Penn's Cabin inventory units.

Penn's Cabin inventory unit; transect location number 1.


Penn's Cabin inventory unit; transect location number 1.

Ecological Sites

The ecological sites served as the basis for the inventory (NRCS 1997). Each inventory unit's ecological sites are displayed in Figures 7-13 (pages 52-58). The legend for ecological site symbols can be found in Appendix A (page 77).

The ecological site descriptions contain the information describing the historic climax plant community (HCPC) or 'potential' for each ecological site. These descriptions can be found in

Appendices B through E (page 79-85). Figure 3 (page 48) indicates the locations and construction year of exclosures that helped in describing the potential for each ecological site. Appendix L (page 98) provides transect data for selected exclosures and reference areas.

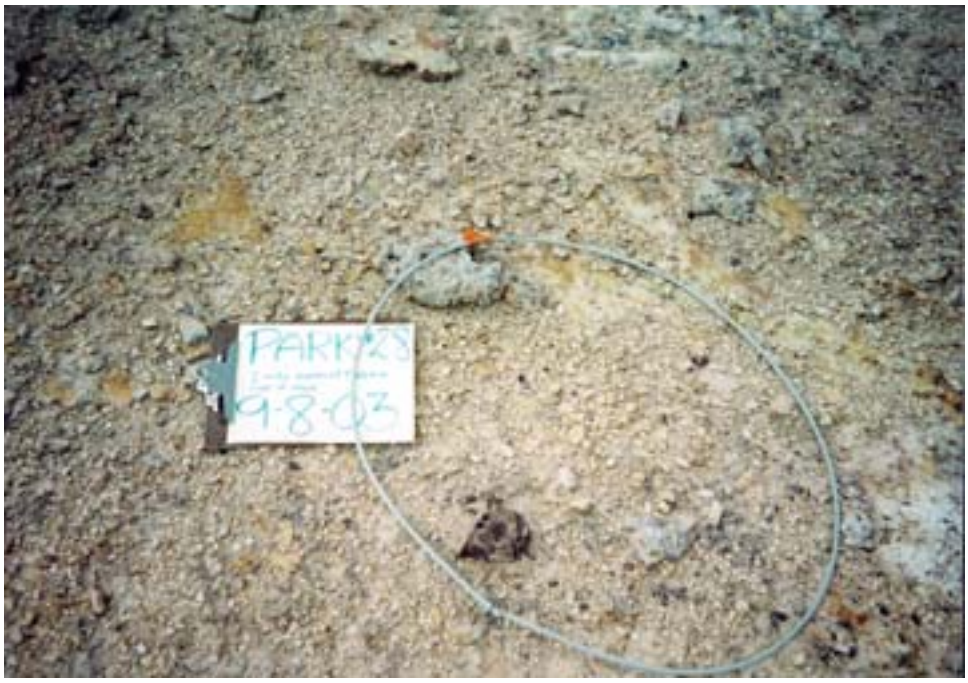
Similarity Index

The similarity index (S.I.) is the amount and type of vegetation presently on an ecological site relative to the HCPC for that site (NRCS 1997). It is expressed as a percentage between one and 100 percent, with 100 percent being the HCPC.

The S.I. provides a quantitative measure of health in terms of species diversity and productivity. It gives a relative idea of where the ecological sites plant community is ecologically, and where it could potentially go.

Presently the various inventory units overall S.I.s could be characterized as follows: Britton Springs 21 percent; National Park 44 percent; Big Coulee 29 percent; Burnt Timber 27 percent; Forest Service 45 percent; and Penn's Cabin 18 percent. A detailed spatial depiction of the S.I.s can be found in Figure 14 (page 59).

Notice that the lowest S.I.s are in the units with available perennial water (lowest and highest elevations). The exception to this is the National Park unit where the dominant plant community is Utah juniper. These ecological sites on which juniper and mahogany dominate have been termed "shrub" sites. They have a large amount of shrubs in the HCPC. Since these plants are only used lightly, their productivity remains more similar to the potential, hence a higher similarity to potential. Also notice the higher S.I.s in the lower Britton Springs administrative pasture verses adjacent areas within the PMWHR (30 percent vs. 15 percent).



National Park inventory unit; transect location number 28.

National Park inventory unit; transect location number 28.

Apparent Trend

Presently, the trend is down overall (Figure 15, page 60). This contrasts with current habitat objectives for the range. The trend transect data is summarized in Table 4 (page 42). The transect locations are shown on Figure 4 (page 49). Generally, the inventory units with the lowest mean annual precipitation (MAP) have the greatest percentage of downward trend. This relates to the ability of a preferred plant to maintain itself under heavy grazing pressure (Briske 1991, Briske and Richards 1994, Briske and Richards 1995, Briske 1996, Holechek et al. 1999). In the six- to nine-inch MAP zone, no more than 35 percent utilization of an individual forage plant may be appropriate to maintain that plant. In the 10- to 14-inch MAP zone it may be 40 percent, 15- to 19-inch zone 45 percent, and in the 20-inch+ zone 50 percent utilization may be appropriate.

Severe soil erosion was noted in all of the six inventory units with the percentage of transects in the unit noting it as follows: Britton Springs, 92 percent; Big Coulee, 74 percent; Burnt Timber, 59 percent; Forest Service, 55 percent; National Park, 31 percent; and Penn's Cabin, 29 percent. Plant pedestalling was most severe in the driest environments with an average of three-inch plant pedestals across the Britton Springs unit. Pedestals as high as two feet were documented in the Britton Springs and National Park units on Wyoming big sage and pricklypear cactus (*Opuntia polyacantha*) plants. It is estimated that pedestals as high as two feet occurred on 20 percent of the Britton Springs and National Park Units.

Severe soil erosion with over 2.5 feet of soil loss in the National Park inventory unit.

Plant pedestalling in the National Park inventory unit.

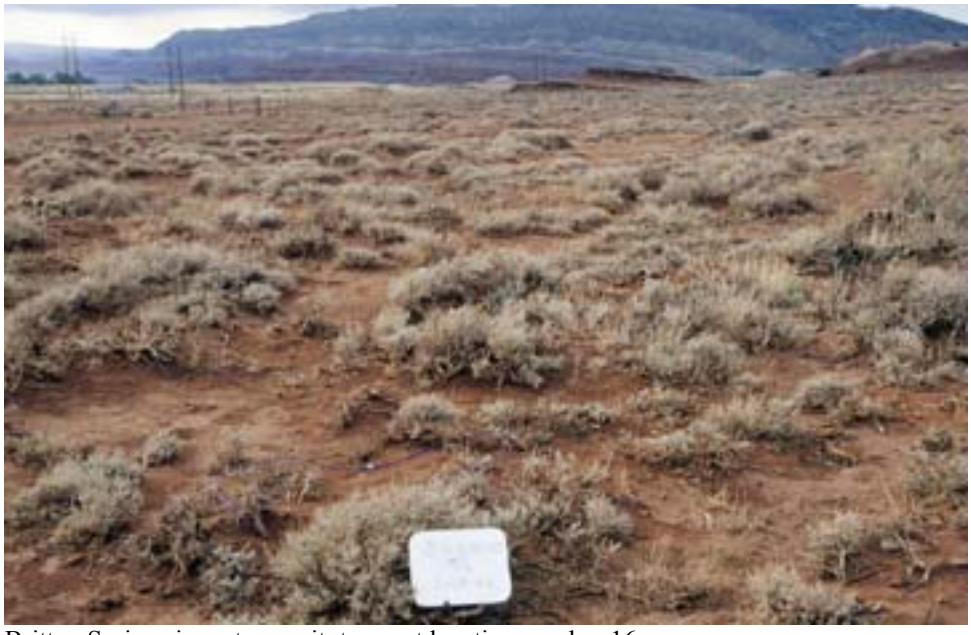
Big Coulee inventory unit; transect location number 24.

Erosion pavement in the Big Coulee inventory unit.

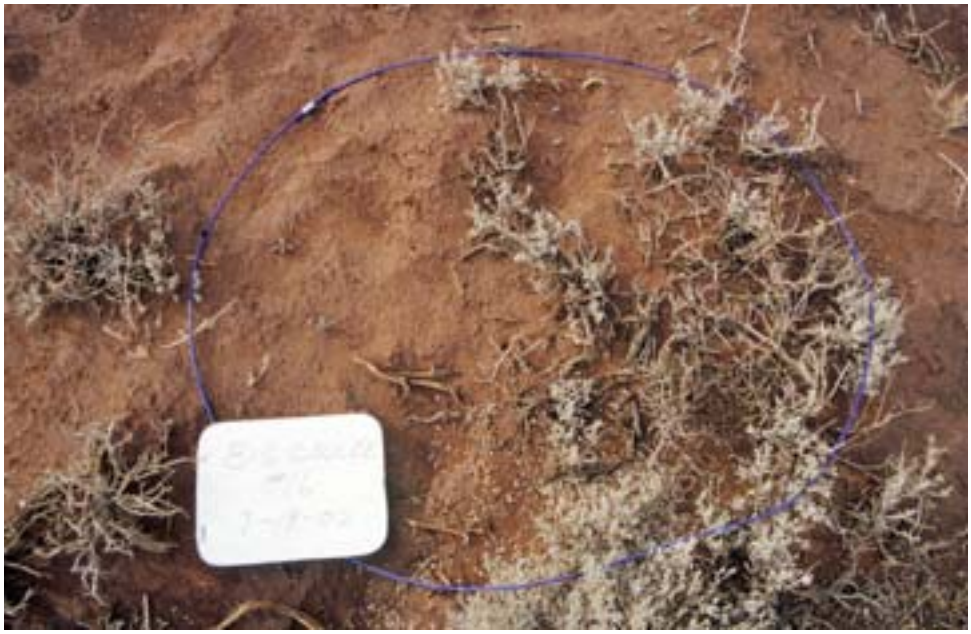
Erosion pavements are formed when the fine soil particles near the soil surface are either blown or washed away, leaving behind the heavier gravels, cobbles, and stones on the surface. These areas often look as though they are very cobbly and bouldery with little soil. However, as you dig into the soil profile the rocks are discovered to be mostly superficial. Every inventory unit noted erosion pavements. Burnt Timber and Big Coulee had the greatest amount of erosion pavements.

Gully erosion was noted in the Burnt Timber and Penn's Cabin units.

The percent bare soil cover was very high across the PMWHR ranging from an average of 56 percent in the Britton Springs unit to 25 percent in the Forest Service and Penn's Cabin units. If rocks are added in, the percentage cover varies from 84 percent in the Britton Springs unit (driest unit with the least forage and nearly the lowest S.I.) to 35 percent in the Forest Service unit (about the wettest unit with the most forage and the highest S.I.). If the relative proportion of rock to bare soil increases in the future, this may be a further indication of declining range trend.



Britton Springs inventory unit; transect location number 16.



Britton Springs inventory unit; transect location number 16.

Britton Springs inventory unit; transect location number 16.

Biological crusts, made up of lichens and mosses, tended to be non-existent in areas that had heavier grazing and finer textured, deeper soils. These are also the areas with more erosion taking place. Figure 16 (page 61) depicts the coverage of biological crusts across the PMWHR.

The turkey flats exclosure illustrates the downward range trend. The S.I. was 52 percent inside and 20 percent outside, the initial recommended stocking rate was 3.5 times higher inside than out, and the total production was almost double inside versus out. There was 59 percent bare soil outside (50 percent inside) with six-inch plant pedestalling, and only one percent basal cover of grass compared to seven percent inside. This is an example of the recuperative capacity of the range when grazing relief is provided over time.

Rangeland Health

On a scale of one to five, with one being an extreme departure from the health of the HCPC and five being a departure of none to slight, the following is the average rangeland health ratings for the PMWHR (Figures 17-19, pages 62-63):

- Penn's Cabin 3.75 – slight to moderate
- Forest Service 3.25 – moderate
- Burnt Timber 2.5 – moderate
- Big Coulee 3 – moderate
- Britton Springs 2 – moderate to extreme
- National Park 2.25 – moderate to extreme

Worksheet scores of four to five are considered healthy, with attributes closely resembling those of the historic climax plant community. Scores of 2.6 to 3.9 are considered at risk for site deterioration, and may be vulnerable to additional disturbances, such as strong climatic events, or

excessive grazing pressure. Scores of 2.5 or less are unhealthy and reflect attributes within the plant community which may not be able to recover from degradation without energy input, such as mechanical alteration.

Half of the PMWHR is at risk for site deterioration and half is unhealthy. The average rangeland health rating for the PMWHR is 2.75. The Britton Springs, lower Burnt Timber, and the north and south ends of the National Park units have crossed a threshold they may not be able to recover from due to cumulative historical grazing impacts.

Burnt Timber inventory unit; transect number 6.


Burnt Timber inventory unit; transect number 6.

Pedestalled forb in the Burnt Timber inventory unit.

Noxious Weeds

Halogeton (*Halogeton glomeratus*), spotted knapweed (*Centaurea biebersteinii*), saltcedar (*Tamarix ramosissima*), and malcolmia (*Malcolmia africana*) were the noxious weeds identified on the PMWHR (Figure 20, page 64). Halogeton, an annual weed that is poisonous to domestic sheep, was the most pervasive weed on the PMWHR covering most of the Britton Springs unit (3926 acres with the cover class ranging from less than one percent to 25-100 percent). The southern end of the Burnt Timber unit also has considerable halogeton. It was spotty elsewhere, however it appeared not to exist at locations above about 13 inches MAP.

Spotted knapweed locations were spotty and usually next to the Burnt Timber Ridge road. Saltcedar was located at one spot just east of the Britton Springs administrative corrals.

Malcolmia, an introduced African annual weed common to the Great Basin region, was located along the Burnt Timber Ridge road and the Sykes Ridge road in the Big Coulee inventory unit.

This noxious weed inventory was not meant to be comprehensive. Other locations of these and other noxious weeds may exist. Russian knapweed (*Acroptilon repens*) exists just south of the PMWHR and may exist on the PMWHR, but was not detected in this study.

National Park inventory unit; transect location number 10.

Halogeton is a non-native invasive annual weed.

Feral Horse Carrying Capacity

Historical Studies

Various studies of the carrying capacity of the PMWHR have been conducted over the years. These include a very broad range condition analysis done in about 1966, "Herd Management Area Plan" utilizing range condition class observations (USDI 1984 and 1992), various trend and

utilization analysis (Voss and Hanify 1990, BLM 1998, Gerhardt and Detling 1998, Fahnestock and Detling 1999, Gerhardt and Detling 2000), and a study by Coughenour (2000). Coughenour discussed the idea of "ecological carrying capacity" which he identified as the maximum numbers of feral horses the PMWHR could support, but not necessarily without impact to the habitat. He also discussed the idea of "economic carrying capacity" (maximum sustained yield) which is 50-60 percent of ecological carrying capacity.

The 1984 BLM study (HMAP) indicated a total of 2,154 animal unit months (AUMs) of forage on the PMWHR, with 1,823 AUMs being usable. At the time, a 1.25 animal unit factor was used for each feral horse. Taking 1,823 AUMs divided by 12 months gives 151 animal units (AUs). Dividing 151 AUs by 1.25 AUs per feral horse, 121 feral horses could be supported on the PMWHR without habitat deterioration.

Animal Unit Months of Forage at a 100 Percent Grazability
If the PMWHR could be grazed at 100 percent efficiently with regard to terrain and distance to water, then the AUMs outlined in Table 5 (page 43) would be appropriate.

One hundred percent grazability applies when no overgrazing of an area occurs because an animal is willing to access steeper slopes or walk a further distance from water to get a fresh bite.

Notice that nearly half of the total forage is in the Forest Service unit. The AUMs/AC. column of Table 5 (page 43), which represents the concentration of feed, shows the Forest Service unit as having nearly twice the concentration of feed as in the Penn's Cabin unit. The concentration of feed in the Penn's Cabin unit is nearly twice that of the other units. However, the Penn's Cabin unit has nearly three times the concentration of feed as the Britton Springs unit.

The stocking rate for the Forest Service unit is .066 AUMs/acre. Although this is higher than the other units, .066 AUMs/AC. is still not a large number for a stocking rate. This is especially true when you consider it equates to 15 acres necessary to feed one 1,000-pound cow (one animal unit) for one month, or about 10 acres for a PMWHR lactating mare (.69 of an animal unit). The typical concentration of feed on the prairies of Eastern Montana would be around .22 AUMs/acre, or 4.5 acres per animal unit, or about three acres per PMWHR lactating mare per month.

Grazability Models
The present AUMs on the PMWHR, if it could be grazed at 100 percent efficiency, would be 1,132 (Table 5, page 43) plus or minus 20 percent for sampling error (Figure 21, page 65). This is nearly the AUMs needed to support the 161 horses on the PMWHR as of 2003 (Table 1, page 40). However, 100 percent grazability is not realistic in a rugged, steep, and poorly watered landscape such as the PMWHR. This is supported by BLM actual use data.

Usable range must be determined to accurately assess the proper stocking rate at which habitat deterioration does not take place or is minimized. Due to the fact that studies have not been conducted concerning feral horse slope use and distance to water versus rangeland deterioration, a model tailored to the PMWHR was created.

For slope use, GPS locations of herd groups recorded by the BLM over several years were superimposed over a digital elevation map (DEM). The percent slope used by the herd group was

then determined from the overlay by month and season. We discovered that from late spring through fall (May-November), feral horses used less than or equal to (≤) 30 percent slopes 95 percent of the time. From winter through early spring (December-April) feral horses used ≤50 percent slopes 95 percent of the time (Table 6, page 43).

To make sure the feral horses were not just using the slopes based on the percentage of availability, we charted the percent of area within each slope class (Tables 7-8, pages 43-44) and compared it against the actual slopes used by feral horses. Between May-November feral horses used ≤20 percent slopes 85 percent of the time, while these slopes only made up 54 percent of the landscape available. The feral horses used ≥31 percent slopes only 5 percent of the time, even though the availability of those slopes on the landscape was 28 percent. Feral horses essentially did not use slopes over 50 percent.

Between December-April feral horses used ≤30 percent slopes 80 percent of the time, while the availability of those slopes on the landscape was 72 percent. Slopes ≥51 percent were used 5 percent of the time, while the availability of those slopes on the landscape was 10 percent.

From this information, ≤30 percent slopes were considered grazable acres in one model and ≤50 percent slopes were considered grazable in another (Figures 22-23, pages 66-67).

Watering source information provided by the BLM is shown in Figure 24 (page 68). Since some of the water sources are only available for a short time or are relatively unavailable, only the perennial water sources were considered in the models. The temporary water sources were excluded because they were essentially only available during the forage growing season. This is the time when the greatest damage to plant health can occur.

Four scenarios were developed to assess the grazability of the range as the feral horses are forced to move further from water in search of forage. These scenarios were superimposed over ≤30 percent slopes available for grazing and ≤50 percent slopes available for grazing. Eight grazing outcomes were assessed. Table 9 (page 44) describes the parameters used to evaluate each scenario.

Notice that with scenario #1 between 45 to 50 feral horses could be supported without deterioration to their habitat (Figures 25-26, pages 69-70). Habitat deterioration involves an overall decline in range trend, health, or similarity index. These numbers are 28 to 31 percent of the current horse numbers on the PMWHR. With scenario #2, between 62 and 71 feral horses could be supported (Figures 27-28, pages 71-72). Scenario #3 could support 105 to 126 feral horses (Figures 29-30, pages 73-74). Scenario #4 could support 117 to 142 feral horses or 73 to 88 percent of the current numbers (Figures 31-32, pages 75-76).

Scenario #3 and #4 require the operation of the mid-mountain water catchments in the Big Coulee and Burnt Timber units, and frame the correct proper stocking number when considering mid-mountain water.

Scenario #1 and #2 frame the correct proper stocking number when considering no available water at mid-mountain. It is understood that feral horses use mid mountain water during the winter when snow is available for water. However, range deterioration is greatest when heavy forage use occurs during the growing season, and least in the winter dormant season

(Crider 1955, Briske 1991, Briske and Richards 1994, Briske and Richards 1995, Briske 1996, Holechek et al. 1999). **Utilization of the forage could be more uniform across the PMWHR with mid-mountain water.**

MANAGEMENT CONSIDERATIONS

The following recommendations are made in light of the 1968 U.S. Department of Interior Secretarial Order creating the PMWHR, the Wild and Free-Roaming Horse and Burro Act of 1971, and the BLM national policy for the Wild Horse and Burro program. In short, these state that the wild horses should be managed as wild and free-roaming on the one hand, and on the other, managed without causing any impairment to the land's productivity. This is an apparent dilemma. Considering this and given the current downward trend, severe erosion, rangeland in the at risk to unhealthy categories, and the very low similarities of the vegetation to potential, the following recommendations are presented for consideration in order to improve the feral horse habitat conditions and reverse habitat deterioration:

1. Consideration could be given to repairing and utilizing the mid-mountain water catchments to provide improved distribution of feral horse grazing.

2. It is recommended that consideration be given to managing the herd within the range given (45 to 142 horses) in the "Results and Discussion" section based on the selected scenario.

3. Consideration could be given to controlling water sources in order to deny or permit access to water by feral horses. This would allow for growing season rest and reproduction of the forage plants, much in the same way that wildlife must be protected from disturbance in order to allow for reproduction and herd health. A type of buck and rail fence may be a possibility for control. This fence is more aesthetically pleasing and more fitting with the wilderness study area environment. In addition, it could provide for the passage of wildlife while controlling water access to feral horses.

4. A grazing rotation is recommended for consideration. Overgrazing is a problem and potentially, undergrazing could be a problem if grazing was eliminated. It could be designed to allow for vegetative recovery following grazing, and seasonality of grazing could be somewhat controlled. This would allow for the greatest range recovery for the benefit of the horses in the shortest period of time.

5. The previous considerations would also increase the noxious weed resistance of the range. Improved native vegetative cover would enhance wilderness, wildlife, and habitat values and create a more aesthetically pleasing environment. Presently, noxious weeds are not a severe problem on the PMWHR, other than Halogeton (*Halogeton glomeratus*) in the areas receiving 10 inches MAP or less. However, the conditions are right for an explosion of noxious weeds.

6. If available, consideration could be given to expanding the range accessible to the feral horses. However, unless recommendations one through three are considered, it is very likely that the present grazing impacts would be extended to the newly acquired lands without improving the existing habitat.

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Greg Evertz, Soil Conservationist, NRCS, Joliet, Montana
Jamie Wages, Range Technician (volunteer), BLM, Britton Springs, Wyoming
William Murray, Range Management Specialist, NRCS, Sheridan, Montana
Joe Fidel, Resource Conservationist, NRCS, Bozeman, Montana
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TABLES

Table 1: Feral Horse Animal Unit Equivalent (AUE), Dry Matter Intake (DMI) and Forage Requirements

Class	Average Weight in Pounds	DMI as a % of Body Weight	DMI in Pounds Per Day	AUE**	Numbers in Class	AUMs*** Needed Per Year
Lactating Mare	800	2.25%*	18	0.69	22	182
Non-Lactating Mare	900	2%	18	0.69	32	265
Stallions	900	2%	18	0.69	57	472
2-3 Year Olds	550	2.50%	13.75	0.53	28	178
Foals	300	3%	9	0.35	22	92
				Total AUMs Needed		**1,189**

* 2.25% represents the average DMI for the year (May-Oct. is 2.5% and Nov.-April is 2%)
** Animal Unit Equivalent equals the proportion of forage required for an animal relative to a 1,000-pound cow (26 pounds dry matter per day)
*** Animal Unit Month is an expression of the amount of forage needed by one animal unit for one month (793 pounds of dry matter)

Table 2: Average Percent Diet Composition (Adapted from Kissel et al. 1996)

	Grass				Forbs				Shrubs				Other *			
Animal	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**	**F**
Feral Horses	76	85	73	68	9	2	8	5	7	2	13	22	8	11	6	5
Big Horn Sheep	28	60	39	28	8	16	6	4	62	19	53	68	2	5	2	T
Mule Deer	T	5	27	T	1	55	24	2	99	31	47	98	T	9	2	T

W = Winter, Sp = Spring, Su = Summer, F = Fall
T=Trace amount

*Other encompasses mostly sedges and rushes

Table 3: Plant Communities (Organized from driest to wettest environments)

Common Names	Scientific Names	Symbols
Wyoming big sagebrush / plains pricklypear / blue grama	*Artemisia tridentata ssp. wyomingensis / Opuntia polyacantha / Bouteloua gracilis*	ARTRW8 / OPPO / BRGR2
Wyoming big sagebrush / halogeton	*Artemisia tridentata ssp. wyomingensis / Halogeton glomeratus*	ARTRW8 / HAGL
Nuttall's saltbush / greasewood	*Atriplex nuttallii / Sarcobatus vermiculatus*	ATNU / SAVE4
Wyoming big sagebrush / rubber rabbitbrush	*Artemisia tridentata ssp. wyomingensis / Ericameria nauseosa*	ARTRW8 / ERNA10
*Wyoming big sagebrush / shortstem buckwheat (shrubby buckwheat)	*Artemisia tridentata ssp. wyomingensis / Eriogonum brevicaule*	ARTRW8 / ERBR5
low forb / Fendler's threeawn	low forb / *Aristida purpurea* var. *fendleriana*	low forb / ARPUF
Wyoming big sagebrush / shadscale	*Artemisia tridentata ssp. wyomingensis / Atriplex confertifolia*	ARTRW8 / ATCO
Wyoming big sagebrush / pricklypear	*Artemisia tridentata ssp. wyomingensis / Opuntia polyacantha*	ARTRW8 / OPPO
alkali sacaton / low forb	*Sporobolus airoides* / low forb	SPAI / low forb
low forb / needleandthread	low forb / *Hesperostipa comata*	low forb / HECO26
Wyoming big sagebrush / needleandthread	*Artemisia tridentata ssp. wyomingensis / Hesperostipa comata*	ARTRW8 / HECO26
Wyoming big sagebrush / plains pricklypear / Indian ricegrass	*Artemisia tridentata ssp. wyomingensis / Opuntia polyacantha / Achnatherum hymenoides*	ARTRW8 / OPPO / ACHY
Utah juniper / Fendler's threeawn	*Juniperus osteosperma / Aristida purpurea* var. *fendleriana*	JUOS / ARPUF
Utah juniper / curl-leaf mountain mahogany / low forb	*Juniperus osteosperma / Cercocarpus ledifolius* / low forb	JUOS / CELE3 / low forb
**bluebunch wheatgrass / low forb	*Pseudoroegneria spicata* / low forb	PSSP6 / low forb
Utah juniper / curl-leaf mountain mahogany / low forb / needleandthread	*Juniperus osteosperma / Cercocarpus ledifolius* / low forb / *Hesperostipa comata*	JUOS / CELE3 / low forb / HECO26
curl-leaf mountain mahogany / low forb	*Cercocarpus ledifolius* / low forb	CELE3 / low forb

Utah juniper / black sagebrush / bluebunch wheatgrass	*Juniperus osteosperma / Artemisia nova / Pseudoroegneria spicata*	JUOS / ARNO4 / PSSP6
Utah juniper / bluebunch wheatgrass	*Juniperus osteosperma / Pseudoroegneria spicata*	JUOS / PSSP6
***black sagebrush / Wyoming big sagebrush / bluebunch wheatgrass	*Artemisia nova / Artemisia tridentata ssp. wyomingensis / Pseudoroegneria spicata*	ARNO4 / ARTRW8 / PSSP6
curl-leaf mountain mahogany / low forb / bluebunch wheatgrass	*Cercocarpus ledifolius* / low forb / *Pseudoroegneria spicata*	CELE3 / low forb / PSSP6
bluebunch wheatgrass / black sagebrush / Wyoming big sagebrush	*Pseudoroegneria spicata / Artemisia nova / Artemisia tridentata ssp. wyomingensis*	PSSP6 / ARNO4 / ARTRW8
Douglas fir / spike fescue	*Pseudotsuga menziesii / Leucopoa kingii*	PSME / LEKI2
spike fescue / forb	*Leucopoa kingii* / forb	LEKI2 / forb
Douglas fir / mountain snowberry	*Pseudotsuga menziesii / Symphoricarpos oreophilus*	PSME / SYOR2
Douglas fir / forb	*Pseudotsuga menziesii* / forb	PSME / forb
Idaho fescue / forb	*Festuca idahoensis* / forb	FEID / forb
sedge / forb	sedge / forb	sedge / forb
Engelmann spruce / forb	*Picea engelmannia* / forb	PIEN / forb
subalpine fir / forb	*Abies lasiocarpa* / forb	ABLA / forb

* Within the ARTRW8 / ERBR5 community are areas of pure ERBR5 / ERNA10.
**Within the PSSPS / low forb community MAP runs from 9-21".
***Within the ARNO4 / ARTRW8 / PSSP6 community are a number of areas of pure PSSP6 / ARNRO4 / low forb.

Table 4: Summary of Apparent Trend

Inventory Unit	Number of Transects	% Upward	% Down	% Not Apparent	MAP (Inches)
Forest Service	18	0	67	33	12-27"
Penn's Cabin	24	0	65	35	18-27"
Burnt Timber	37	3	80	17	9-17"
Big Coulee	35	0	78	22	9-29"
National Park	32	0	63	37	6-18"
Britton Springs	26	0	100	0	6-12"
Entire Horse Range	**172**	**1**	**76**	**23**	**6-27"**

Table 5: AUMs (at 100% Grazability) and Mean Annual Precipitation (MAP) per Inventory Unit

Inventory Unit	Acres	AUMs	% of Total Forage	AUMs / AC.	MAP (in inches)
Forest Service	8,038	534	45%	0.066	12-27"
Penn's Cabin	4,492	155	13%	0.035	18-27"
Burnt Timber	7,263	128 (20)*	13%	0.02	9-17"
Big Coulee	6,991	124	11%	0.018	9-20"
National Park	7,363	146	12%	0.02	6-18"
Britton Springs	5,504	45 (25)*	6%	0.012	6-12"

* 45 AUMs are unavailable to the feral horses because they are fenced within the administrative pasture.

Table 6: Feral Horse Use of Slopes by Season (% of Occurrences) Pryor Mountain Wild Horse Range, Montana and Wyoming

Slope %	Late Spring-Fall (May-November)	Winter-Early Spring (December-April)
≤20%	85%	50%
≤30%	95%	80%
≤50%	100%	95%
≤70%	trace	100%
>70%	0	0

Table 7: Percent of Area Within Slope Range on the Pryor Mountain Wild Horse Range

Slope %	Total Area %
0-20%	54%
21-30%	18%
31-50%	18%
51%+	10%

Table 8: Percent of Total Area Within Slope Classes by Inventory Unit Pryor Mountain Wild Horse Range, Montana and Wyoming

Slope %	Forest Service	Penn's Cabin	Burnt Timber	Big Coulee	National Park	Britton Springs
≤20%	43%	41%	67%	43%	54%	83%
≤30%	65%	61%	84%	65%	70%	95%
≤50%	88%	88%	96%	89%	86%	100%

Table 9: Grazability Scenarios and Approximate Carrying Capacities for the PMWHR

Grazability Scenario	Distance to Water (miles)	Grazability Percent	Mid-Mtn. Water	Usable AUMs	Carrying Capacity (approx. # of horses)
#1 ≤30% Slope	≤1.5	100%	No	335	45
	1.5 - 2	75%			
	2 - 2.5	50%		(34)*	
	2.5 - 3	25%			
	>3	0%			
#1 ≤50% Slope	≤1.5	100%	No	366	50
	1.5 - 2	75%			
	2 - 2.5	50%		(35)*	
	2.5 - 3	25%			
	>3	0%			
#2 ≤30% Slope	≤3	100%	No	457	62
	3 - 3.5	75%			
	3.5 - 4	50%		(45)*	
	4 - 4.5	25%			
	>4.5	0%			
#2 ≤50% Slope	≤3	100%	No	526	71
	3 - 3.5	75%			
	3.5 - 4	50%		(46)*	
	4 - 4.5	25%			
	>4.5	0%			
#3 ≤30% Slope	≤1.5	100%	Yes	773	105
	1.5 - 2	75%			
	2 - 2.5	50%		(35)*	
	2.5 - 3	25%			
	>3	0%			
#3 ≤50% Slope	≤1.5	100%	Yes	928	126
	1.5 - 2	75%			
	2 - 2.5	50%		(36)*	

	2.5 - 3	25%			
	>3	0%			
#4 ≤30% Slope	≤3	100%	Yes	867	117
	3 - 3.5	75%			
	3.5 - 4	50%		(44)*	
	4 - 4.5	25%			
	>4.5	0%			
#4 ≤50% Slope	≤3	100%	Yes	1049	142
	3 - 3.5	75%			
	3.5 - 4	50%		(45)*	
	4 - 4.5	25%			
	>4.5	0%			

* These AUMs are within the administrative pasture and are not available to the horses.

Figure 1: NRCS Inventory Units, Ownership, and Major Features

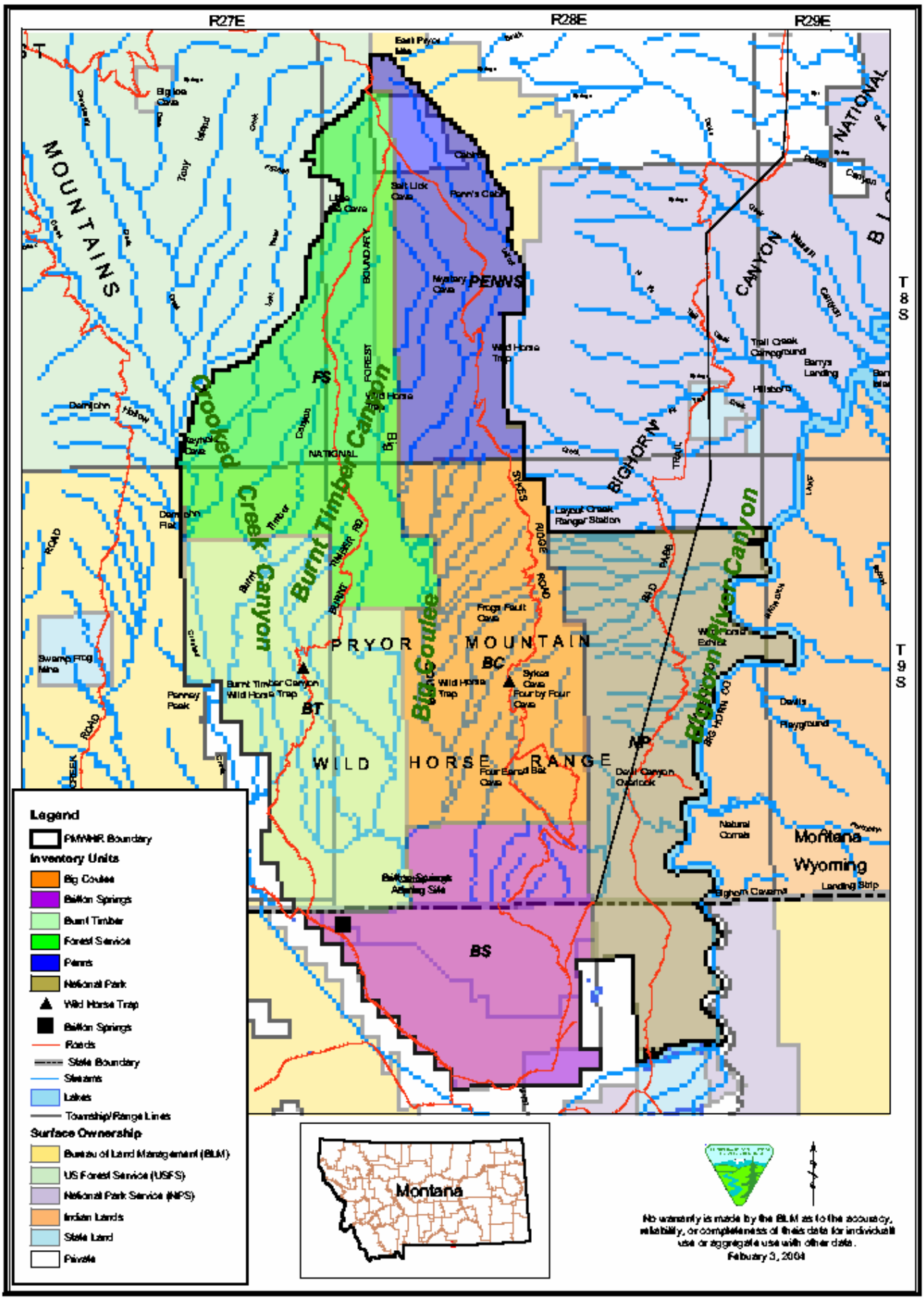


Figure 2: Precipitation Map for the Pryor Mountain Wild Horse Range

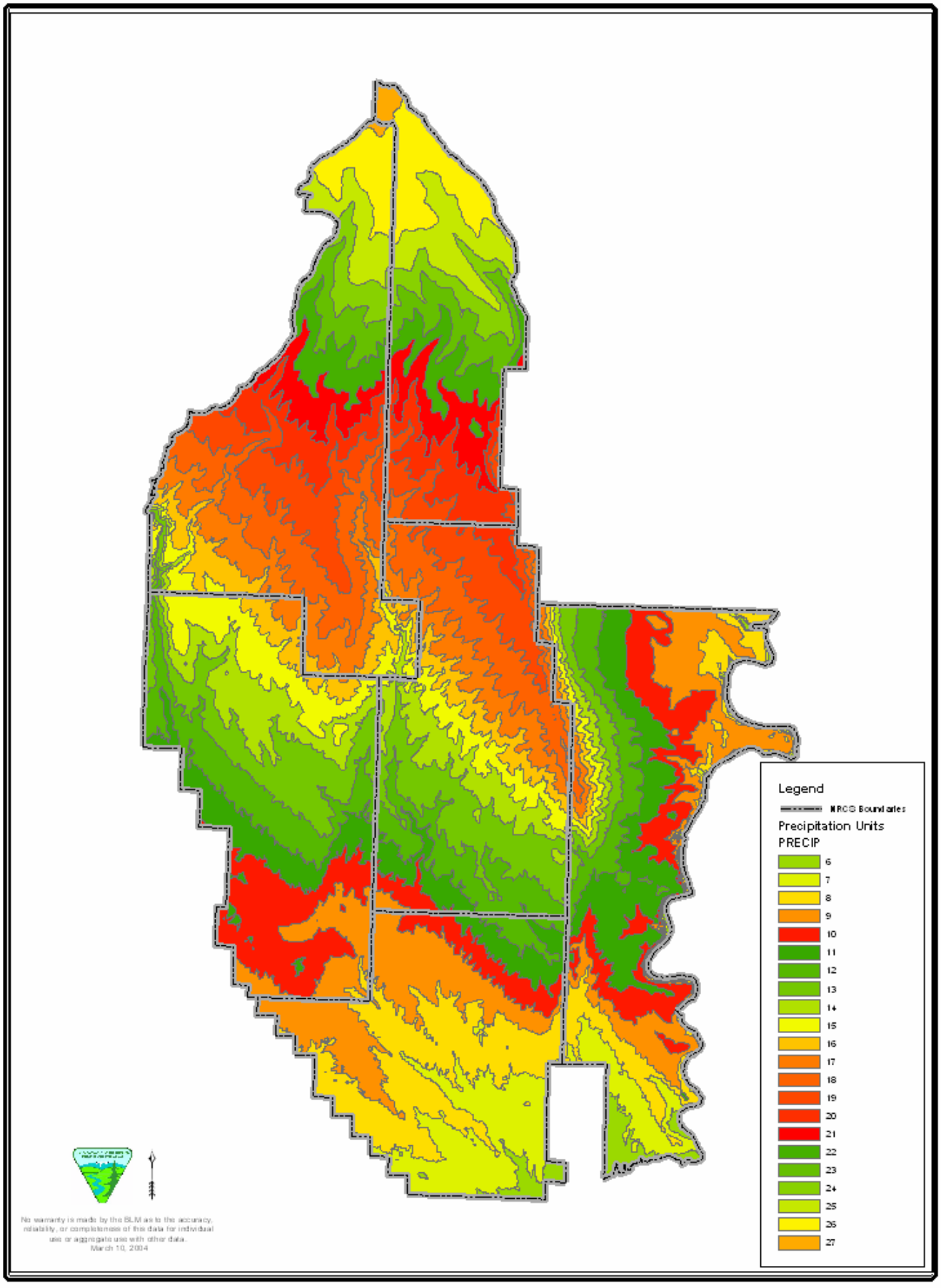


Figure 3: Exclosure Locations and Year of Construction

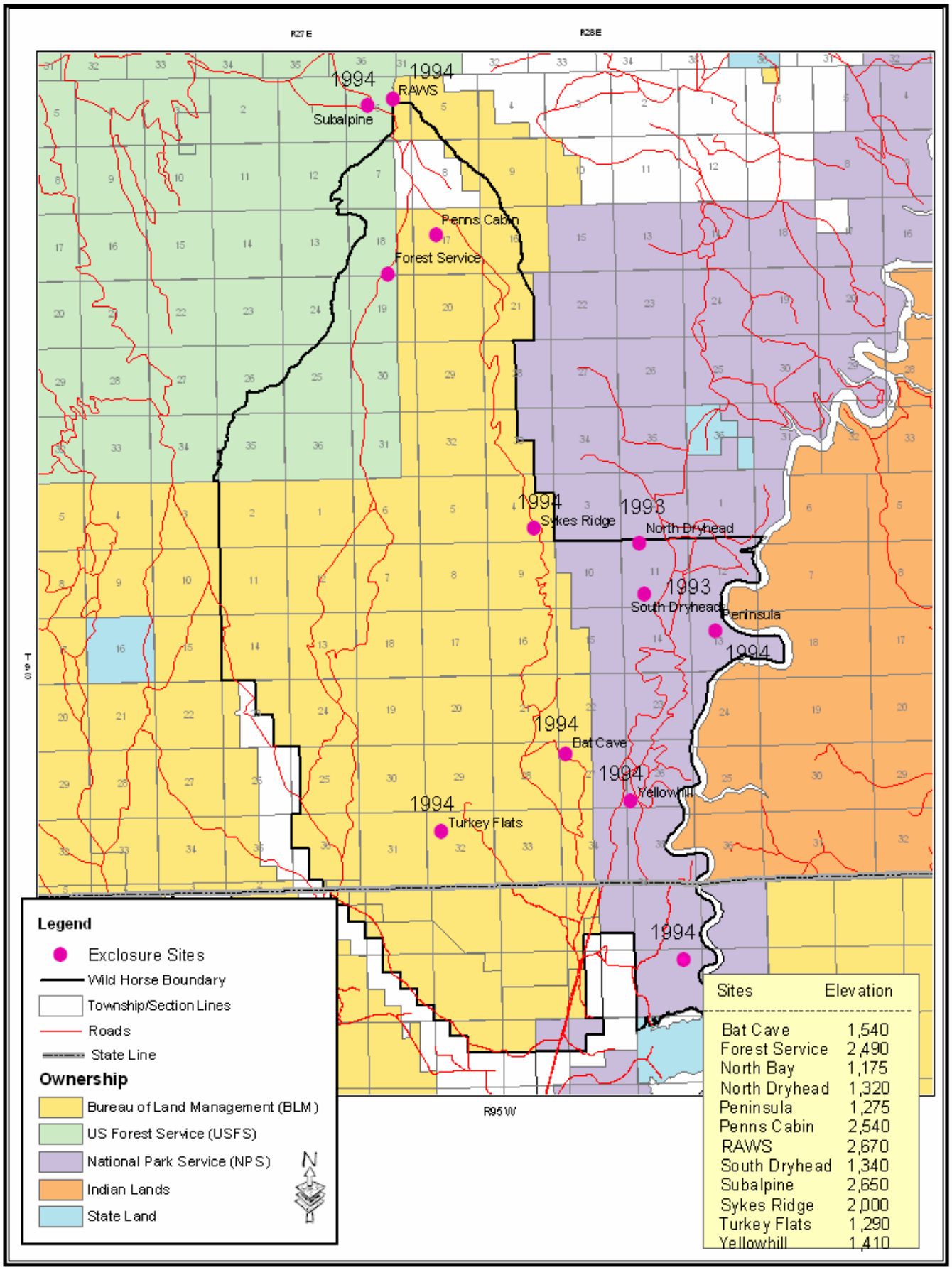


Figure 4: Transect Locations

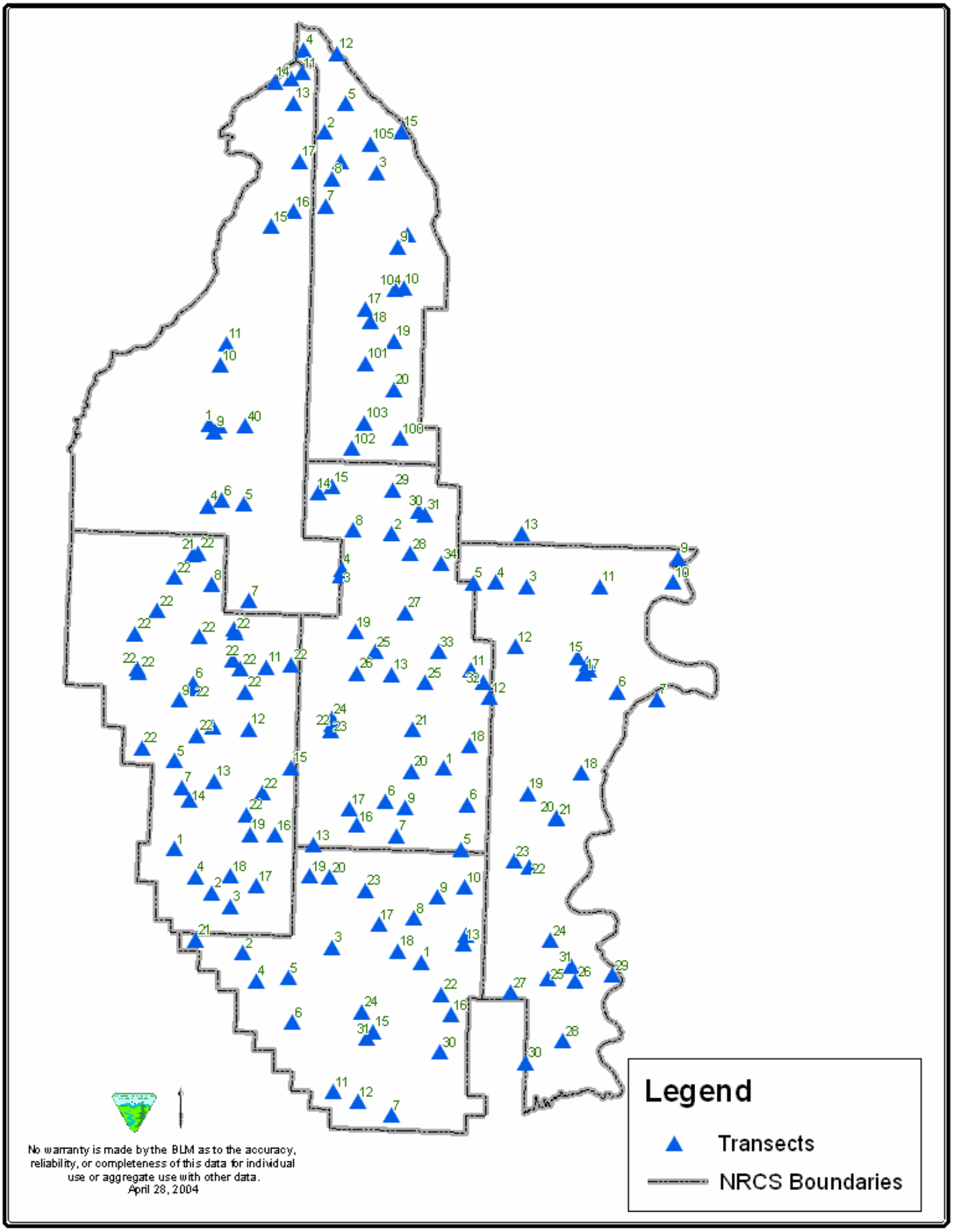


Figure 5: Age Structure and Sex Ratio on PMWHR, Spring 2003

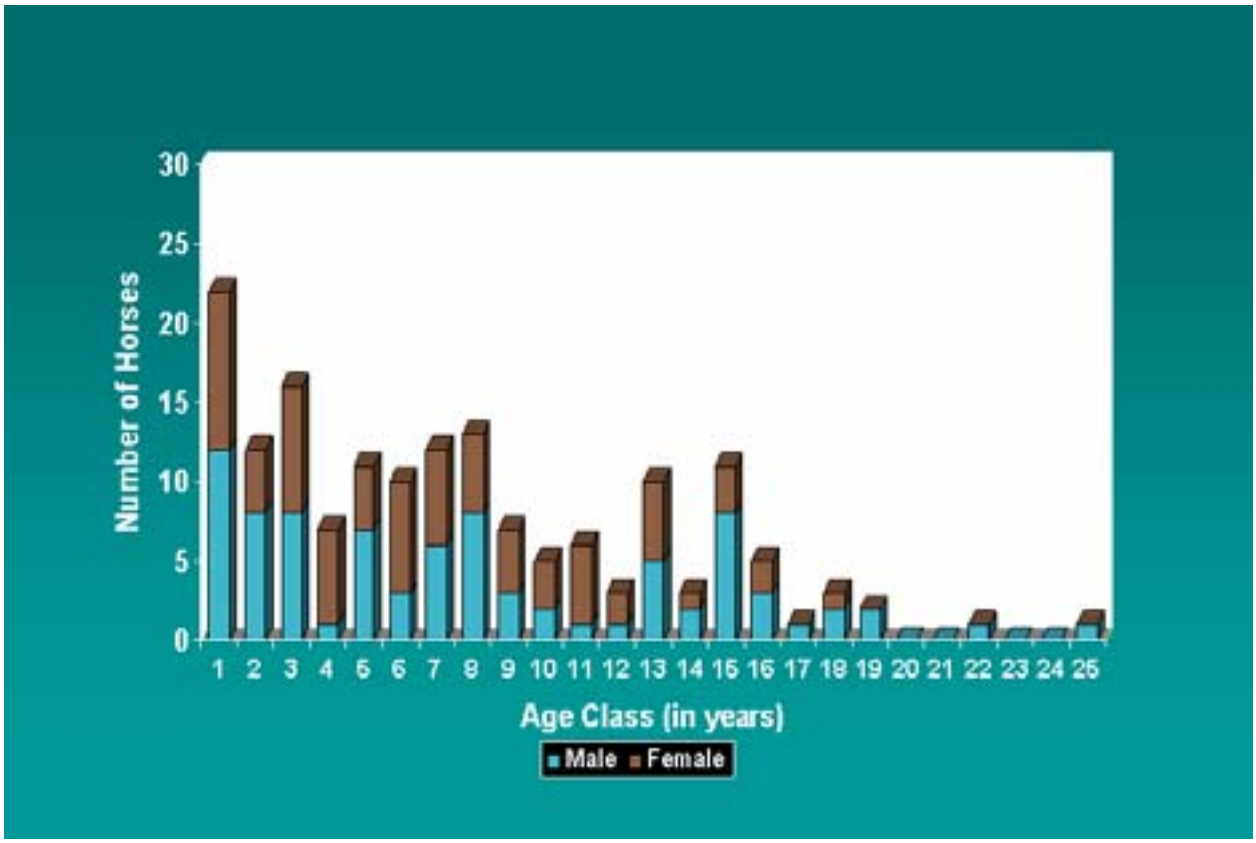
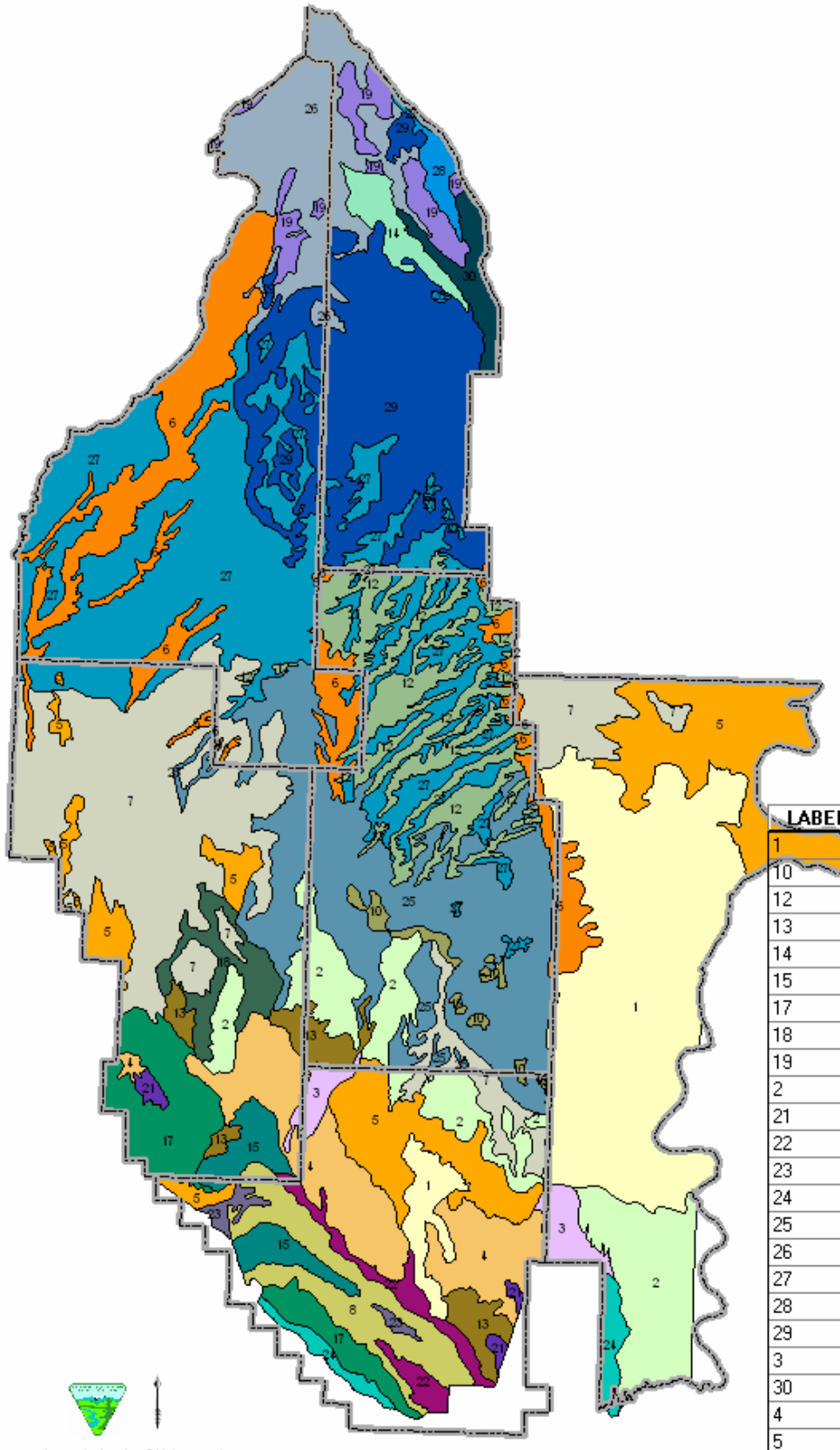


Figure 6: Plant Community



No warranty is made by the BLM as to the accuracy, reliability, or completeness of this data for individual use or aggregate use with other data.
April 28, 2004

LABEL	Count_LABEL	Acreage
1	2	4451
10	6	181
12	18	1745
13	4	536
14	1	290
15	2	478
17	2	1088
18	1	448
19	8	557
2	6	2230
21	3	93
22	2	372
23	2	109
24	2	313
25	5	3725
26	2	1599
27	24	5653
28	2	160
29	4	3367
3	2	379
30	1	331
4	3	1653
5	12	2830
6	17	2352
7	6	4558
8	1	885

Figure 6: Plant Community

Figure 7: Ecological Sites

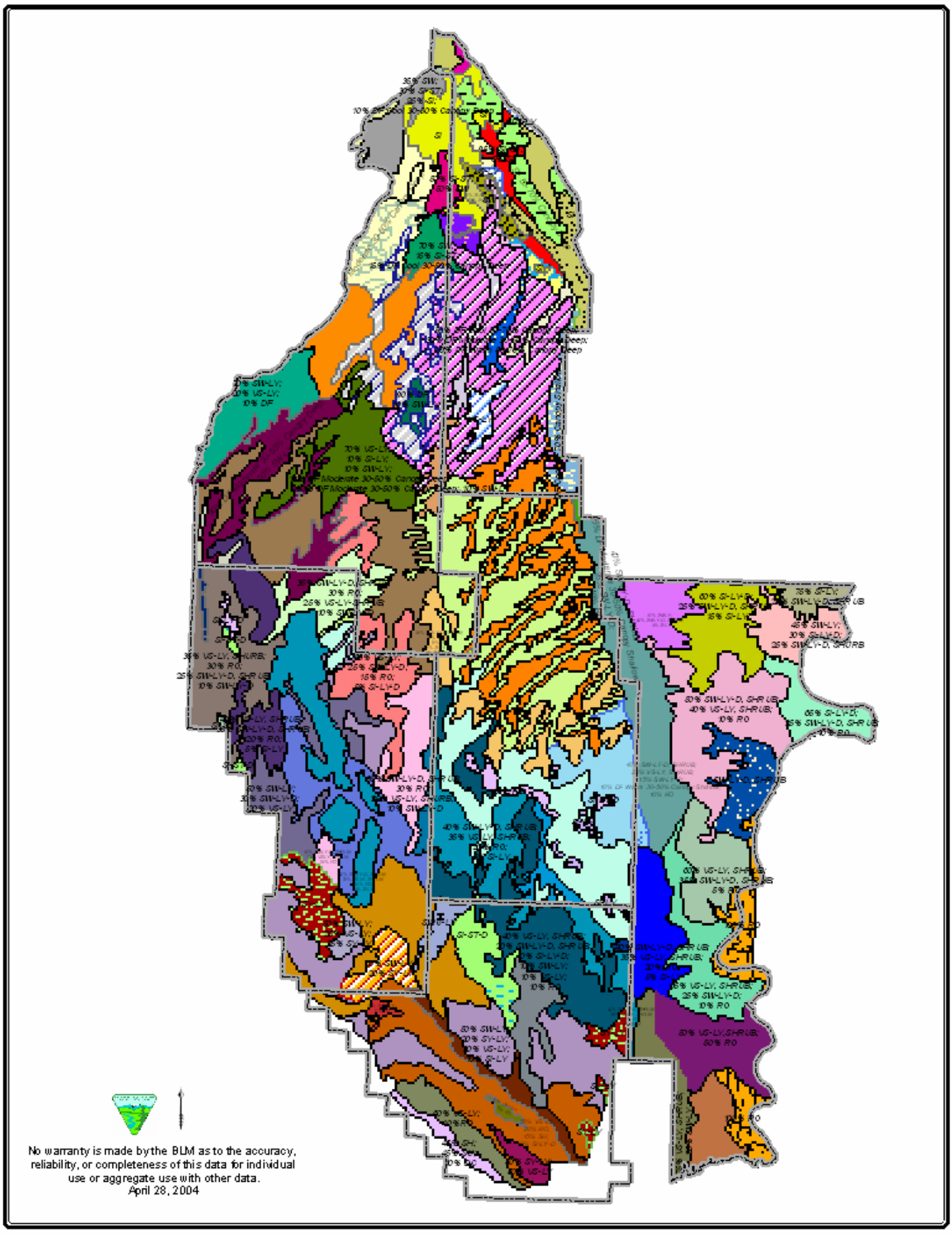


Figure 7: Ecological Sites

Figure 8: Forest Service Inventory Unit Ecological Sites

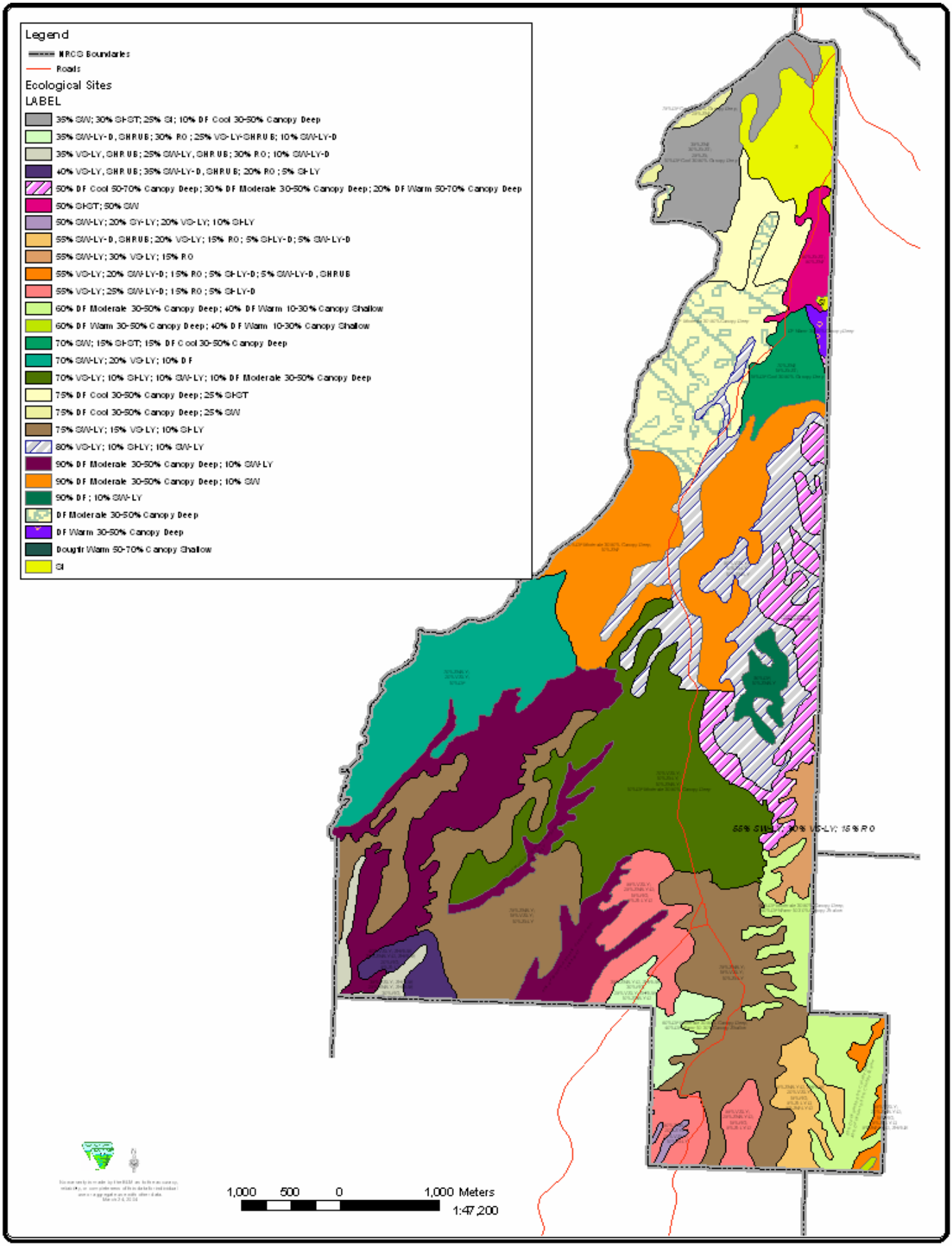


Figure 9: Penn's Cabin Inventory Unit Ecological Sites

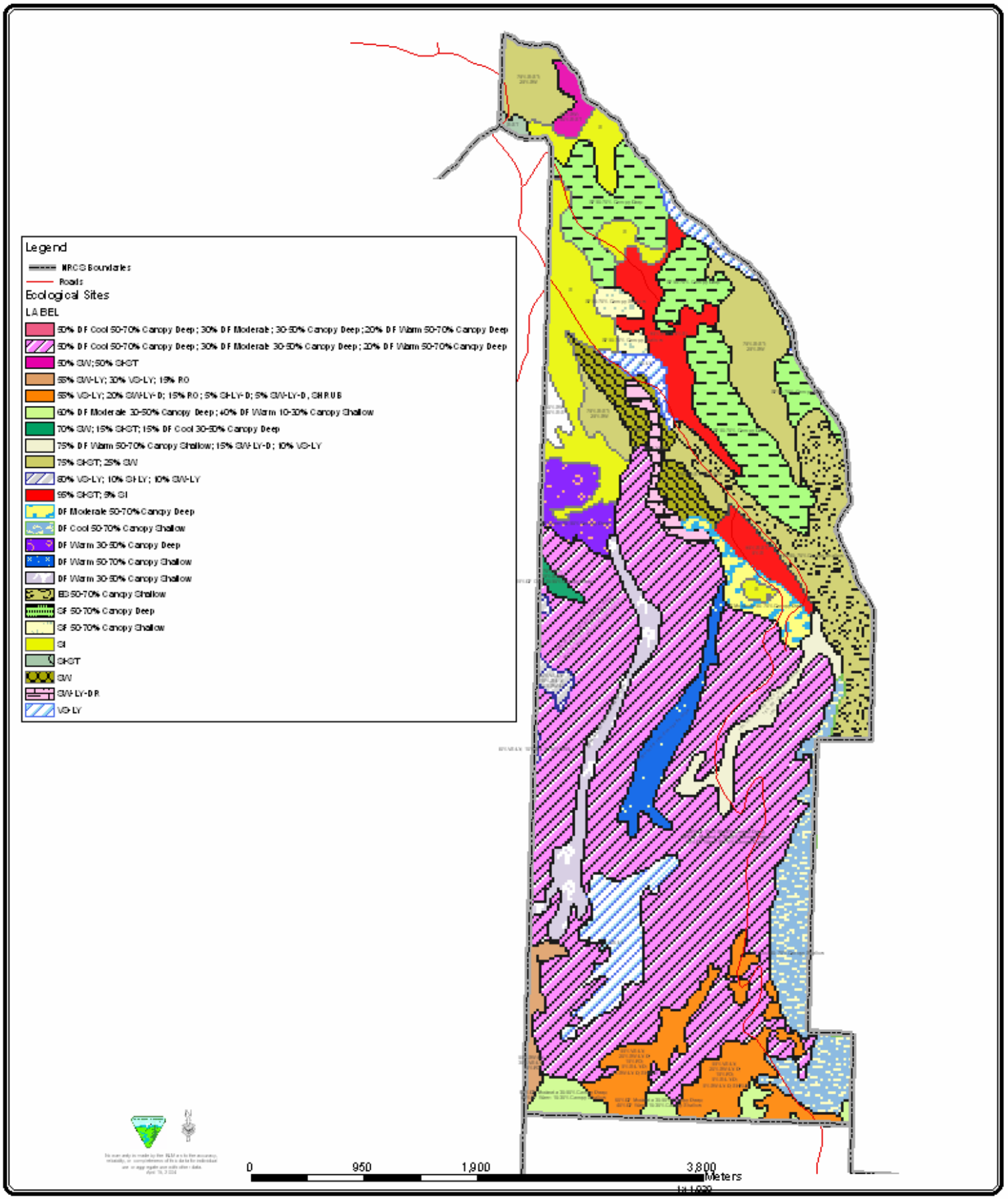


Figure 10: Burnt Timber Inventory Unit Ecological Sites

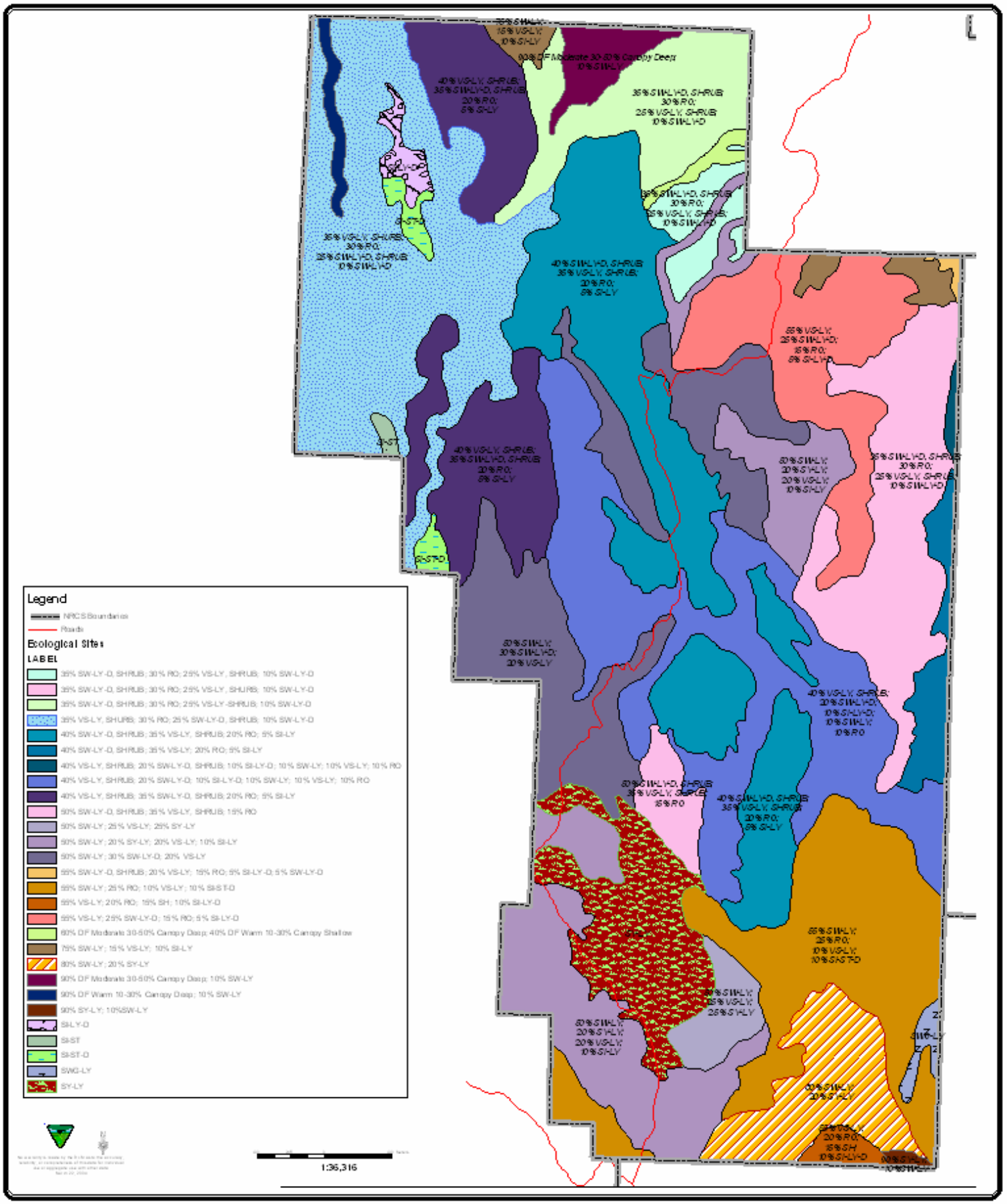


Figure 11: Big Coulee Inventory Unit Ecological Sites

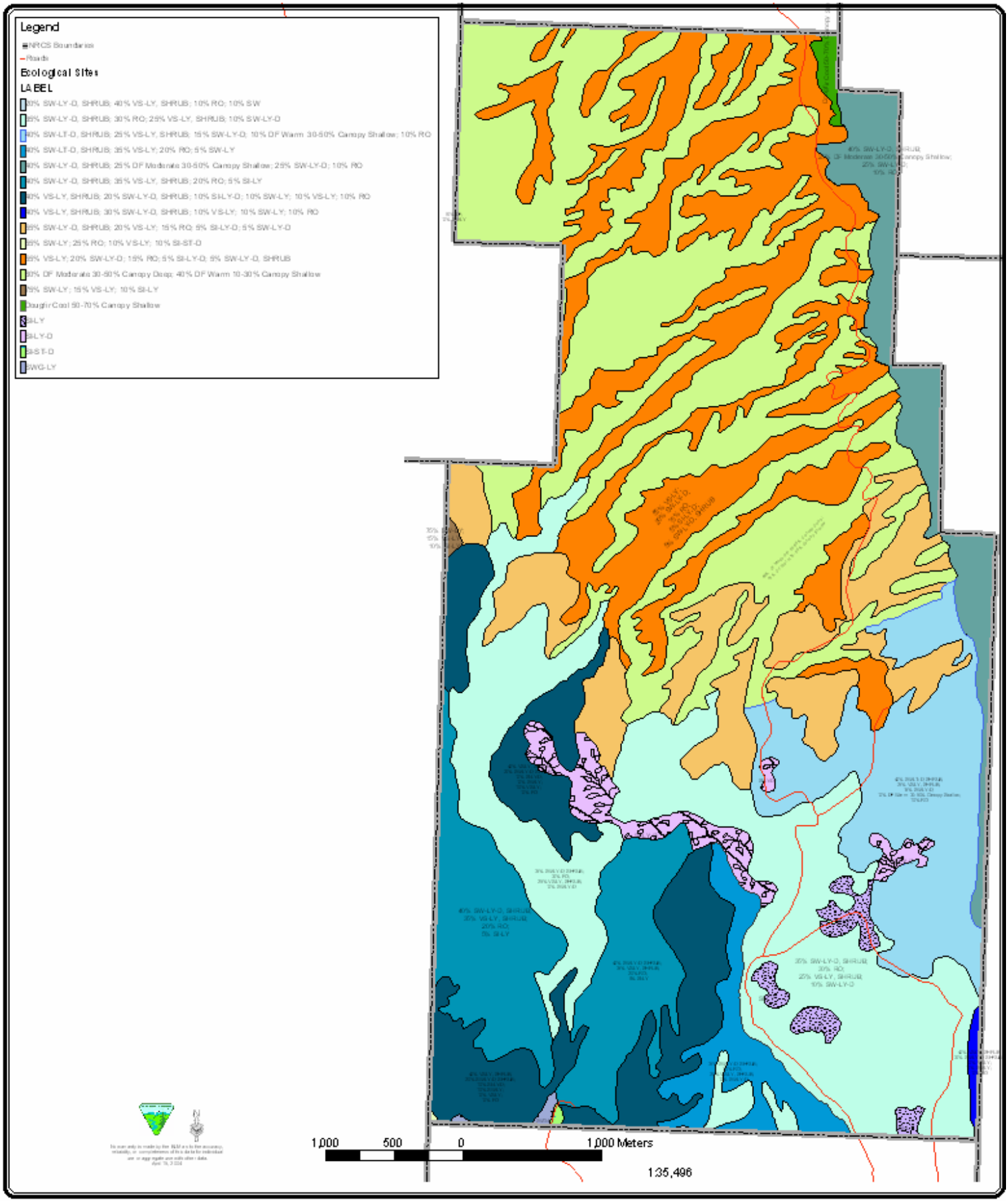


Figure 12: National Park Inventory Unit Ecological Sites

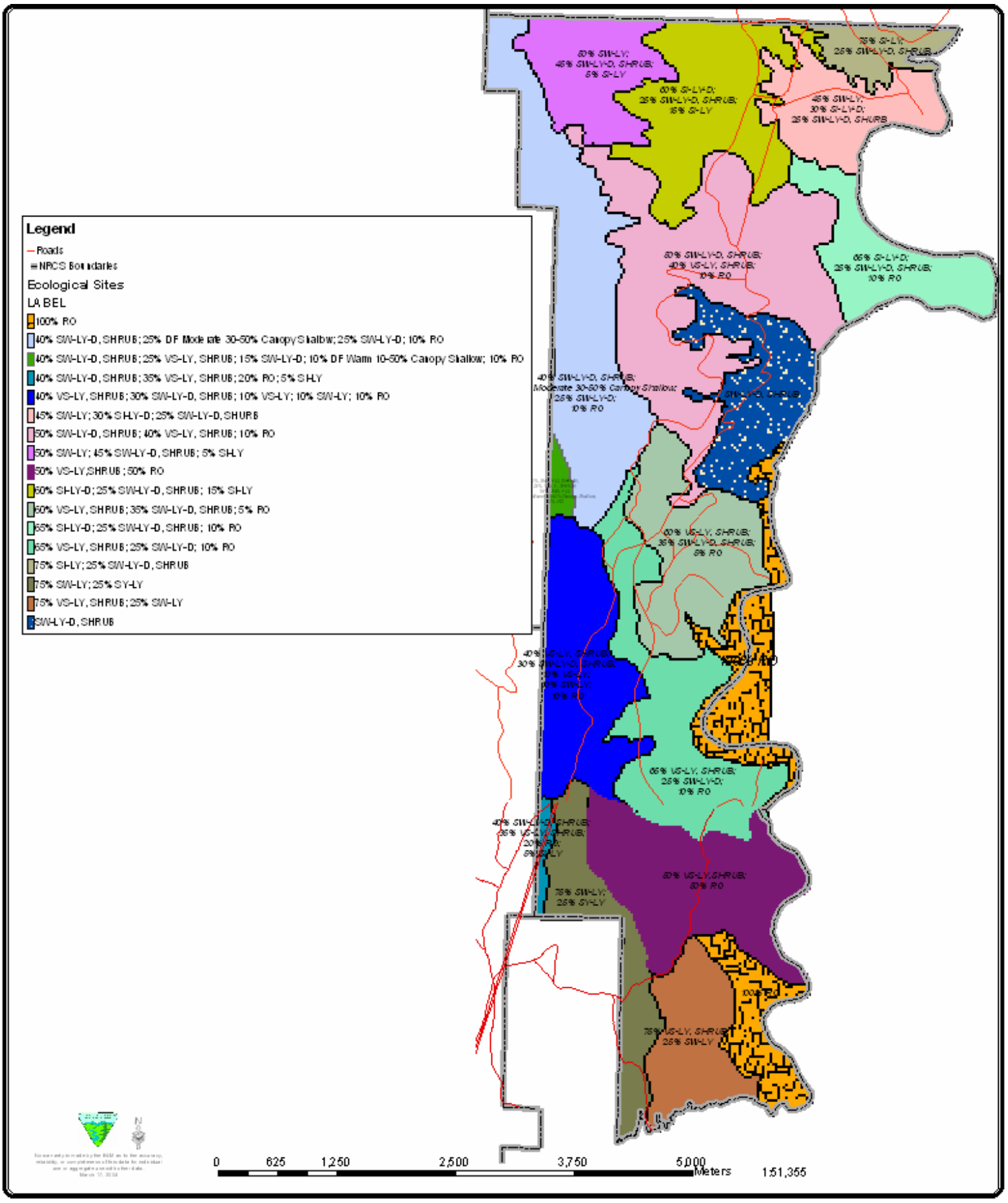


Figure 13: Britton Springs Inventory Unit Ecological Sites

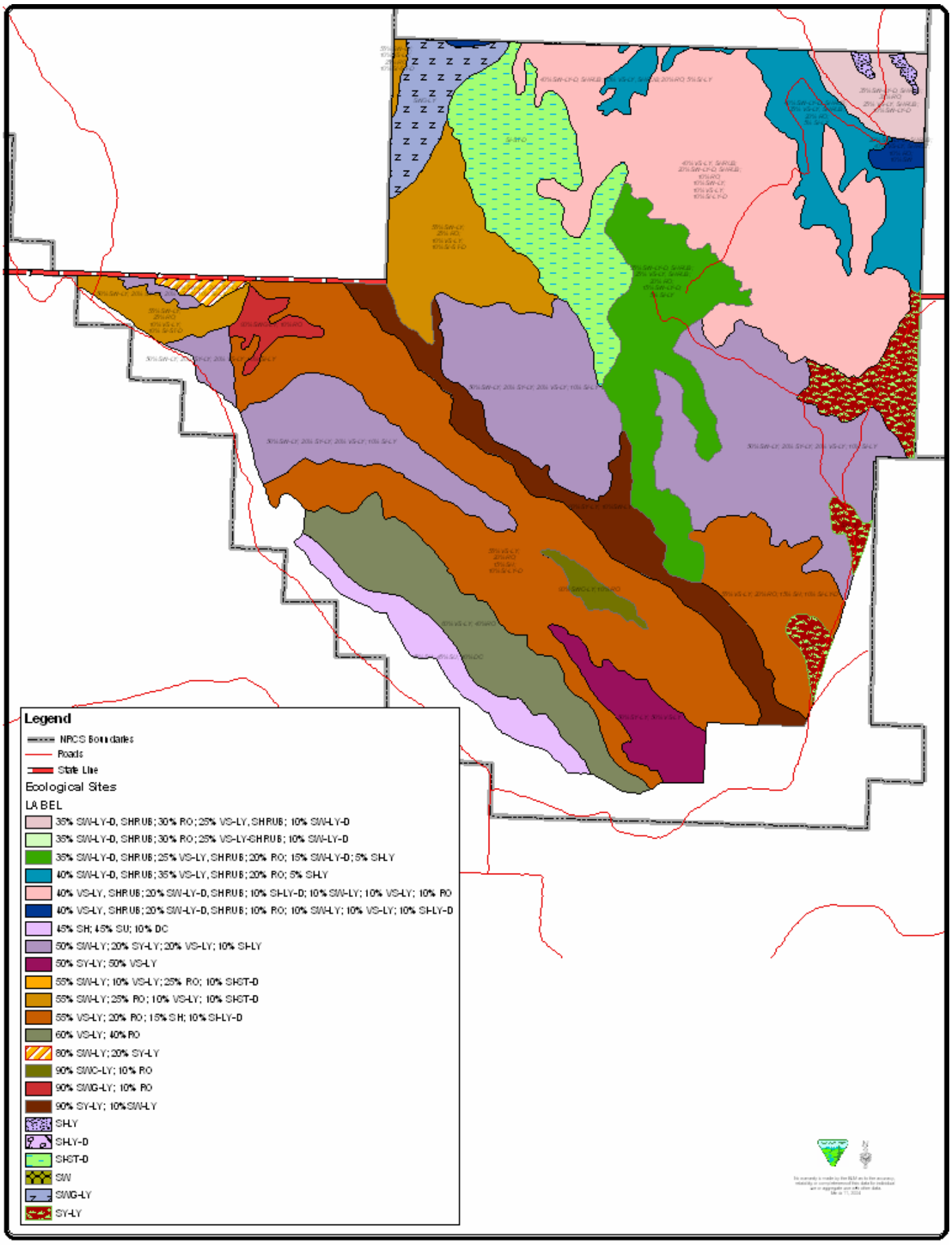


Figure 14: Similarity Index

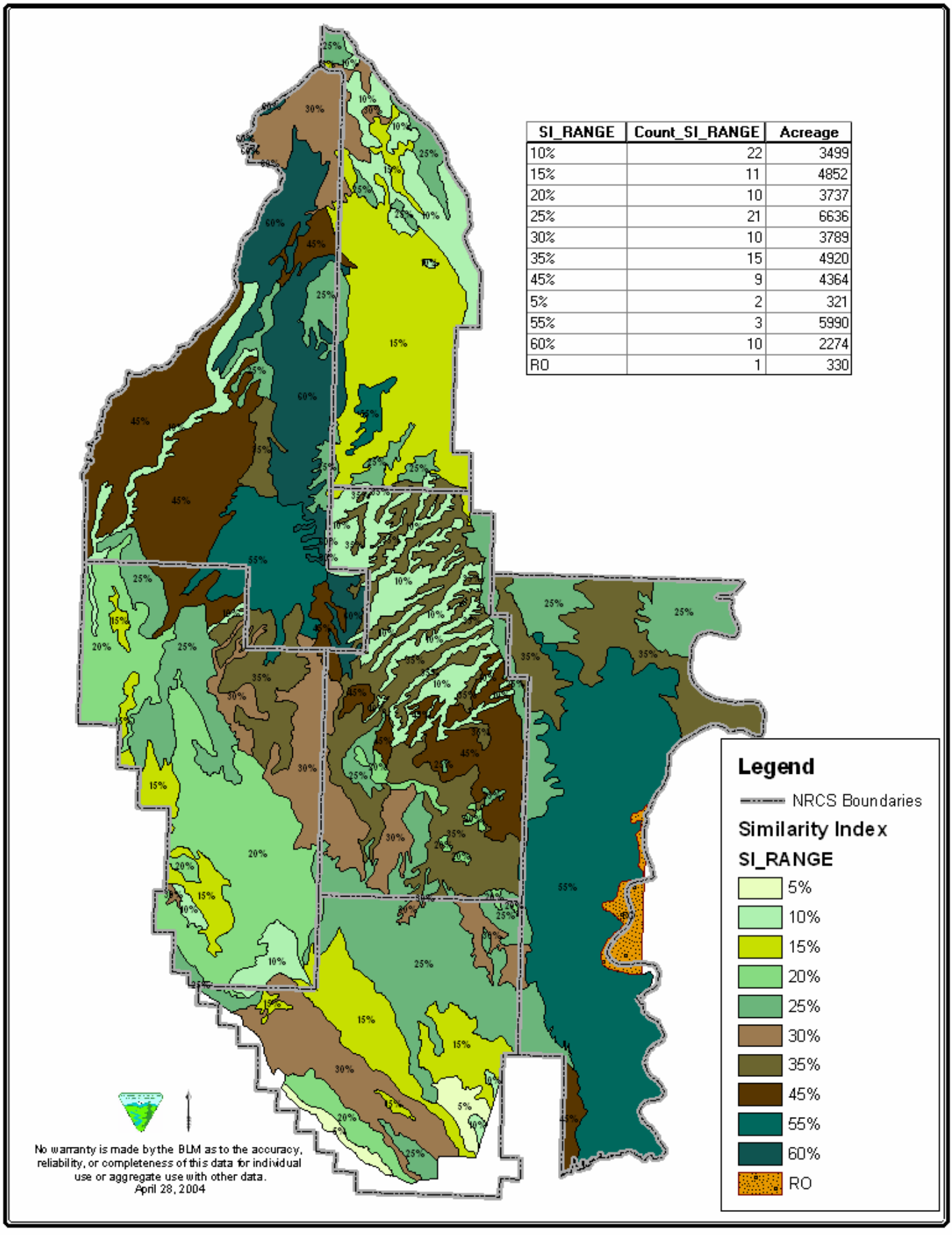


Figure 15: Apparent Trend

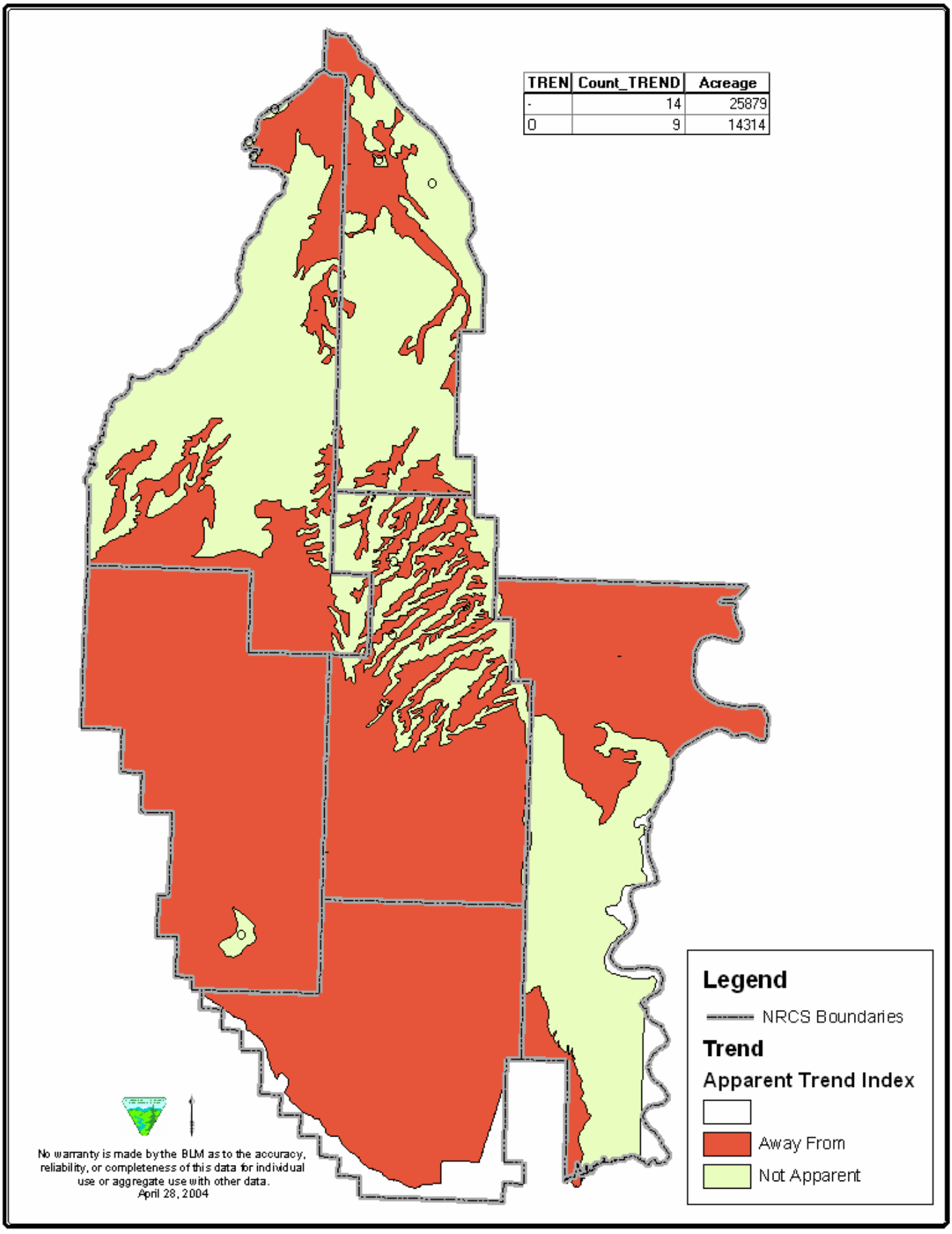


Figure 16: Biological Crust

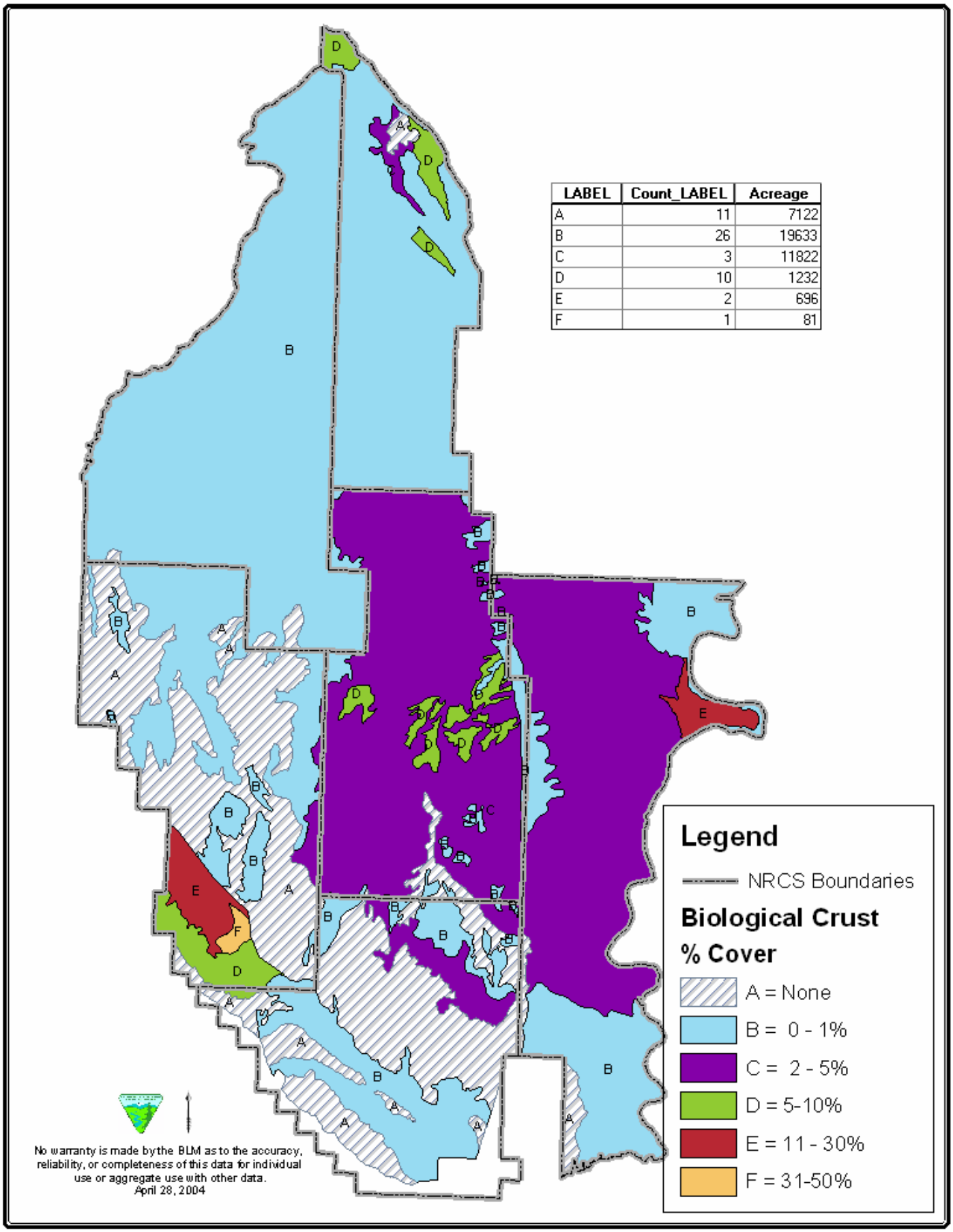


Figure 17

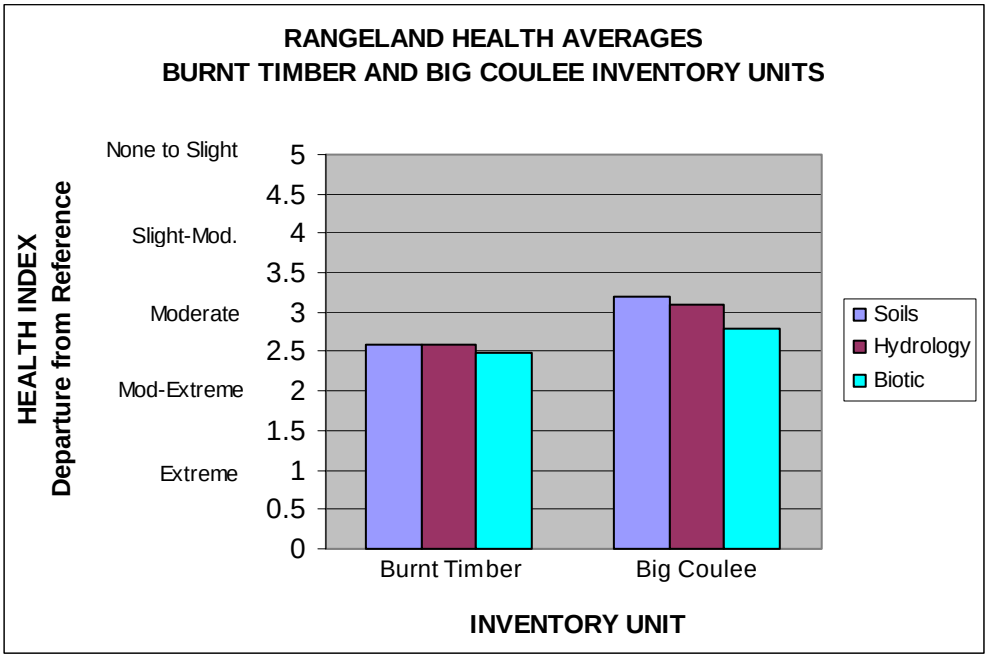


Figure 18

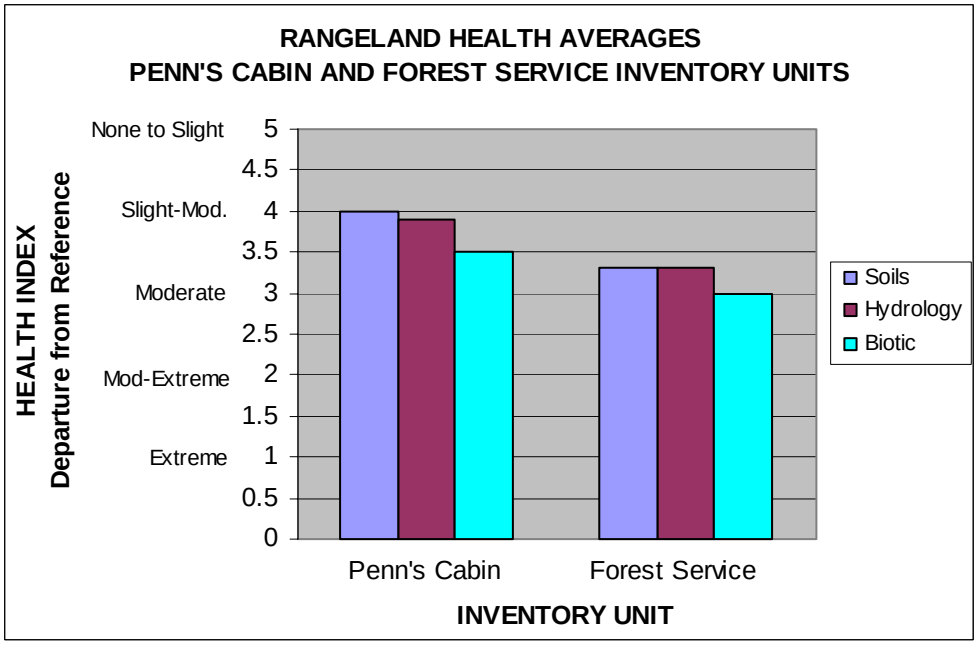


Figure 19

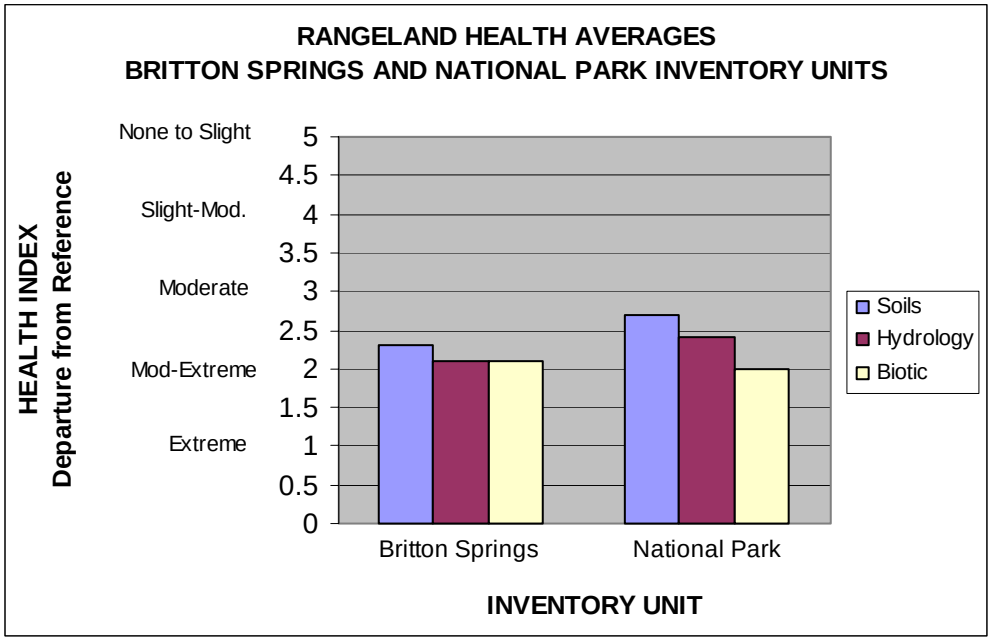

RANGELAND HEALTH AVERAGES
BRITTON SPRINGS AND NATIONAL PARK INVENTORY UNITS
HEALTH INDEX
Departure from Reference
None to Slight
Slight-Mod.
Moderate
Mod-Extreme
Extreme
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Britton Springs
National Park
INVENTORY UNIT
Soils
Hydrology
Biotic

Figure 20: Noxious Weeds

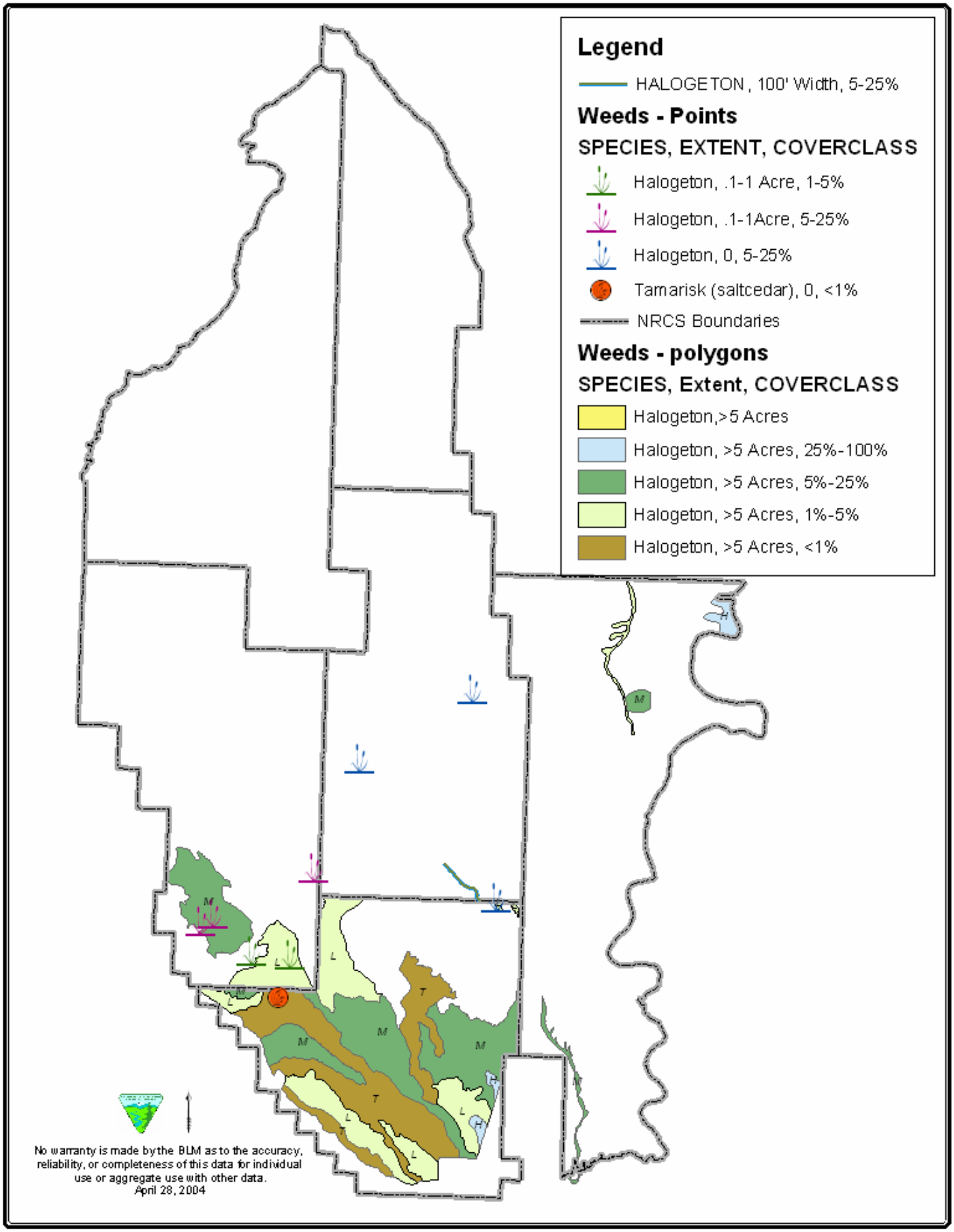


Figure 21: Stocking Rate at 100% Grazability

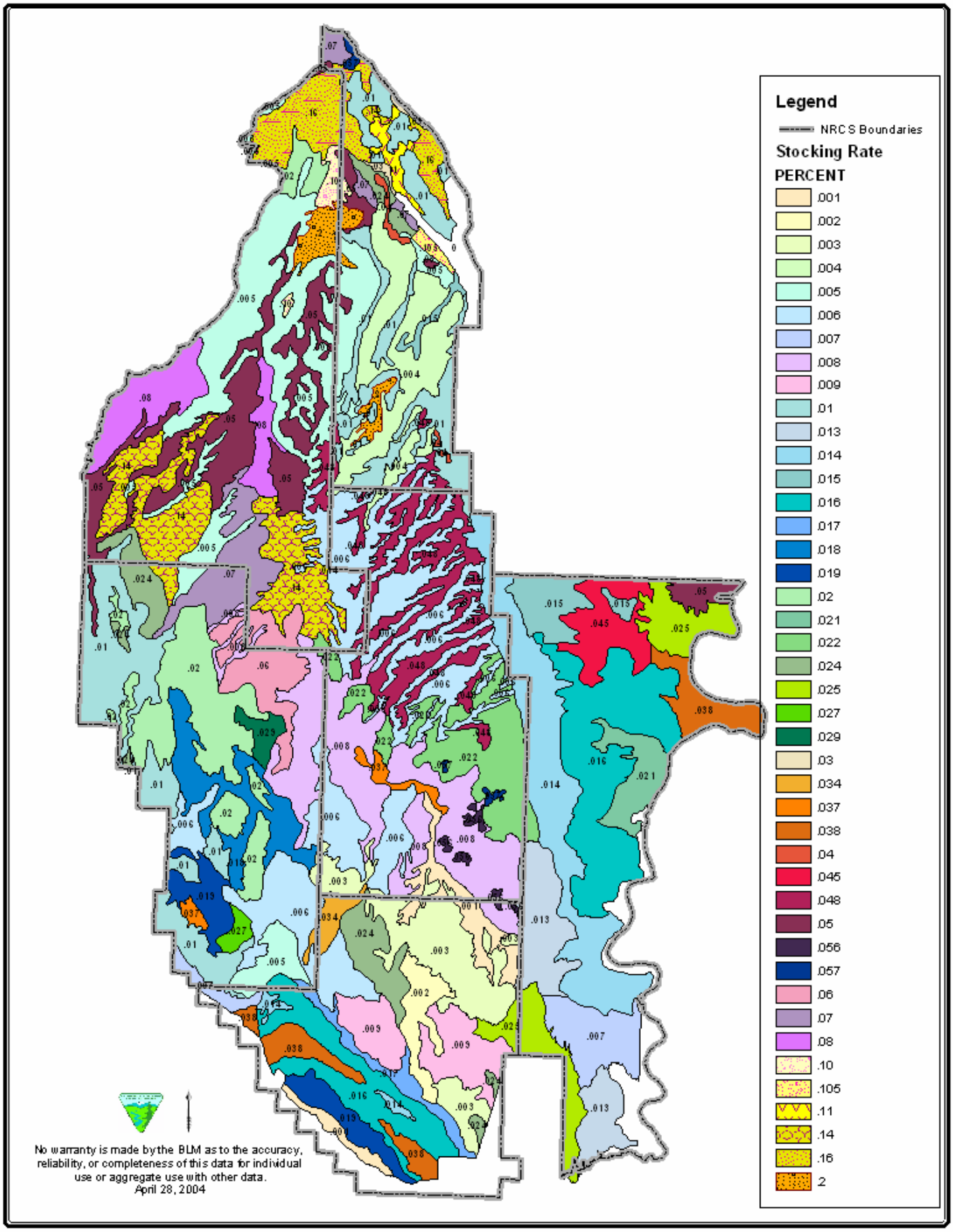


Figure 22: Slopes of 30% or Less for the Pryor Mountain Inventory Units

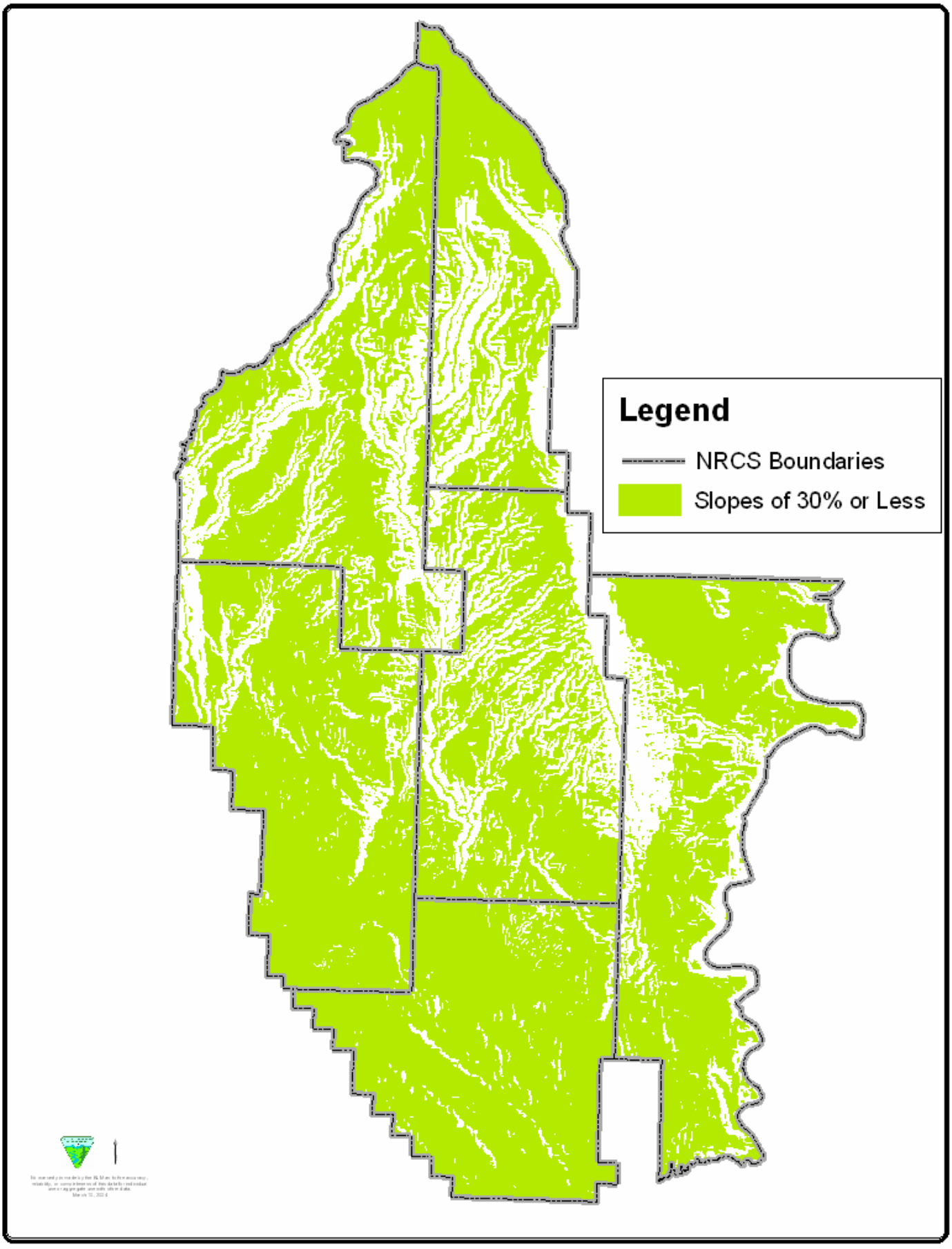


Figure 23: Slopes of 50% or Less for the Pryor Mountain Inventory Units

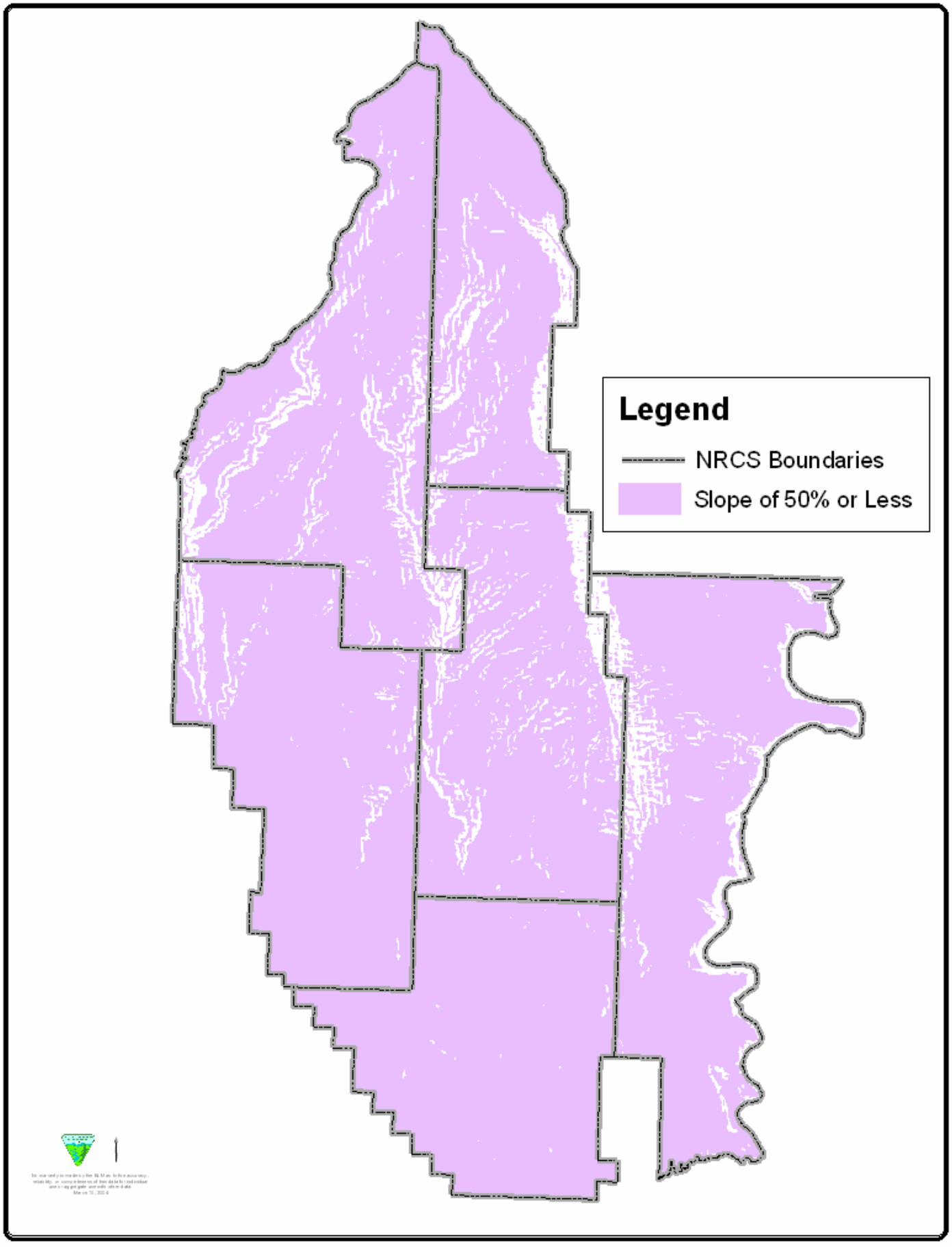


Figure 24: PMWHR Water Sources

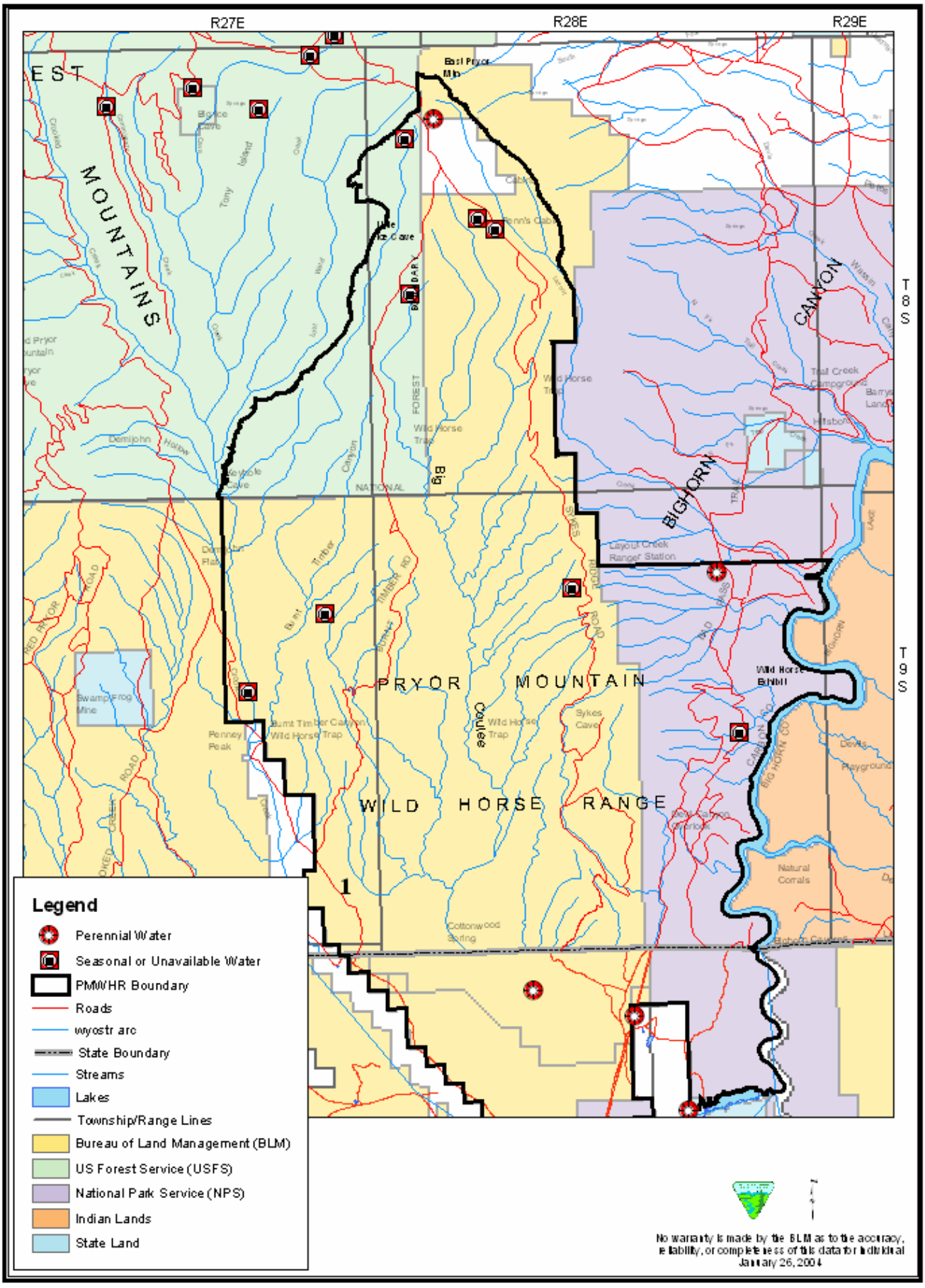


Figure 25: Grazability Scenario #1 (less than or equal to 30% slopes)

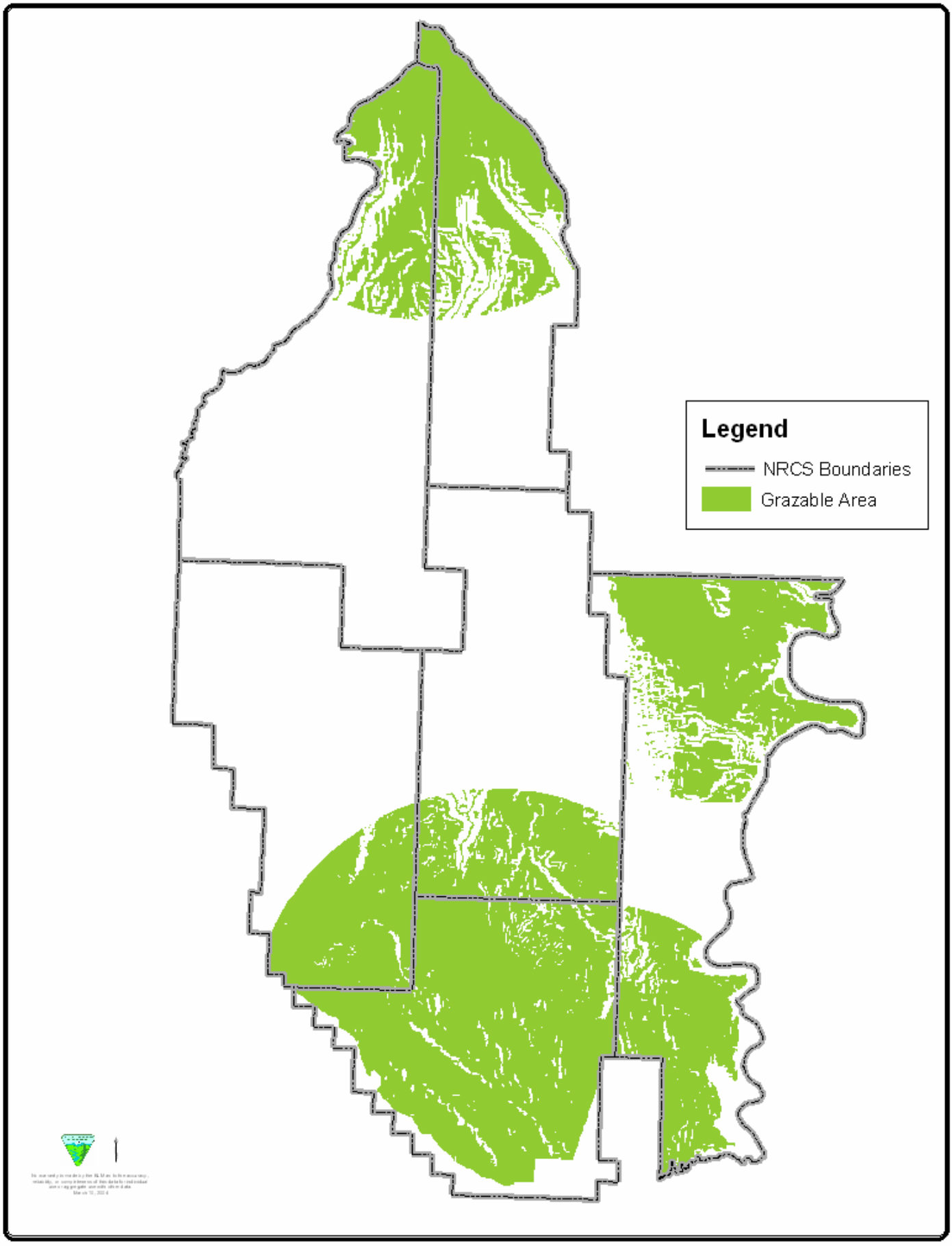


Figure 26: Grazability Scenario #1 (less than or equal to 50% slopes)

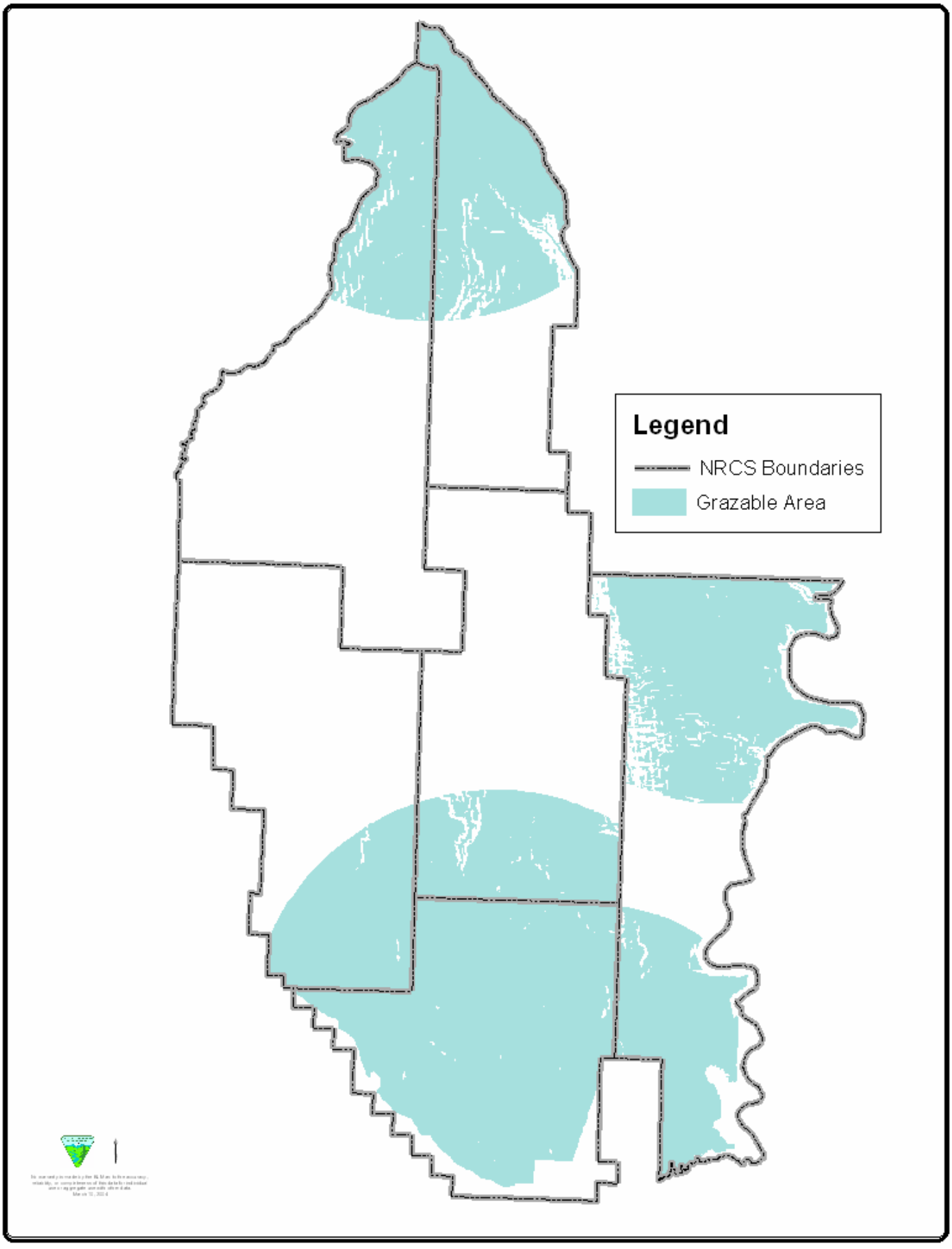


Figure 27: Grazability Scenario #2 (less than or equal to 30% slopes)

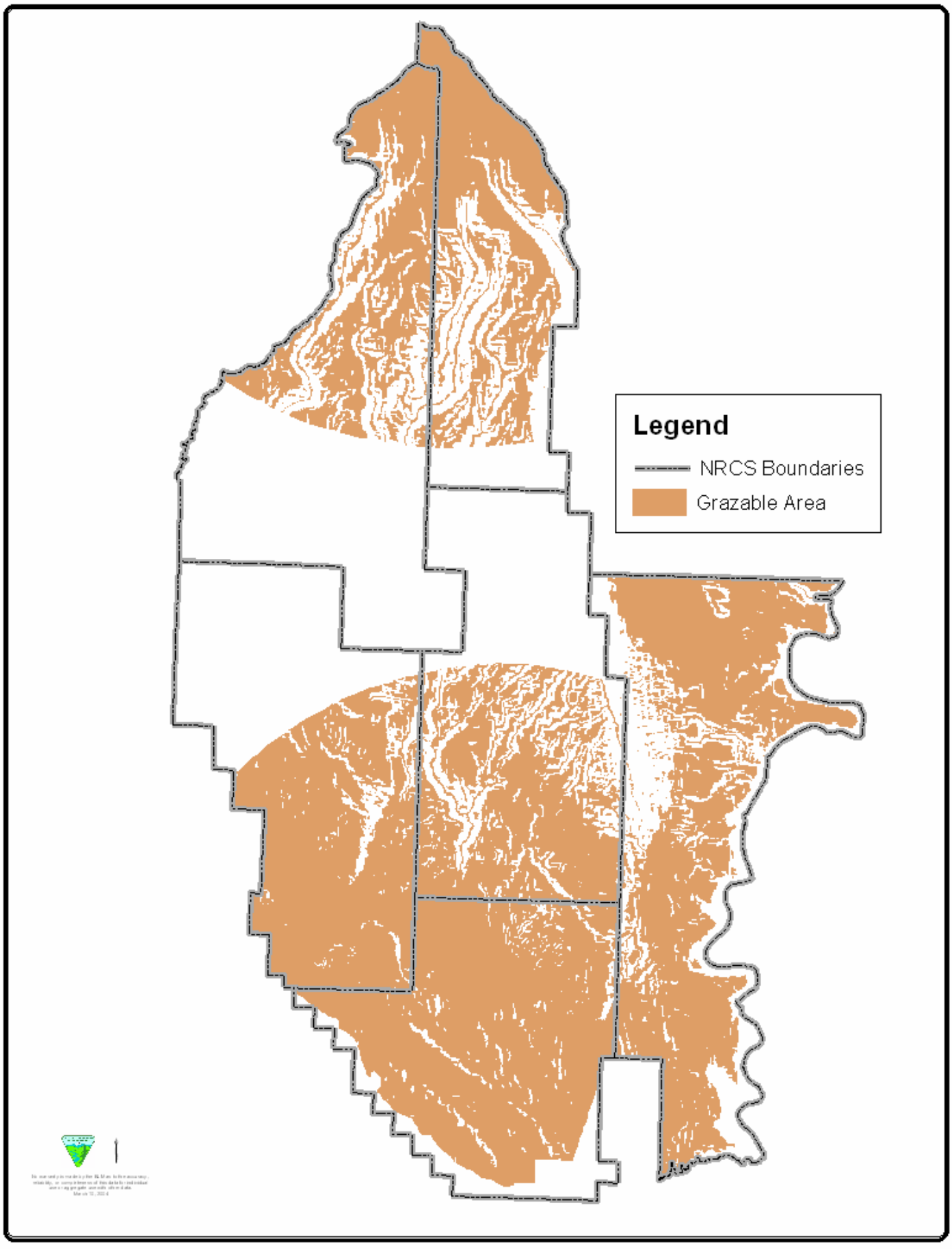


Figure 28: Grazability Scenario #2 (less than or equal to 50% slopes)

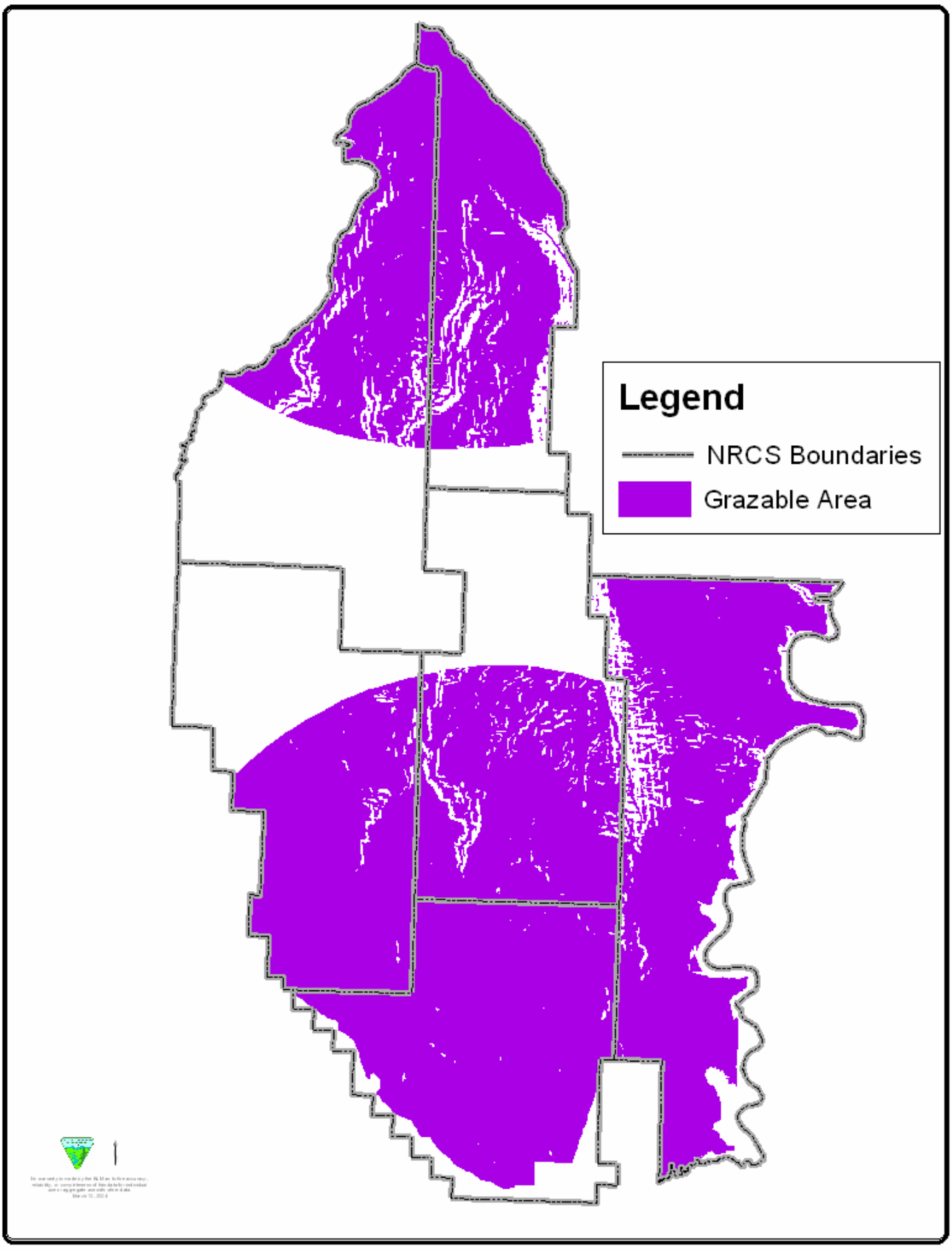


Figure 29: Grazability Scenario #3 (less than or equal to 30% slopes)

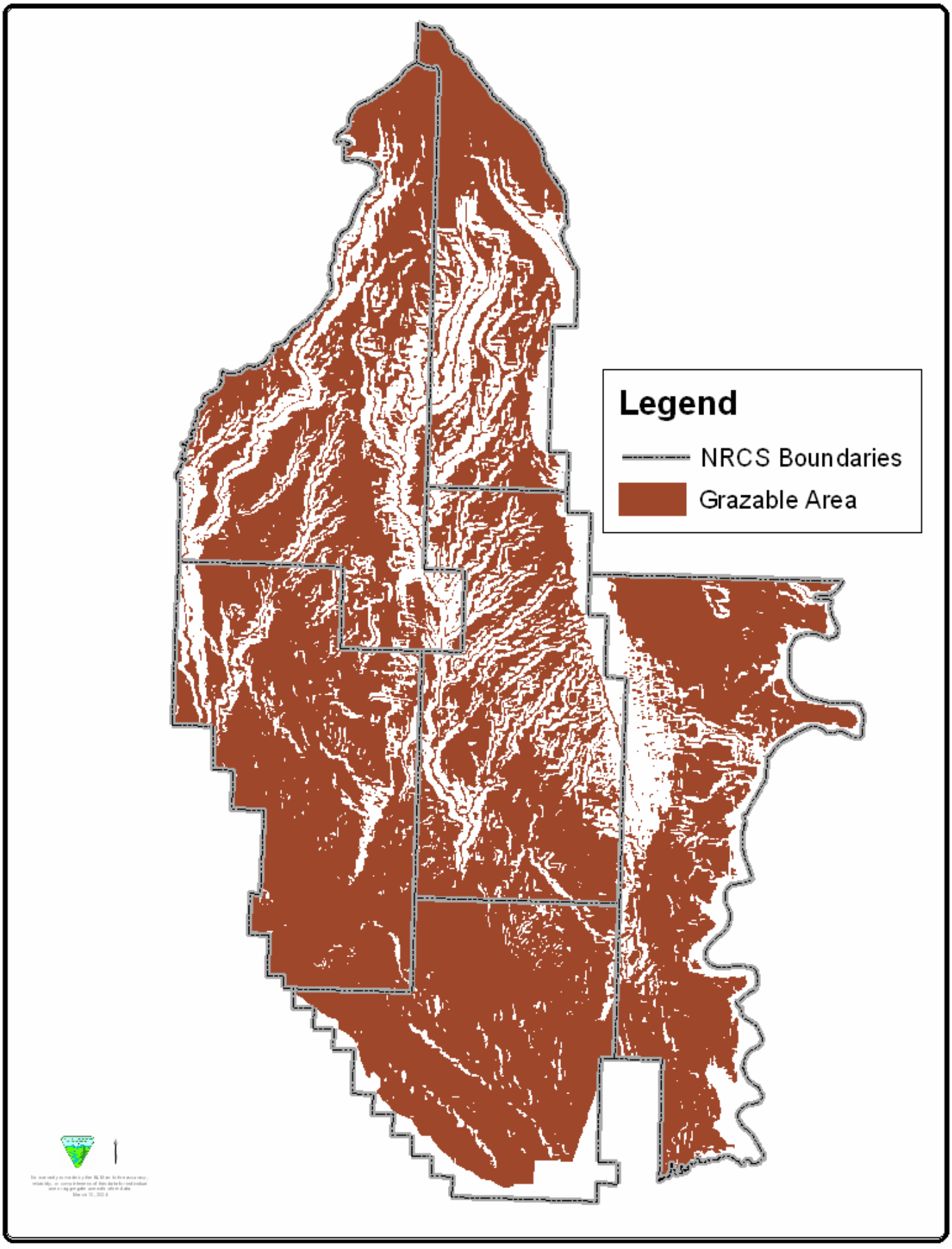


Figure 30: Grazability Scenario #3 (less than or equal to 50% slopes)

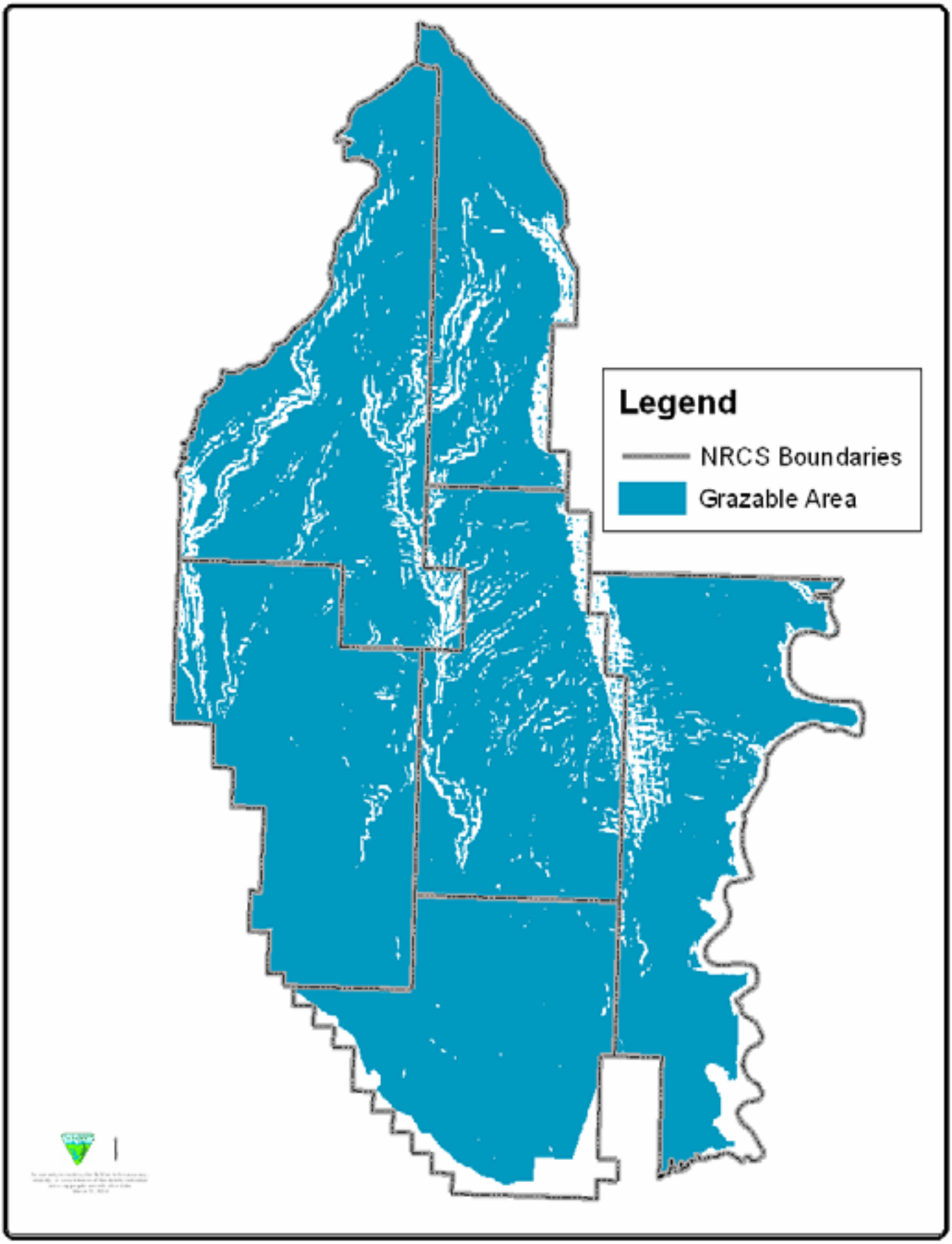


Figure 31: Grazability Scenario #4 (less than or equal to 30% slopes)

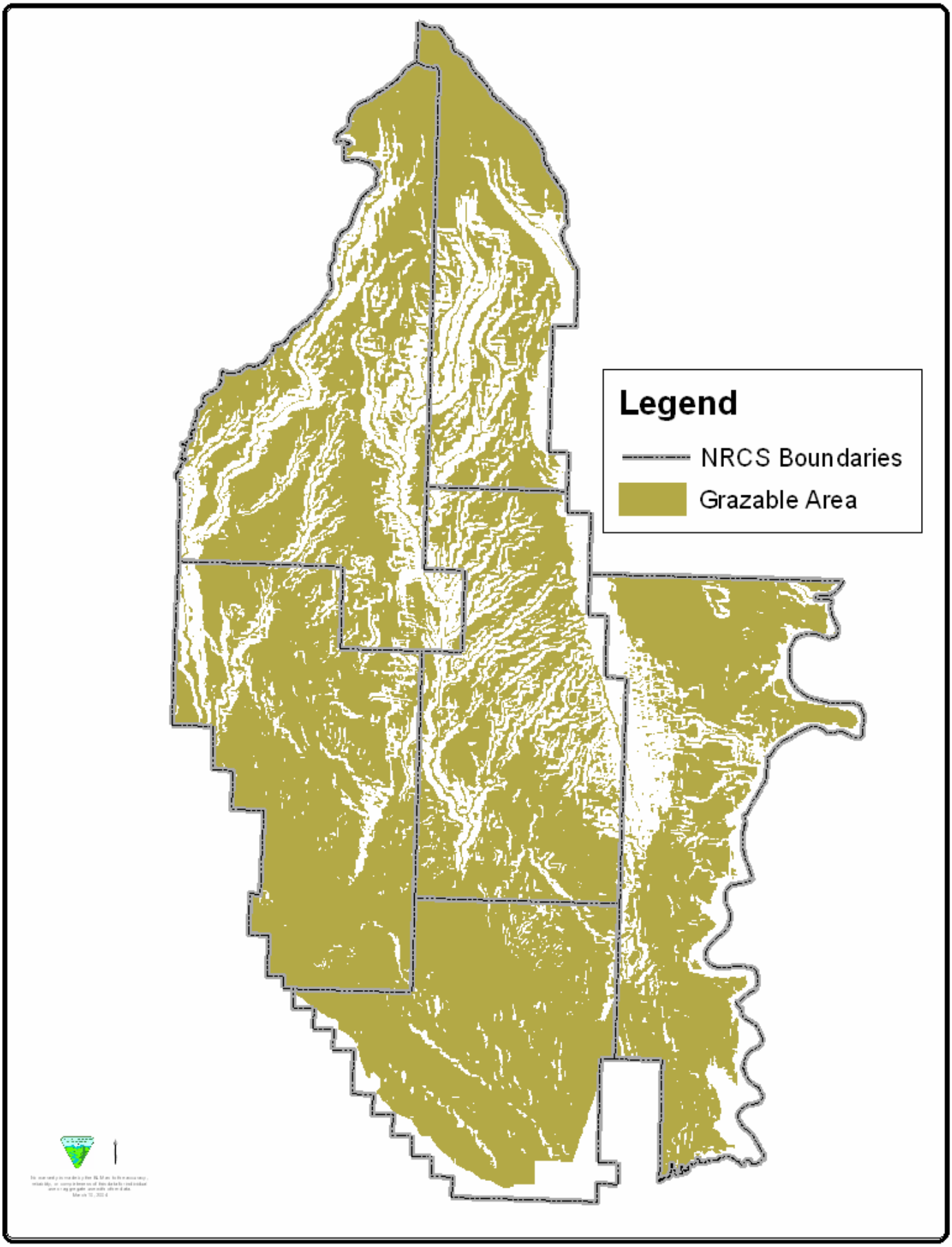
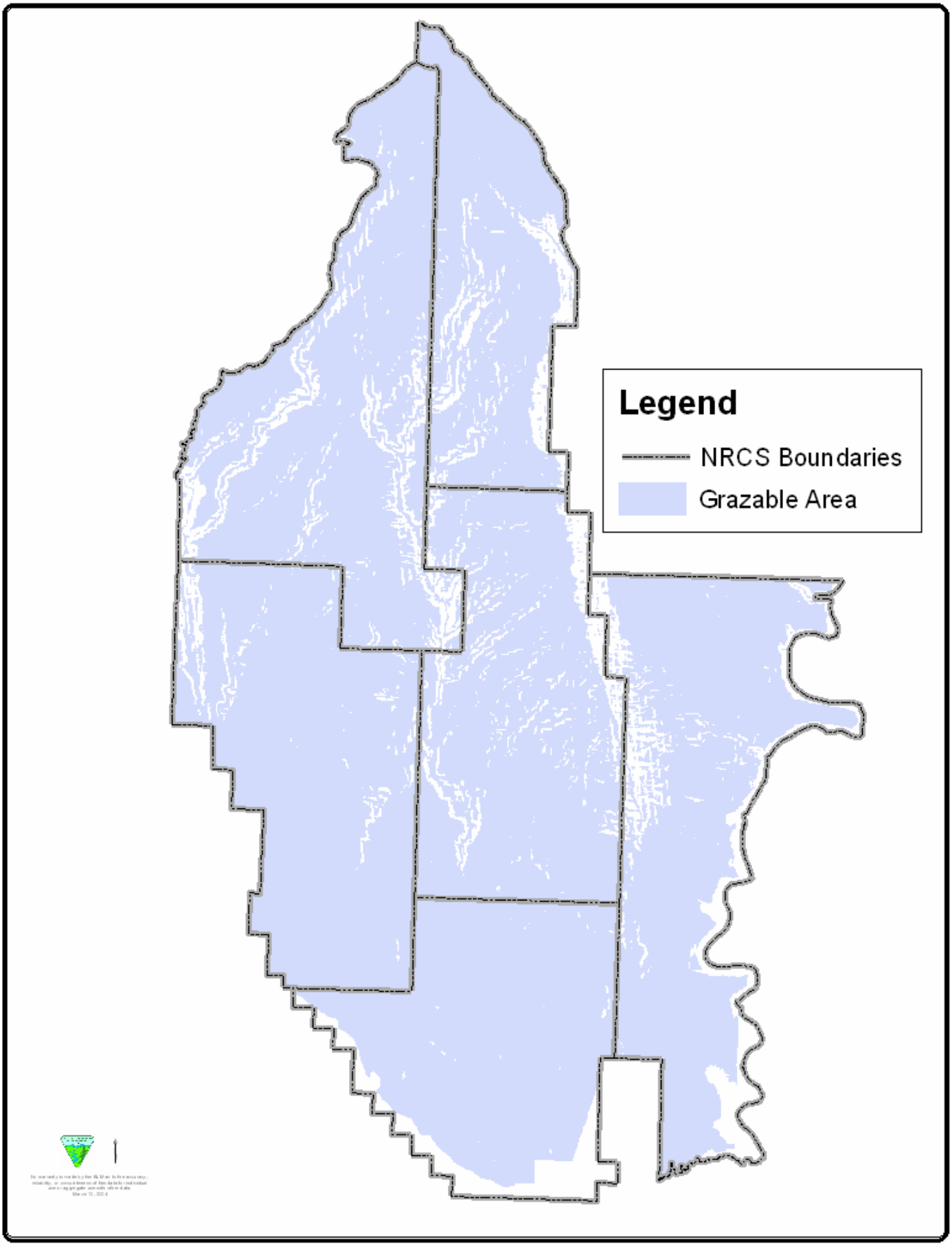


Figure 32: Grazability Scenario #4 (less than or equal to 50% slopes)



APPENDIX A: Ecological Site Definitions for the Pryor Mountain Wild Horse Range

Si	SILTY: Very fine sandy loams, loams, or silt loams more than 20 inches deep. This includes soils with as little as two inches of loamy surface over clayey subsoil.
Si-D	SILTY DROUGHTY: Very fine sandy loams, loams, and silt loams, more than 20 inches deep with at least 40 percent rock fragments on the surface or in the upper 12 inches of the profile. Occur on slopes of less than 15 percent and/or loamy soils with lower rock fragment percentages that occur on steep (generally greater than 15 percent slope), hot, south and west facing slopes. This includes soils with two inches or more loam or silt loam over clayey subsoils.
Si-St	SILTY STONY: Surface texture is loam or silt loam with stones and cobbles occupying more than 40 percent of the surface layer but depth is greater than 20 inches.
Si-St-D	SILTY STONY DROUGHTY: Surface texture is loam or silt loam with stones and cobbles occupying more than 40 percent of the surface layer. Soil profile is skeletal (greater than 35 percent coarse fragments throughout) and depth is greater than 20 inches.
Si-Ly	SILTY LIMY: Surface texture is loam or silt loam and limy (strongly effervescent) within four inches of the surface. Soil depth is grater than 20 inches.
Si-Ly-D	SILTY LIMY DROUGHTY: Surface texture is loam or silt loam and limy (strongly effervescent) within four inches of the surface and skeletal (greater than 35 percent coarse fragments throughout the profile). Soil depth is greater than 20 inches.
Sy-Ly	SANDY LIMY: Surface texture is coarse to fine sandy loams and limy (strongly effervescent). Soils are greater than 20 inches deep. In the Pryors these soils are usually associated with the Chugwater formation consisting of red shales and sandstone.
Sw	SHALLOW: Loamy soils that are 10-20 inches deep to hard rock or soft beds of decomposed granite, siltstone or sandstone. Few roots penetrate deeper than 20 inches.
Sw-Ly	SHALLOW LIMY: Shallow loamy texture soils that are very limy (violently effervescent). Soils are over limestone or limy sandstone and are 10-20 inches deep. In the Pryors these soils tend to be an eroded phase of the sandy limy sites.
SwG-Ly	SHALLOW GRAVEL LIMY: Soils 10-20 inches deep to loose sandy gravel, limy (strongly effervescent). Few roots penetrate deeper than 20 inches.

SwC-Ly	SHALLOW CLAY LIMY: Shallow clayey, limy (strongly effervescent) soils that are 10-20 inches deep to underlying shale or nearly impervious clay. Few roots penetrate deeper than 20 inches.
Sw-Ly-D	SHALLOW LIMY DROUGHTY: Surface texture is loam or silt loam, skeletal (greater than 35 percent coarse fragments throughout profile) and very limy (violently effervescent). Soils are 10-20 inches deep with inclusions of soils deeper than 20 inches. Shrub canopy is greater than 15 percent. On the PMWHR these shrubs tend to consist of Utah juniper.
Vs-Ly	VERY SHALLOW LIMY: Very limy (violently effervescent) soils generally less than 10 inches deep to a restricted layer of limestone or limy sandstone.
Vs-Ly-D	VERY SHALLOW LIMY DROUGHTY: Very limy (violently effervescent) soils, skeletal (greater than 35 percent coarse fragments throughout profile) and generally less than 10 inches to a restrictive layer of limestone or limy sandstone.
Vs-Ly,	VERY SHALLOW LIMY SHRUB: Very limy (violently effervescent) shrub soils generally less than 10 inches to a restricting layer of limestone. There are some inclusions of soils greater than 20 inches deep effectively acting like Sw-Ly-D, shrub sites. There is greater than 15 percent canopy cover of shrubs. In the Pryors these shrubs tend to consist of curl-leaf mountain mahogany.
Vs-Ly-St	VERY SHALLOW LIMY STEEP: These are very shallow limy soils on greater than 25 percent slopes.
DC	DENSE CLAY: Relatively impervious, moderately deep or deep non-granular clay soils. They may be overlain with greater than two inches of lighter textured materials. The dispersed layer is very hard to extremely hard when dry.
SH	SHALE: Readily puddled uplands where some unweathered, angular, raw shale fragments are exposed at the surface and little, if any, soil profile development is evident.
SU	SALINE UPLAND: Soils of various textures and depths that are characterized by high salinity and support a community of mostly salt-tolerant plants.

APPENDIX B

Ecological Site Descriptions - 6-9" MAP
Northern Rocky Mountains, South
Some inclusions of 10-11"

	Horse Grazing Preference	Sy-Ly	Sw-Ly	Sw-Ly-D	SwC-Ly	SwG-Ly	Vs-Ly	Vs-Ly, steep	Vs-Ly, shrub	Si-St-D	Si-Ly	Si-Ly-D	SU	SH	DC
HCPC lbs/ac															
Production 7" MAP (lbs/ac)		500	300	200	300	350	200	150	750	400	500	400	200	300	300
1" Increments [1]		120	60	40	60	70	40	40	50	70	100	70	60	20	80
Percent of Total Production Allowable															
Grasses (Max. %)[2]		65	60	60	75	80	70	45	5	60	80	75	25	65	45
bluebunch wheatgrass	P	10	60	60	25	40	70	60	5	60	70	65			
needleand thread	P	25	15	20		25	20	20		25	25	25			
Indian ricegrass	P	50	15	20		30	20	20		25	25	25	5		
thickspike wheatgrass	P	10			35	5	5	5			10				30
western wheatgrass	P														
alkali sacaton	D	20	10	10	20		5	5					15	40	
inland saltgrass	D				10									20	5
blue grama	P		10	10	10	5	5	5		10					
sedges	D	5				10	5	5		5				5	
prairie junegrass	P						5	5		10					5
Sandberg bluegrass	P												5		5
bottlebrush squirreltail	D	5					5	5		10			5		5
sand dropseed	D									10					
Fendler's threeawn	U						5	10		10					
green needlegrass	P														
other native grasses		10	5	5	5	10	5	5	5	5	10	15	10	10	5

Forbs (Max. %)		5	5	5	5	5	10	25	5	10	10	10	5	5	5
Shrubs (Max. %)		30	35	35	20	15	20	30	90	30	10	20	70	35	50
Utah juniper	N	5	5	5			5	5	50	5					
shadscale saltbrush	P	5			10	5								5	10
spiny hopsage	N													10	
fringed sagewort	U														
plains pricklypear	N	5	5	5			5	5	5						
broom snakeweed	N		5	5			5	5	5						
yucca	N	5	5	5			5	5	5					10	
Wyoming big sagebrush	U	10	10	10	10	5	10	10	10	10		5			
rubber rabbitbrush	U	5	5	5	5		5	5	5	5					
winterfat	P	10	10	10	10	5	10	10	10	10	5	10	10		
Nuttall's saltbush	P	10	10	10	10	5	10	10	10	10			60	20	20
curl-leaf mountain mahogany	N								80						
greasewood	N													20	15
bud sage	P	5	5	5	5	5	5	5	5	5			5		10
prickly phlox	N													T[3]	
green rabbitbrush	N													T	
birdsfoot sagebrush					5								10		10
four-wing saltbush		10			10										20
other native shrubs		5			5					5	5	10		5	10
Percent Cover															
Canopy Cover		50	35	30	40	40	30	20	50	40	40	40	30	35	35
Basal Cover		10	5	3	5	5	3	3	15	10	10	10	3	5	5
Bare Ground		30	30	30	30	20	30	60	30	20	30	20	50	20	30
Gravel		10	20	30	10	30	20	20	30	30	10	20	10	30	10
Litter		20	15	10	20	20	10	10	20	20	20	15	20	20	20

1. For each inch over 7” MAP, add the amount indicated. For each inch under 7” MAP, subtract the amount indicated.
2. Can count up to the percentage indicated.
3. T=Trace

APPENDIX C

Ecological Site Descriptions - 10-14" MAP
Northern Rocky Mountains, South

	Horse Grazing Preference	Sy-Ly	Vs-Ly, steep	Sw-Ly	Vs-Ly	Vs-Ly, shrub	Si-Ly	Si-Ly-D	Sw-Ly-D, shrub	Sw-Ly-D	Si-St-D	Si-St
HCPC lbs/ac												
Production 12" MAP (lbs/ac)		1,100	350	600	400	1,000	1,000	750	700	400	750	1,000
1" Increments[1]		120	40	60	40	50	160	70	60	60	60	100
Grasses (Max. %)[2]		65	45	65	70	15	80	80	45	65	70	80
bluebunch wheatgrass	P	50	40	60	60	15	70	75	40	60	65	70
needleandthread	P	25	20	15	20	5	10	15	15	15	15	10
Indian ricegrass	P	25	20	5		5		15	5	5	5	10
thickspike wheatgrass	P	5	10	5	10		15	10		5		
western wheatgrass	P											
alkali sacaton	D	10										
inland saltgrass	P											
blue grama	P									5		
threadleaf sedge	P	5	5	5	5	5	5		5		5	10
prairie junegrass	P					5			5			
Sandberg bluegrass	P					T[3]			5			
bottlebrush squirreltail	D	5				T						
sand dropseed	D					T						
Fendler's threeawn	U					5						
green needlegrass	D											
other native grasses		15	5	15	5	1	10	10	10	10	15	15
Forbs (Max. %)		5	25	10	10	5	10	10	5	10	10	10

Shrubs (Max. %)		30	30	25	20	80	10	10	50	25	20	10
Utah juniper	N	5	5			40			50			
fringed sagewort	N											
plains pricklypear	N	5							T			
broom snakeweed	N											
yucca	N	5										
Wyoming big sagebrush	U	10		10	10		5	5	10	10	5	5
rubber rabbitbrush	N	5	5									
winterfat	P	10		10	10		10	10	10	10	10	10
curl-leaf mountain mahogany	N					80					5	
black sagebrush	U			10	10	5	5	5	10	10	5	
shadscale saltbrush	U		10	5						5		
skunkbush sumac	U		15		5							
Nuttall's saltbush	P		10									
other shrubs		5	5	5		5	5	5	5	5	5	5
Percent Cover												
Canopy Cover		60	25	40	35	50	55	50	50	35	50	55
Basal Cover		15	8	10	8	15	15	15	15	10	10	15
Bare Ground		30	50	30	35	30	25	25-30	30	30	15	15
Gravel		10	20	15	20	30	10	15	25	20	25	20
Litter		30	20	20	20	20	30	30	25	20	20	25

1. For each inch over 12” MAP, add the amount indicated. For each inch under 12” MAP, subtract the amount indicated.
2. Can count up to the percentage indicated.
3. T=Trace

APPENDIX D

Ecological Site Descriptions - 15-19" MAP
Northern Rocky Mountains, South

	Horse Grazing Preference	Si-Ly	Si-Ly-D	Si-St	Si	Sw	Sw-Ly	Sw-Ly-D	Vs-Ly	Vs-Ly, shrub
HCPC lbs/ac										
Production 17" MAP (lbs/ac)		1,500	1,100	1,500	2,200	1,400	1,000	700	600	1,250
1" Increments[1]		100	70	100	140	100	80	60	40	50
Percent of Total Production Allowable										
Grasses (Max. %)[2]		75	80	75	70	75	70	65	70	35
bluebunch wheatgrass	P	70	80	70	65	70	70	60	70	30
Idaho fescue	P	10	5	15	20	15		10		
Columbia needlegrass	P	5	10	5	5	10	5			
bearded wheatgrass	P									
slender wheatgrass	P									
Parry danthonia	P									
needleandthread	P					5		10		
thickspike wheatgrass	P					10	5			
western wheatgrass	P									
prairie junegrass	P								5	
Sandberg bluegrass	P								5	
timber danthonia	D									
sedges	D				10	10	5	5	5	
other native grasses	D	10	10	15	15	15	15	10	5	5
Forbs (Max. %)		20	10	10	15	10	10	10	10	10
Shrubs (Max. %)		5	10	15	15	15	15	15	20	65
serviceberry	N									
mountain big sagebrush	U									
rose	N									

Utah juniper	N									
Wyoming big sagebrush	U		5	10	5	5		5	10	
curl-leaf mountain mahogany	N									60
black sagebrush	U		10					10		
skunkbush sumac	N									
other shrubs	N	5	5			15		15	5	5
conifers	N			10						
Percent Cover										
Canopy Cover		65	60	50	85	65	60	40	40	55
Basal Cover		15	15	15	25	15	10	15	10	15
Bare Ground		10	25-30	5	0	15	25	30	30	20
Gravel		5	10	30	T	5	5	15	20	30
Litter		40	30	40	60	50	40	35	20	25

1. For each inch over 17” MAP, add the amount indicated. For each inch under 17” MAP, subtract the amount indicated.
2. Can count up to the percentage indicated.

APPENDIX E

Ecological Site Descriptions - 20"+
Northern Rocky Mountains, South

	Horse Grazing Preference	Sw-Ly-D	Vs-Ly	Vs-Ly, shrub	Si-St	Sw	Si	Si-D	Si-Ly
HCPC lbs/ac									
Production 22" MAP (lbs/ac)		1,000	800	1,250	2,100	1,800	2,900	2,100	2,000
1" Increments[1]		60	40		120	80	140	80	100
Percent of Total Production Allowable									
Grasses (Max %)[2]		65	70	15	60	75	65	70	75
subalpine needlegrass	P	10	5		40	40	40	10	10
spike fescue	P	10	5		30	20	50	30	15
Idaho fescue	P	5	5		20	20	20	15	
big bluegrass	P						10		
purple oniongrass	P						10		
bearded wheatgrass	P					15	20	10	
mountain bromes	P							10	
Parry danthonia	P							5	
Timber danthonia	P	5	5			5	5	5	
alpine foxtail	P						5		
spike trisetum	P					5	5		
sedges	D		5		10	5	5	5	5
purple reedgrass	P						20		
bluebunch wheatgrass	P	60	65	10	10	10		50	50
other native grasses		10	5	5	15	5	5	10	10
Forbs: (Max %)		10	10	5	10	10	25	20	20

Shrubs: (Max %)		15	20	80	30	15	10	10	5
mountain big sagebrush	U	5	5		10	10	10	5	
snowberry	N				5				
serviceberry	N				5				
rose	N				5				
conifers	N				5				
curl-leaf mountain mahogany	N			75					
black sagebrush	U	5	10						
other shrubs	N	5	5	5	5	5	10	5	5
Percent Cover									
Canopy Cover		50	40	55	60	65	90	80	80
Basal Cover		15	15	15	25	20	30	25	25
Bare Ground		20	30	20	0-T[3]	10	0	0-T	0-T
Gravel		20	20	30	15	5	0-T	5	5
Litter		40	30	25	60	55	70	60	60

1. For each inch over 22" MAP, add the amount indicated. For each inch under 22" MAP, subtract the amount indicated.
2. Can count up to the percentage indicated.
3. T=Trace

APPENDIX F

Pryor Mountain Wild Horse Range Transect Summary
Forest Service Inventory Unit

UNIT	TR #	ECO SITE	MAP (IN)	SOIL MU	PLANT COMMUNITY	TOTAL PROD LBS/AC	FORAG PROD LBS/AC	STOCK. RATE AUM/AC	SIM IND %	APP. TREND	VEGETATION AND LITTER BASAL COVER %					COARSE FRAGMENT & BARE GROUND %		
											Gras	Forb	Shrb	Cryp	Litter	CoFr	Bare	TOT
FS	8	Sw-Ly	17	LE	PSSP6 / ARNO4 / ARTRW8	421	350	.098	42	Not app.	-	-	-	-	-	-	-	-
FS	6	Sw-Ly	18	LH	PSSP6 / ARNO4 / ARTRW8	559	447	.139	50	Away from	-	-	-	-	-	-	-	-
FS	7	Sw-Ly	18	LH	PSSP6 / ARNO4 / ARTRW8	649	508	.169	52	Away from	8	4	1	1	5	24	59	83
Ave.						**543**	**435**	**.135**	**48**		**8**	**4**	**1**	**1**	**5**	**24**	**59**	**83**
FS	4	Si-Ly	18	LH	PSSP6 / ARNO4 / ARTRW8	761	692	.246	41	Away from	-	-	-	-	-	-	-	-
FS	3	Si-Ly	20	DG	ARNO4 / ARTRW8 / PSSP6	553	496	.116	17	Not app.	-	-	-	-	-	-	-	-
Ave.						**657**	**594**	**.181**	**29**		-	-	-	-	-	-	-	-
FS	5	Vs-Ly	18	LE	PSSP6 / low forb	503	373	.137	69	Away from	-	-	-	-	-	-	-	-
FS	1	Vs-Ly	19	LH	PSSP6 / ARNO4 / ARTRW8	540	315	.096	59	Not app.	-	-	-	-	-	-	-	-
FS	2	Vs-Ly	19	DG	ARNO4 / ARTRW8 / PSSP6	444	296	.082	46	Not app.	-	-	-	-	-	-	-	-
FS	9	Vs-Ly	19	LH	PSSP6 / ARNO4 / ARTRW8	253	189	.055	36	Not app.	3	5	T	4	6	42	42	84
FS	10	Vs-Ly	20	LH	PSSP6 / ARNO4 / ARTRW8	400	230	.058	45	Not app.	-	-	-	-	-	-	-	-
FS	40	Vs-Ly	20		PSSP6 / ARNO4/ ARTRW8	176	145	.04	21	Away from	-	-	-	-	-	-	-	-
FS	11	Vs-Ly	21	HD	PSSP6 / low forb	260	200	.062	32	Not app.	-	-	-	-	-	-	-	-
Ave.						**368**	**249.7**	**.076**	**44**		**3**	**5**	**T**	**4**	**6**	**42**	**42**	**84**
FS	15	Sw	24	LH	FEID / forb	1,182	821	.245	41	Not app.	10	24	0	0	35	4	30	34
FS	14	Sw	25	HE	FEID / forb	628	456	.151	27	Not app.	30	30	0	0	30	0	10	10
FS	16	Sw	25	TX	FEID / forb	1,425	977	.285	38	Away from	18	44	4	0	18	2	14	16
FS	17	Sw	25	TM	LEKI / forb	775	372	.107	23	Away from	-	-	-	-	-	-	-	-
Ave.						**1,002.5**	**656.5**	**.197**	**32.3**		**19.3**	**32.7**	**1.3**	**0**	**27.7**	**2**	**18**	**20**
FS	12	Si	25	HE	FEID / forb	1,367	822	.237	33	Not app.	20	30	0	1	36	T	14	14
FS	13	Si	25	TX	FEID / forb	1,071	523	.155	28	Not app.	40	40	T	1	20	T	5	5
Ave.						**1,219**	**672.5**	**.196**	**30.5**		**30**	**35**	**T**	**1**	**28**	**T**	**9.5**	**9.5**

APPENDIX G

Pryor Mountain Wild Horse Range Transect Summary
Penn's Cabin Inventory Unit

UNIT	TR #	ECO SITE	MAP (IN)	SOIL MU	PLANT COMMUNITY	TOTAL PROD LBS/AC	FORAG PROD LBS/AC	STOCK. RATE AUM/AC	SIM IND %	APP. TREND	VEGETATION AND LITTER BASAL COVER %					COARSE FRAGMENT & BARE GROUND %		
											Gras	Forb	Shrb	Cryp	Litter	CoFr	Bare	TOT
Penn's Cabin	100	Sw-Ly-D	19	LH1	PSSP6 / low forb	341	204	.06	26	Away from	8	5	0	8	25	23	33	56
Penn's Cabin	103	Sw-Ly-D	20	LH1	PSSP6 / low forb	341	204	.06	26	Away from	-	-	-	-	-	-	-	-
Penn's Cabin	20	Sw-Ly-D	21	LH1	PSSP6 / low forb	380	270	.1	33	Away from	-	-	-	-	-	-	-	-
Penn's Cabin	101	Sw-Ly-D	21	LH1	PSSP6 / low forb	542	524	.2	54	Not app.	6	0	0	0	26	46	22	68
Ave.						**401**	**300.5**	**.105**	**34.8**		**7**	**2.5**	**0**	**4**	**25.5**	**34.5**	**27.5**	**62**
Penn's Cabin	18	Vs-Ly	20	LH1	PSSP6 / low forb	127	70	.03	16	Away from	-	-	-	-	-	-	-	-
Penn's Cabin	102	Vs-Ly	22	LE	PSSP6 / low forb	139	102	.04	17	Away from	0	0	0	0	4	66	30	96
Ave.						**133**	**86**	**.035**	**16.5**		**0**	**0**	**0**	**0**	**4**	**66**	**30**	**96**
Penn's Cabin	17	PSME warm 50-70% canopy, Sw	22	LH1	PSME / forb	45	13	.005	13	Away from	-	-	-	-	-	-	-	-
Penn's Cabin	19	PSME cool 60% canopy, deep	22	HD	PSME / forb	0	0	0	0	Away from	-	-	-	-	-	-	-	-
Penn's Cabin	104	PSME mod. 35% canopy, deep	23	HD	PSME / forb	454	70	.016	10	Away from	6	8	0	0	84	2	0	2
Penn's Cabin	10	PSME warm 64% canopy, deep	24	HD	PSME / forb	45	13	.005	13	Away from	0	0	0	0	100	0	0	0
Penn's Cabin	3	ABLA 60% canopy, deep	25	Sickel-sheets	ABLA / forb	198	64	.01	10	Away from	0	0	0	0	82	18	0	18
Ave.						**148.4**	**32**	**.007**	**9.2**		**2**	**2.7**	**0**	**0**	**88.7**	**6.7**	**0**	**6.7**
Penn's Cabin	9	Si	24	TM	LEKI2 / forb	315	158	.05	11	Not app.	5	6	0	0	77	4	8	12
Penn's Cabin	105	Si	25	TM	FEID / forb	1,157	625	.2	40	Not app.	10	4	0	0	73	0	13	13
Penn's Cabin	7	Si	25	TX	FEID / forb	438	113	.05	15	Away from	0	0	0	0	40	9	51	60
Penn's Cabin	2	Si	26	TX	FEID / forb	2,114	377	.09	31	Away from	16	21	0	0	53	0	9	9
Penn's Cabin	5	Si	26	TX	FEID / forb	852	315	.07	29	Away from	-	-	-	-	-	-	-	-
Ave.						**975.2**	**317.6**	**.092**	**25.2**		**7.8**	**7.8**	**0**	**0**	**60.8**	**3.3**	**20.3**	**23.5**

Penn's Cabin	1	Sw	26	DG	sedge / forb	140	26	.01	8	Away from	9	7	0	0	44	5	35	40
Penn's Cabin	15	Sw	26	HE	LEKI2 / forb	438	358	.14	17	Away from	2	0	0	8	68	0	18	18
Penn's Cabin	8	Sw	26	HE	sedge / forb	658	154	.04	21	Away from	5	11	0	1	27	15	40	55
Ave.						**412**	**179.3**	**.063**	**15.3**		**5.3**	**6**	**0**	**3**	**46.3**	**6.7**	**31**	**37.7**
Penn's Cabin	6	Si-St	25	TM	sedge / forb	414	100	.09	16	Away from	5	20	0	10	35	15	15	30
Penn's Cabin	12	Si-St	26	DG	sedge / forb	383	79	.08	16	Away from	5	13	3	10	33	18	18	36
Penn's Cabin	106	Si-St	26	HE	LEKI2 / forb	543	424	.15	26	Not app.	11	12	0	3	54	7	13	20
Penn's Cabin	4	Si-St	27	HE	FEID / forb	825	455	.08	24	Away from	-	-	-	-	-	-	-	-
Penn's Cabin	11	Si-St	27	LD	FEID / forb	244	116	.03	14	Away from	12	12	0	0	33	0	44	44
Ave.						**481.8**	**234.8**	**.086**	**19.2**		**8.3**	**14.3**	**0.8**	**5.8**	**38.8**	**10**	**22.5**	**32.5**

APPENDIX H

Pryor Mountain Wild Horse Range Transect Summary
Burnt Timber Inventory Unit

UNIT	TR #	ECO SITE	MAP (IN)	SOIL MU	PLANT COMMUNITY	TOTAL PROD LBS/AC	FORAG PROD LBS/AC	STOCK. RATE AUM/AC	SIM IND %	APP. TREND	VEGETATION AND LITTER BASAL COVER %					COARSE FRAGMENT & BARE GROUND %		
											Gras	Forb	Shrb	Cryp	Litter	CoFr	Bare	TOT
Burnt Timber	16	Sw-Ly	10	SA	ARTRW8 / ERBR5	269	238	.03	25	Away from	1	1	0	0	5	34	60	94
Burnt Timber	17	Sw-Ly	10	MT2	low forb / ARPUF	73	42	.005	10	Away from	1	1	2	2	10	56	28	84
Burnt Timber	18	Sw-Ly	10	SD1	ARTRW8 / ERBR5	495	98	.015	23	Not app.	-	-	-	-	-	-	-	-
Burnt Timber	19	Sw-Ly	10	SD1	ARTRW8 / ERBR5	210	66	.009	20	Away from	-	-	-	-	-	-	-	-
Burnt Timber	2*	Sw-Ly	10	SO	ARTRW8 / OPPO	244	117	.027	21	Away from	0	0	0	35	5	0	59	59
Ave.						**258.2**	**112.2**	**.017**	**19.8**		**0.7**	**0.7**	**0.7**	**12.3**	**6.7**	**30**	**49**	**79**
Burnt Timber	1*	Sy-Ly	10	SO1	ARTRW8 / HAGL	296	284	.037	11	Away from	0	0	0	7	14	3	76	79
Burnt Timber	4*	Sy-Ly	10	NF	ARTRW8 / ATCO	231	108	.019	13	Away from	0	2	1	12	22	3	54	57
Ave.						**263.5**	**196**	**.028**	**12**		**0**	**1**	**0.5**	**9.5**	**18**	**3**	**65**	**68**
Burnt Timber	37	Sw-Ly-D	11	SD	PSSP6 / low forb	264	122	.07	73	Away from	0	1	0	0	0	79	20	99
Burnt Timber	14	Sw-Ly-D	11	SD	low forb / ARPUF	70	23	.006	19	Away from	3	2	0	3	5	40	46	86
Burnt Timber	5	Sw-Ly-D	11	SA	low forb / HECO26	112	77	.02	26	Not app.	0	0	0	2	3	50	45	95
Burnt Timber	7	Sw-Ly-D	11	SD1	PSSP6 / low forb	77	17	.003	15	Away from	0	0	0	9	2	57	33	90
Burnt Timber	26	Sw-Ly-D	13	SD	PSSP6 / low forb	343	34	.012	11	Away from	-	-	-	-	-	-	-	-
Burnt Timber	38	Sw-Ly-D	15	LH1	PSSP6 / low forb	476	447	.17	60	Away from	5	7	0	0	7	37	44	81
Burnt Timber	28	Sw-Ly-D	15	SD1	PSSP6 / low Forb	224	203	.06	41	Away from	-	-	-	-	-	-	-	-
Ave.						**223.7**	**131.9**	**.049**	**35**		**1.6**	**2**	**0**	**2.8**	**3.4**	**52.6**	**37.6**	**90.2**
Burnt Timber	36	Vs-Ly, shrub	10	SA1	JUOS / CELE3 / low forb	168	0	0	19	Away from	-	-	-	-	-	-	-	-
Burnt Timber	23	Vs-Ly, shrub	13	SA	JUOS / PSSP6	187	68	.02	18	Away from	0	7	0	10	10	49	24	73
Burnt Timber	9	Vs-Ly, shrub	13	SA	JUOS / PSSP6	139	68	.02	13	Away from	0	0	0	0	7	75	19	94
Burnt Timber	27	Vs-Ly, shrub	15	LH2	JUOS / CELE3 / low forb	168	0	0	15	Away from	-	-	-	-	-	-	-	-
Ave.						**165.5**	**34**	**.01**	**16.3**		**0**	**3.5**	**0**	**5**	**8.5**	**62**	**21.5**	**83.5**

Burnt Timber	3*	Vs-Ly	10	SD1	ARPUF / low forb	31	22	.003	10	Toward	0	2	0	2	4	66	25	91
Burnt Timber	35	Vs-Ly	11	SA	low forb / ARPUF	51	50	.009	12	Away from	-	-	-	-	-	-	-	-
Burnt Timber	15	Vs-Ly	12	LH2	PSSP6 / low forb	64	40	.005	15	Away from	0	1	0	21	10	50	23	73
Burnt Timber	12	Vs-Ly	13	LH2	PSSP6 / low forb	68	67	.02	15	Away from	-	-	-	-	-	-	-	-
Burnt Timber	13	Vs-Ly	13	SA1	low forb / ARPUF	51	50	.009	12	Away from	-	-	-	-	-	-	-	-
Burnt Timber	11	Vs-Ly	15	LH1	PSSP6 / low forb	71	70	.025	14	Away from	2	6	0	0	2	62	24	86
Burnt Timber	10	Vs-Ly	16	LH1	PSSP6 / low forb	230	163	.05	30	Not app.	1	3	0	3	13	51	29	80
Ave.						**80.9**	**66**	**.017**	**15.4**		**0.8**	**3**	**0**	**6.5**	**7.3**	**57.3**	**25.3**	**82.5**
Burnt Timber	32	Sw-Ly-D, shrub	13	SA	JUOS / ARPUF	190	14	.003	25	Away from	0	1	0	0	5	74	20	94
Burnt Timber	6	Sw-Ly-D, shrub	14	SA1	JUOS / ARNO4 / PSSP6	421	273	.07	42	Not app.	1	2	1	1	16	32	45	77
Burnt Timber	21	Sw-Ly-D, shrub	16	LH2	JUOS / PSSP6	471	181	.06	43	Away from	2	2	0	2	23	53	16	69
Ave.						**360.7**	**156**	**.044**	**36.7**		**1**	**1.7**	**0.3**	**1**	**14.7**	**53**	**27**	**80**

APPENDIX I

Pryor Mountain Wild Horse Range Transect Summary
Big Coulee Inventory Unit

UNIT	TR #	ECO SITE	MAP (IN)	SOIL MU	PLANT COMMUNITY	TOTAL PROD LBS/AC	FORAG PROD LBS/AC	STOCK. RATE AUM/AC	SIM IND %	APP. TREND	VEGETATION AND LITTER BASAL COVER %					COARSE FRAGMENT & BARE GROUND %		
											Gras	Forb	Shrb	Cryp	Litter	CoFr	Bare	TOT
BC	5	Si-Ly	12	LH2	ARNO4 / ARTRW8 / PSSP6	343	318	.072	24	Away from	0	0	0	1	19	17	63	80
BC	1	Si-Ly	13	LH2	ARNO4 / ARTRW8 / PSSP6	269	221	.04	18	Away from	-	-	-	-	-	-	-	-
Ave.						**306**	**269.5**	**.056**	**21**		**0**	**0**	**0**	**1**	**19**	**17**	**63**	**80**
BC	17	Sw-Ly-D, shrub	12	SA1	JUOS / CELE3 / low forb	219	21	.005	31	Away from	-	-	-	-	-	-	-	-
BC	22	Sw-Ly-D, shrub	13	SA	JUOS / ARNO4 / PSSP6	381	35	.005	46	Away from	0	0	0	0	38	26	36	62
BC	18	Sw-Ly-D, shrub	14	LH	JUOS / ARNO4 / PSSP6	1,048	68	.015	54	Away from	2	0	1	0	56	22	19	41
BC	35	Sw-Ly-D, shrub	15	LH1	JUOS / PSSP6	1,108	116	.033	63	Away from	-	-	-	-	-	-	-	-
Ave.						**689**	**60**	**.015**	**48.5**		**1**	**0**	**0.5**	**0**	**47**	**24**	**27.5**	**51.5**
BC	16	Vs-Ly, shrub	11	SA1	JUOS / CELE3 / low forb	73	0	0	43	Away from	-	-	-	-	-	-	-	-
BC	10	Vs-Ly, shrub	12	SA	JUOS / PSSP6	328	74	.018	33	Away from	-	-	-	-	-	-	-	-
BC	6	Vs-Ly, shrub	13	LH2	CELE3 / low forb / PSSP6	190	37	.014	18	Not app.	-	-	-	-	-	-	-	-
BC	12	Vs-Ly, shrub	18	LH	CELE3 / low forb / PSSP6	459	70	.03	36	Away from	-	-	-	-	-	-	-	-
Ave.						**262.5**	**45.3**	**.016**	**32.5**		-	-	-	-	-	-	-	-
BC	9	Si-Ly-D	11	LH2	ARTRW8 / OPPO / ACHY	151	151	.023	12	Away from	0	0	0	21	33	11	32	43
BC	24	Si-Ly-D	13	SA	ARNO4 / ARTRW8 / PSSP6	268	221	.05	24	Away from	-	-	-	-	-	-	-	-
BC	21	Si-Ly-D	14	LH	PSSP6 / ARNO4 / ARTRW8	222	203	.057	25	Away from	0	2	4	4	42	16	32	48
BC	25	Si-Ly-D	14	LH1	PSSP6 / ARNO4 / ARTRW8	251	249	.066	24	Not app.	-	-	-	-	-	-	-	-
BC	33	Si-Ly-D	18	LH1	PSSP6 / ARNO4 / ARTRW8	346	280	.078	31	Away from	-	-	-	-	-	-	-	-
Ave.						**247.6**	**220.8**	**.055**	**23.2**		**0**	**1**	**2**	**12.5**	**37.5**	**13.5**	**32**	**45.5**

BC	7	Sw-Ly-D	13	SA1	CELE3 / low forb	197	0	0	23	Away from	0	0	0	0	14	58	28	86
BC	20	Sw-Ly-D	13	LH2	PSSP6 / low forb	153	65	.024	24	Away from	-	-	-	-	-	-	-	-
BC	23	Sw-Ly-D	13	SA	ARNO4 / ARTRW8 / PSSP6	186	154	.033	29	Away from	-	-	-	-	-	-	-	-
BC	26	Sw-Ly-D	14	LH1	PSSP6 / low forb	157	78	.029	28	Away from	-	-	-	-	-	-	-	-
BC	4	Sw-Ly-D	17	LH1	PSSP6 / ARNO4 / ARTRW8	112	101	.032	16	Away from	4	3	0	3	6	41	43	84
BC	11	Sw-Ly-D	18	LH	PSSP6 / low forb	360	229	.063	40	Away from	4	2	1	4	37	26	36	62
BC	30	Sw-Ly-D	19	LH1	PSSP6 / low forb	425	230	.058	31	Away from	-	-	-	-	-	-	-	-
BC	28	Sw-Ly-D	19	LH1	PSSP6 / ARNO4 / ARTRW8	963	799	.264	84	Not app.	-	-	-	-	-	-	-	-
Ave.						**319.1**	**207**	**.063**	**34.4**		**2.7**	**1.7**	**0.3**	**2.3**	**19**	**41.7**	**35.7**	**77.3**
BC	13	Vs-Ly	10	SA	low forb / ARPUF	92	0	0	15	Away from	0	0	0	27	1	51	21	72
BC	19	Vs-Ly	15	LH1	JUOS / PSSP6	407	86	.032	46	Not app.	2	2	0	2	48	26	20	46
BC	32	Vs-Ly	16	LH1	CELE3 / low forb / PSSP6	108	50	.018	19	Away from	2	4	0	0	14	56	24	80
BC	3	Vs-Ly	17	LH1	ARNO4 / ARTRW8 / PSSP6	85	64	.013	14	Away from	-	-	-	-	-	-	-	-
BC	8	Vs-Ly	18	LH1	PSSP6 / low forb	304	255	.097	48	Away from	4	3	0	6	31	23	25	48
BC	14	Vs-Ly	18	LH1	PSSP6 / ARNO4 / ARTRW8	342	260	.077	53	Away from	-	-	-	-	-	-	-	-
BC	34	Vs-Ly	19	LH1	PSSP6 / low forb	268	154	.045	30	Away from	-	-	-	-	-	-	-	-
BC	2	Vs-Ly	19	LH1	PSSP6 / ARNO4 / ARTRW8	233	217	.077	33	Away from	3	3	0	8	29	35	22	57
Ave.						**229.9**	**135.8**	**.045**	**32.3**		**2.2**	**2.4**	**0**	**8.6**	**24.6**	**38.2**	**22.4**	**60.6**
BC	15	Sw-Ly	18	LH1	PSSP6 / ARNO4 / ARTRW8	730	642	.175	58	Not app.	-	-	-	-	-	-	-	-
BC	27	PSME mod. 30-50% canopy, deep coarse	17	HD	PSME / LEKI2	88	0	0	5	Not app.	0	0	0	8	92	-	-	-
BC	29	PSME warm 10-30% canopy, Sw	19	HD	PSME / LEKI2	107	46	.016	10	Not app.	-	-	-	-	-	-	-	-
Ave.						**97.5**	**46**	**.016**	**7.5**		**0**	**0**	**0**	**8**	**92**	**-**	**-**	**-**

APPENDIX J

Pryor Mountain Wild Horse Range Transect Summary
National Park Inventory Unit

UNIT	TR #	ECO SITE	MAP (IN)	SOIL MU	PLANT COMMUNITY	TOTAL PROD LBS/AC	FORAG PROD LBS/AC	STOCK. RATE AUM/AC	SIM IND %	APP. TREND	VEGETATION AND LITTER BASAL COVER %					COARSE FRAGMENT & BARE GROUND %		
											Gras	Forb	Shrb	Cryp	Litter	CoFr	Bare	TOT
PARK	30	Sw-Ly-D	6	SD	low forb / HECO26	240	43	.01	30	Away from	2	15	0	0	12	18	52	70
PARK	27	Sy-Ly	7	SO1	ARTRW8 / HECO26	220	107	.063	30	Away from	.5	12	6	.5	10	0	71	71
PARK	10	Sy-Ly	9	SO1	ARTRW8 / HAGL	443	279	.037	23	Away from	2	5	5	.5	4	6	77	83
Ave.						**331.5**	**193**	**.05**	**26.5**		**1.3**	**8.5**	**5.5**	**.5**	**7**	**3**	**74**	**77**
PARK	6	Si-Ly	9	HK2	PSSP6 / low forb	427	210	.043	25	Away from	1	9	1	9	15	25	40	65
PARK	9	Si-Ly-D	9	SO	low forb / HECO26	210	60	.013	21	Away from	2	18	6	1	6	35	31	66
PARK	7	Si-Ly-D	9	SO1	PSSP6 / low forb	363	258	.059	51	Away from	2	3	3	15	21	22	35	67
PARK	8	Si-Ly-D	9	HK2	PSSP6 / low forb	322	170	.055	48	Away from	-	-	-	-	-	-	-	-
PARK	11	Si-Ly-D	9	HK2	PSSP6 / low forb	386	75	.021	28	Away from	2	8	3	.5	7	13	65	78
PARK	1	Si-Ly-D	10	HK2	ARNO4 / ARTRW8 / PSSP6	516	443	.131	46	Away from	10	2	1	10	28	22	27	49
PARK	2	Si-Ly-D	10	HK2	ARNO4 / ARTRW8 / PSSP6	357	192	.069	44	Away from	-	-	-	-	-	-	-	-
PARK	3	Si-Ly-D	10	HK2	PSSP6 / low forb	290	227	.039	24	Away from	-	-	-	-	-	-	-	-
PARK	14	Si-Ly-D	10	HK2	PSSP6 / low forb	858	137	.046	29	Not app.	4	5	2	4	12	24	49	73
PARK	12	Si-Ly-D	11	HK2	PSSP6 / low forb	216	115	.03	22	Away from	2	11	6	4	24	20	34	54
PARK	13	Si-Ly-D	11	HK1	JUOS / PSSP6	766	55	.011	16	Away from	1	5	5	9	22	42	17	59
Ave.						**428.4**	**173.2**	**.047**	**33**		**3.3**	**7.4**	**3.7**	**6.2**	**17.1**	**25.4**	**36.9**	**63.7**
PARK	4	Sw-Ly-D, shrub	11	HK1	JUOS / PSSP6	2,440	78	.021	70	Away from	-	-	-	-	-	-	-	-
PARK	5	Sw-Ly-D, shrub	11	HK1	JUOS / PSSP6	3,585	78	.021	70	Away from	-	-	-	-	-	-	-	-
Ave.						**3,013.5**	**78**	**.021**	**70**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

PARK	28	Vs-Ly, shrub	7	SA1	JUOS / CELE3 / low forb	816	8	.002	65	Not app.	-	-	-	-	-	-	-	-
PARK	29	Vs-Ly, shrub	8	SA1	JUOS / CELE3 / low forb	1,395	8	.001	70	Not app.	.5	1	1	2	4	62	30	92
PARK	25	Vs-Ly, shrub	8	SA1	JUOS / CELE3 / low forb	262	2	0	33	Not app.	-	-	-	-	-	-	-	-
PARK	31	Vs-Ly, shrub	9	SA1	JUOS / CELE3 / low forb	281	5	.001	33	Not app.	-	-	-	-	-	-	-	-
PARK	26	Vs-Ly, shrub	10	SA1	JUOS / CELE3 / low forb	1,004	9	.002	65	Not app.	T	.5	1	.5	2	49	45	94
PARK	18	Vs-Ly, shrub	10	LH1	JUOS / CELE3 / low forb / HECO26	521	86	.019	58	Not app.	1	4	1	6	3	40	45	85
PARK	24	Vs-Ly, shrub	10	SA1	JUOS / CELE3 / low forb / HECO26	542	84	.024	59	Not app.	-	-	-	-	-	-	-	-
PARK	15	Vs-Ly, shrub	11	LH1	JUOS / CELE3 / low forb / HECO26	809	99	.025	85	Not app.	2	7	5	7	24	26	29	55
PARK	16	Vs-Ly, shrub	11	LH1	JUOS / CELE3 / low forb / HECO26	297	106	.02	29	Away from	1	6	2	7	35	23	26	49
PARK	17	Vs-Ly, shrub	11	LH1	JUOS / CELE3 / low forb / HECO26	823	107	.014	85	Away from	.5	2	1	4	23	20	50	70
PARK	19	Vs-Ly, shrub	11	SA1	JUOS / CELE3 / low forb / HECO26	780	52	.011	69	Not app.	1	1	1	.5	2	27	66	93
PARK	20	Vs-Ly, shrub	11	SA1	JUOS / CELE3 / low forb / HECO26	325	83	.031	33	Not app.	-	-	-	-	-	-	-	-
PARK	21	Vs-Ly, shrub	11	SA1	JUOS / CELE3 / low forb / HECO26	836	102	.03	52	Not app.	2	3	1	1	1	50	42	92
PARK	22	Vs-Ly, shrub	11	SA1	JUOS / CELE3 / low forb / HECO26	1,222	88	.016	56	Not app.	.5	2	1	9	1	28	58	86
PARK	23	Vs-Ly, shrub	11	SA1	JUOS / CELE3 / low forb / HECO26	267	52	.019	28	Not app.	-	-	-	-	-	-	-	-
Ave.						**678.7**	**59.4**	**.014**	**54.7**		**.9**	**2.9**	**1.6**	**4.1**	**10.6**	**36.1**	**43.4**	**79.6**
PARK	32	PSME mod. 30-50% canopy, Sw	18	LH2	PSME / SYOR2	106	52	.01	16	Not app.	0	0	0	2	88	8	2	10

APPENDIX K

Pryor Mountain Wild Horse Range Transect Summary
Britton Springs Inventory Unit

UNIT	TR #	ECO SITE	MAP (IN)	SOIL MU	PLANT COMMUNITY	TOTAL PROD LBS/AC	FORAG PROD LBS/AC	STOCK. RATE AUM/AC	SIM IND %	APP. TREND	VEGETATION AND LITTER BASAL COVER %					COARSE FRAGMENT & BARE GROUND %		
											Gras	Forb	Shrb	Cryp	Litter	CoFr	Bare	TOT
Bri S	16	Sy-Ly	7	SD1	ARTRW8 / HAGL	230	189	.024	11	Away from	0	3	2	0	48	0	47	47
Bri S	7	Sy-Ly	7	Ng1	ARTRW8 / OPPO / BOGR2	152	149	.043	21	Away from	12	0	0	0	23	0	65	65
Bri S	15	Sy-Ly	7	MT2	ARTRW8 / OPPO / BOGR2	91	57	.018	18	Away from	1	0	0	1	19	2	77	79
Bri S	24	Si-Ly	7	SO	low forb / ARPUF	104	72	.014	18	Away from	-	-	-	-	-	-	-	-
Bri S	18	Si-Ly	8	SA1	ARTRW8 / ERBR5	67	7	.003	11	Away from	-	-	-	-	-	-	-	-
Bri S	13	Si-Ly	9	SA	PSSP6 / low forb	94	52	.02	12	Away from	-	-	-	-	-	-	-	-
Ave.						**123**	**87.7**	**.02**	**15.2**		**4.3**	**1**	**0.7**	**0.3**	**30**	**0.7**	**63**	**63.7**
Bri S	11	SU	8	SC	ATNU2 / SAVE4	1	0	0	1	Away from	0	0	0	0	1	1	98	99
Bri S	31	Sh	8	SC	ARTRW8 / ERNA10	86	78	.01	22	Away from	-	-	-	-	-	-	-	-
Bri S	17	Sw-Ly-D	8	SA1	low forb / HECO26	93	25	.009	15	Away from	-	-	-	-	-	-	-	-
Bri S	30	Vs-Ly	7	SC	low forb / ARPUF	12	0	0	5	Away from	0	1	0	1	0	46	52	98
Bri S	22	Vs-Ly	8	SO	ARTRW8 / ERBR5	36	9	.001	14	Away from	-	-	-	-	-	-	-	-
Bri S	12	Vs-Ly	8	SC1	ARTRW8 / ATCO	165	161	.033	29	Away from	2	0	0	0	20	69	9	78
Bri S	5	Vs-Ly	9	SC	low forb / HECO26	96	80	.024	35	Away from	1	0	0	0	2	43	54	97
Bri S	3	Vs-Ly	9	SO	JUOS / ARPUF	85	19	.003	19	Away from	-	-	-	-	-	-	-	-
Bri S	6	Vs-Ly	10	SC1	ARTRW8 / ATCO	125	106	.03	15	Away from	0	0	0	0	11	68	21	89
Bri S	9	Vs-Ly	11	SA	CELE3 / low forb	151	0	0	16	Away from	-	-	-	-	-	-	-	-
Ave.						**95.7**	**53.6**	**.013**	**19**		**0.8**	**0.3**	**0**	**0.3**	**8.3**	**56.5**	**34**	**90.5**
Bri S	19	SwG-Ly	9	Hf	ARTRW8 / HECO26	186	173	.034	25	Away from	1	0	0	0	10	30	59	89
Bri S	2	SwC-Ly	9	SC1	SPAI / low Forb	57	52	.015	14	Away from	2	0	0	0	6	1	91	92
Bri S	21	Si-St-D	9	SD1	low forb / HECO26	130	109	.035	23	Away from	-	-	-	-	-	-	-	-
Bri S	20	Si-St-D	9	Hk1	PSSP6 / low forb	132	80	.024	24	Away from	-	-	-	-	-	-	-	-
Ave.						**131**	**94.5**	**.03**	**23.5**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Bri S	4	Sw-Ly	9	SO	ARTRW8 / OPPO / ACHY	315	127	.021	30	Away from	-	-	-	-	-	-	-	-
Bri S	1	Sw-Ly	9	SO	ARTRW8 / OPPO	45	27	.005	11	Away from	1	0	0	0	13	18	68	86
Bri S	8	Sw-Ly	10	SA	PSSP6/ low forb	71	34	.013	15	Away from	2	5	0	3	4	60	26	86
Ave.						**143.7**	**62.7**	**.013**	**18.7**		**1.5**	**2.5**	**0**	**1.5**	**8.5**	**39**	**47**	**86**
Bri S	23	Si-Ly-D	10	SA	PSSP6 / low forb	109	44	.016	18	Away from	-	-	-	-	-	-	-	-
Bri S	14	Vs-Ly, shrub	10	SA	JUOS / CELE3 / low forb	448	0	0	50	Away from	-	-	-	-	-	-	-	-
Bri S	10	Vs-Ly, shrub	12	SA1	CELE3 / low forb	39	0	0	4	Away from	-	-	-	-	-	-	-	-
Ave.						**243.5**	**0**	**0**	**27**		-	-	-	-	-	-	-	-

APPENDIX L

Pryor Mountain Wild Horse Range Transect Summary
Ecological Reference Sites/ Exclosures

UNIT	TR #	ECO SITE	MAP (IN)	SOIL MU	PLANT COMMUNITY	TOTAL PROD LBS/AC	FORAG PROD LBS/AC	STOCK. RATE AUM/AC	SIM IND %	APP. TREND	VEGETATION AND LITTER BASAL COVER %					COARSE FRAGMENT & BARE GROUND %		
											Gras	Forb	Shrb	Cryp	Litter	CoFr	Bare	TOT
Turkey Flat EX		SwG-Ly	9	-	ACHY / KRLA2	341	341	.122	52	Toward	7	0	0	0	26	17	50	67
BC 31		Sw-Ly-D	19	LH1	PSSP6 / ARTRW8	470	455	.146	57	Not app.	-	-	-	-	-	-	-	-
Layout Crk Ranger Stn.		Si-Ly-D	9	-	PSSP6 / HECO26	450	350	.11	60	Toward	All plants 9			6	24	25	22	47
Horseshoe Bend		Si-Ly	6	-	PSSP6 / ARTRW8	350	275	.087	50	Toward	All plants 9			4	17	20	48	68
BT 8		Si-Ly	14	SA1	PSSP6 / low forb	331	318	.12	25	Not app.	0	0	0	0	20	20	60	80
EP EX		Si-Ly	25	-	forb / sedge	642	541	.132	20	Not app.	-	-	-	-	-	-	-	-
FS 15-EX		Si-D	24	LH	FEID / LEKI2	930	677	.237	44	Toward	All plants 41				29	3	27	31
BT EX		Si-D	24	-	ELMA7 / forb	844	772	.223	31	Toward	-	-	-	-	-	-	-	-
PC EX		Si	26	-	CAPU / low forb	642	541	.132	20	Not app.	-	-	-	-	-	-	-	-
PC 16		Si	26	TX	forb / sedge	449	148	.05	14	Away from	8	8	0	3	31	3	49	52
Horseshoe Bend		Sy-Ly	6	-	ACHY / ARTRW8	400	325	.102	60	Toward	All plants 9			-	19	10	40	50
Sykes Loop EX		Vs-Ly, shrub	13	-	CELE / JUOS	715	59	.022	68	Toward	-	-	-	-	-	-	-	-

APPENDIX M: Summary of NRCS Rangeland Inventory Procedures

Ecological Sites (Range Sites)

NRCS uses the ecological site as the basis for all rangeland inventory and monitoring methods. An ecological site is a distinct kind of land with specific physical characteristics that differs from other sites in its ability to produce a distinctive kind and amount of vegetation.

An ecological site is the product of all environmental factors responsible for its development, including soils characteristics, climate, topography, parent material, and living organisms. An ecological site evolves to a specific plant community based on plant species composition, proportion of species, and total productivity.

The Ecological Site Description describes the Historic Climax Plant Community (HCPC) or Potential Plant Community that has the potential of occurring on the site. It provides a table of plant species composition by dry weight, a summary of plant community dynamics, and information on management of the site for livestock grazing, wildlife habitat, and other uses.

Uses:

1. Stratifying complex range acres into ecological units with similar characteristics of soil, plants, climate, etc.

2. Evaluating changes in ecological condition

3. Determining similarity sndex (Range Condition)

4. Provides baseline information for monitoring ecological changes over time

Determining Production and Composition

Total Annual Production

All production and composition data collected by NRCS is based on weight measurements (harvested biomass). Total Annual Production is the total production of all species in the plant community (regardless of management implications). Biomass measurements are taken for all aboveground parts of plants produced during a single growth year (up to 4.5 feet high for shrubs).

Weight is determined by either: 1) harvesting and weighing all plants, 2) a combination of estimating and harvesting (double sampling), and 3) estimations only. Plot size and shape may vary, but typically for rangeland either the 9.6 square foot circular plot or 4.8 square foot circular or square plot is used. The conversion factors for these plots are: 9.6 square foot plot, multiply grams by 10 to calculate pounds per acre; 4.8 square foot plot, multiply grams by 20 to calculate pounds per acre. Smaller plot sizes may be used for homogeneous vegetation, such as meadows.

The number of plots sampled varies with the inventory goals, and the uniformity and consistency of vegetation. Five to ten plots can be used for planning information. A minimum of ten plots is required when collecting data for ecological site development.

Plant weight is determined on an air-dry weight basis (in the PMWHR study, plant samples were usually oven-dried at 150 degrees F for 24 to 48 hours). Plants may be sampled green, and later converted to dry weight using either actual measurements or dry weight charts.

Uses:

1. Determining similarity index (Range Condition)
2. Calculating percent composition of species
3. Determining forage quantity and stocking rates for livestock and wildlife
4. Monitoring tool for sampling changes in productivity over time
5. Determining rangeland health

Determing Plant Species Composition

Species percent composition is determined by dividing the total annual production for each species by the total production of the site. It is important to remember that during the time of inventory, individual species may not have reached their total production for the season yet. In this case, it is necessary to mentally reconstruct plant growth as it would most likely appear at the end of the growing season. Adjustments must also be made if plants have been grazed previous to being sampled, to account for that vegetation which has been removed by grazing.

Uses:

1. Determining similarity index (Range Condition)
2. Determining forage values for livestock and wildlife
3. Monitoring tool for sampling changes in plant community over time
4. Determining rangeland trend and health
5. Assessing infestations of noxious weeds, poisonous, or undesirable plants

Evaluating and Rating Ecological Sites

Similarity Index (Range Condition)

The purpose of determining Similarity Index (S.I.) is to provide a basis for describing the extent and direction of changes that have occurred in the present plant community, and predicting changes most likely to occur in the future based on specific management. Similarity index to Historic Climax Plant Community is a comparison of the present state of vegetation on an ecological site to that described for the Historic Climax Plant Community for the site.

Similarity index is expressed as a percent, by weight, of the HCPC for the site, for example 33 percent. This percentage will usually be representative of a particular plant community, i.e. a steady state community other than HCPC. Similarity index ratings can also be grouped into classes similar to range condition, such as 25 to 35 percent S.I. This is useful for mapping large

rangeland acres, and for identifying similar areas that may need a specific management regime for improvement.

Uses:

1. Describing the extent and direction of changes that have occurred in the present plant community

2. Identifying existing steady state plant communities, and predicting changes in species composition over time

3. Monitoring tool for sampling changes in ecological condition over time

4. Identifying trends in livestock utilization levels for different ecological sites

Rangeland Trend

Rangeland trend is the direction of change in an existing plant community relative to the Historic Climax Plant Community. Apparent trend is a point in time determination of the direction of change that is estimated from evaluating the following factors:

1. Species composition changes

2. Abundance of seedlings and young plants (reproductive capability) of desirable species

3. Plant residue amount and accumulation

4. Vigor and health of desirable plants

5. Condition of the soil surface

Ratings for trend are described as:

Toward: Moving towards the Historic Climax Plant Community

Away From: Moving away from the Historic Climax Plant Community

Not Apparent: No change detectable

Measured Trend requires actual measurements of the trend indicators over a period of time. There are several acceptable methods to use for establishing monitoring procedures (Sampling Vegetation Attributes, 1996).

Uses:

1. Describing the extent and direction of ecological changes that have occurred on the site

2. Predicting changes for the site that may occur under specific management

3. Provides information to land manager if current management is meeting desired goals for site

Rangeland Health

Rangeland health is the degree to which the integrity of the soil, vegetation, water, and ecological processes of the rangeland ecosystem are balanced and sustained. Rangeland health is evaluated using baseline information from the ecological site description. Information is used to assist the land manger understand what is happening on the ecological site relative to soil and site stability, watershed and hydrologic function, and soil and plant community integrity (Interpreting Indicators of Rangeland Health, 2000).

Seventeen ecological attributes are observed and evaluated:

- Rills
- Water flow patterns
- Pedestals and/or terracettes
- Bare ground
- Litter amount
- Gullies
- Wind scoured, blowouts, or depositional areas
- Annual production
- Soil surface resistance to erosion
- Soil surface loss or degradation
- Plant community composition and distribution relative to infiltration and runoff
- Plant mortality/ decadence
- Functional/structural groups
- Litter movement
- Invasive plants
- Reproductive capability of perennial plants
- Compaction layer

These attributes are rated according to how they agree or disagree with the ecological site description. Ratings can be grouped as indicators of positive or negative effects on:

1. Soil and site stability

2. Hydrologic function

3. Biotic integrity

Uses:

1. Describing the extent and direction of ecological changes that have occurred on the site

2. Predicting changes for the site that may occur under specific management

3. Provides information to land manager if current management is meeting desired goals for site

4. Identifies critical factors that may be contributing to site degradation

Conservation Planning Interpretations

Evaluating Stocking Rates

NRCS assists clients in setting and evaluating stocking rates on a range unit basis by three methods:

1. Evaluating the similarity index and trend of the resources, as it has responded to current stocking and management is the best way to assess if current stocking is appropriate to meet the landowner's goals and objectives, and to maintain or improve resource conditions. Often, uneven livestock distribution within a rangeland unit or area is the cause of specific areas to be overused. Improvements in fencing and watering facilities can often alleviate these problems, if overall stocking is balanced with the forage resources.

2. NRCS rangeland ecological site descriptions provide guides for setting safe stocking rates. These are calculated from typical productivity of the site based on similarity index or range condition classes. These numbers have been generated from several sets of data, however they may not be accurate within a range unit due to areas that are inaccessible to livestock or other factors which cause productivity to be variable from the norm. Therefore, stocking rates should not be based directly on the initial stocking rate guides without a careful onsite evaluation of productivity, and factors affecting grazing use of the entire range unit.

3. The stocking rate for an individual rangeland unit can be calculated using the following formula and instructions:

   Total Available Forage(lbs/acre) X Harvest Efficiency(HE) ÷ 793 lbs/Animal Unit Month

   a. Determine the total pounds per acre of available forage by summing the total pounds (dry weight) of preferred and desirable forage for the kind of livestock you are planning for, from the range inventory worksheet.

   b. Determine the appropriate Harvest Efficiency (HE) for the range unit, based on forage quality, uniformity, and type of grazing system. The average HE for rangeland under a moderate management level is 25%. Units in high similarity index with uniform grazing and a high level of grazing management may use a HE of 35%. Units in extremely low condition with poor forage quality should use a HE of 20%.

   c. Multiply the results from a. above by the results in b. above to determine the total pounds of forage that is available to be allocated.

      Example: 1390 lbs/acre x 25% HE = 348 lbs/acre

   d. Divide the answer in c. by 793 pounds per animal unit month. (Remember to calculate an Animal Unit adjustment factor if planning for animals other than a 1000-pound cow and calf under 4 months old.)

Example: 348 lbs/acre / 793 lbs/AUM = .44 AUM/acre

e. Make adjustments to this stocking rate number as needed to account for any forage that is inaccessible due to slope or other factors, or generally known by the rancher to be unused due to specific conditions, such as too far a distance from drinking water.

   Example: It is determined that 10% of a 100 acre range unit is inaccessible. The available AUMs for that unit would be .44 AUMs/acre x 100 acres x 90% = 39.6 AUMs.

This information is then calculated for each unit, and used to determine an appropriate grazing plan that will balance the forage resources with the livestock or wildlife nutritional requirements (NRCS National Range and Pasture Handbook, 1997).

APPENDIX N: Rangeland Health Indicator Evaluation Matrix

State _____ Office _____ Ecological Site _____ Site ID _____

If indicator(s) revised: Observers _____ Date _____

Departure from Ecological Site Description/Ecological Reference Area(s)					
Indicator	**Extreme**	**Moderate to Extreme**	**Moderate**	**Slight to Moderate**	**None to Slight**
1. Rills (Default description)	Rill formation is severe and well defined throughout most of the area.	Rill formation is moderately active and well defined throughout most of the area.	Active rill formation is slight at infrequent intervals; mostly in exposed areas.	No recent formation of rills; old rills have blunted or muted features.	Current or past formation of rills as expected for the site.
2. Water Flow Patterns (Default description)	Extensive and numerous; unstable with active erosion; usually connected.	More numerous than expected; deposition and cut areas common; occasionally connected.	Nearly matches what is expected for the site; erosion is minor with some instability and deposition.	Matches what is expected for the site; some evidence of minor erosion. Flow patterns are stable and short.	Matches what is expected for the site; minimal evidence of past or current soil deposition or erosion.
3. Pedestals and/or Terracettes (Default description)	Abundant active pedestalling and numerous terracettes. Many rocks and plants are pedestalled; exposed plant roots are common.	Moderate active pedestalling; terracettes common. Some rocks and plants are pedestalled with occasional exposed roots.	Slight active pedestalling; most pedestals are in flow paths and interspaces and/or on exposed slopes. Occasional terracettes present.	Active pedestalling or terracette formation is rare; some evidence of past pedestal formation, especially in water flow patterns on exposed slopes.	Current or past evidence of pedestalled plants or rocks as expected. Terracettes absent or uncommon.
4. Bare Ground (Default description)	Much higher than expected for the site. Bare areas are large and generally connected.	Moderate to much higher than expected for the site. Bare areas are large and occasionally connected.	Moderately higher than expected for the site. Bare areas are of moderate size and sporadically connected.	Slightly to moderately higher than expected for the site. Bare areas are small and rarely connected.	Amount and size of bare areas nearly to totally matches that expected for the site.

Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
5. Gullies (Default description)	Common with indications of active erosion and downcutting; vegetation is infrequent on slopes and/or bed. Nickpoints and headcuts are numerous and active.	Present with indications of active erosion; vegetation is intermittent on slopes and/or bed. Headcuts are active; down-cutting is not apparent.	Moderate in number with indications of active erosion; vegetation is intermittent on slopes and/or bed. Occasional headcuts may be present.	Uncommon, vegetation is stabilizing the bed and slopes; no signs of active headcuts, nickpoints, or bed erosion.	Drainages are represented as natural stable channels; no signs of erosion with vegetation common.
6. Wind Scoured, Blowout and/or Depositional Areas (Default description)	Extensive	Common.	Occasionally present.	Infrequent and few	Matches what is expected for the site.
7. Litter Movement (wind or water) (Default description)	Extreme; concentrated around obstructions. Most size classes of litter have been displaced.	Moderate to extreme; loosely concentrated near obstructions. Moderate to small size classes of litter have been displaced.	Moderate movement of smaller size classes in scattered concentrations around obstructions and in depressions.	Slightly to moderately more than expected for the site with only small size classes of litter being displaced.	Matches that expected for the site with a fairly uniform distribution of litter.
8. Soil Surface Resistance to Erosion (Default description)	Extremely reduced throughout the site. Biological stabilization agents including organic matter and biological crusts virtually absent.	Significantly reduced in most plant canopy interspaces and moderately reduced beneath plant canopies. Stabilizing agents present only in isolated patches.	Significantly reduced in at least half of the plant canopy interspaces, or moderately reduced throughout the site.	Some reduction in soil surface stability in plant interspaces or slight reduction throughout the site. Stabilizing agents reduced below expected.	Matches that expected for the site. Surface soil is stabilized by organic matter decomposition products and/or a biological crust.

Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
9. Soil Surface Loss or Degradation (Default description)	Soil surface horizon absent. Soil structure near surface is similar to, or more degraded, than that in subsurface horizons. No distinguishable difference in subsurface organic matter content.	Soil loss or degradation severe throughout site. Minimal differences in soil organic matter content and structure of surface and subsurface layers.	Moderate soil loss or degradation in plant interspaces with some degradation beneath plant canopies. Soil structure is degraded and soil organic matter content is significantly reduced.	Some soil loss has occurred and/or soil structure shows signs of degradation, especially in plant interspaces.	Soil surface horizon intact. Soil structure and organic matter content match that expected for site.
10. Plant Community Composition & Distribution Relative to Infiltration & Runoff (Default description)	Infiltration is severely decreased due to adverse changes in plant community composition and/or distribution. Adverse plant cover changes have occurred.	Infiltration is greatly decreased due to adverse changes in plant community composition and/or distribution. Detrimental plant cover changes have occurred.	Infiltration is moderately reduced due to adverse changes in plant community composition and/or distribution. Plant cover changes negatively affect infiltration.	Infiltration is slightly to moderately affected by minor changes in plant community composition and/or distribution. Plant cover changes have only a minor effect on infiltration.	Infiltration and runoff are equal to that expected for the site. Plant cover (distribution and amount) adequate for site protection.
11. Compaction Layer (below soil surface) (Default description)	Extensive; severely restricts water movement and root penetration.	Widespread; greatly restricts water movement and root penetration.	Moderately wide-spread, moderately restricts water movement and root penetration.	Rarely present or is thin and weakly restrictive to water movement and root penetration.	None to minimal, not restrictive to water movement and root penetration.

Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
12. Functional/ Structural Groups (F/S Groups) (Default description See Functional/ Structural Groups Worksheet	Number of F/S groups greatly reduced. AND/OR Relative dominance of F/S groups has been dramatically altered. AND/OR Number of species within F/S groups dramatically reduced.	Number of F/S groups reduced AND/OR One dominant group and/or one or more sub-dominate group replaced by F/S groups not expected for the site AND/OR Number of species within F/S groups significantly reduced.	Number of F/S groups moderately reduced. AND/OR One or more sub-dominant F/S groups replaced by F/S groups not expected for the site. AND/OR Number of species within F/S groups moderately reduced.	Number of F/S groups slightly reduced. AND/OR Relative dominance of F/S groups has been modified from that expected for the site. AND/OR number of species within F/S slightly reduced.	F/S groups and number of species in each group closely match that expected for the site.
13. Plant Mortality/ Decadence (Default Description)	Dead and/or decadent plants are common.	Dead plants and/or decadent plants are somewhat common.	Some dead and/or decadent plants are present.	Slight plant mortality and/or decadence.	Plant mortality and decadence matches that expected for the site.
14. Litter Amount (Default description)	Largely absent or dominant relative to site potential and weather.	Greatly reduced or increased relative to site potential and weather.	Moderately more or less relative to site potential and weather.	Slightly more or less relative to site potential and weather.	Amount is what is expected for the site potential and weather.
15. Annual Production (Default description)	Less than 20% of potential production.	20-40% of potential production.	40-60% of potential production.	60-80% of potential production.	Exceeds 80% of potential production.
16. Invasive Plants (Default description)	Dominate the site.	Common throughout the site.	Scattered throughout the site.	Present primarily in disturbed areas.	Rarely present on the site.
17.Reproductive Capability of Perennial Plants (native or seeded) (Default description)	Capability to produce seed or vegetative tillers is severely reduced relative to recent climatic conditions	Capability to produce seed or vegetative tillers is greatly reduced relative to recent climatic conditions	Capability to produce seed or vegetative tillers is somewhat limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is only slightly limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is not limited relative to recent climatic conditions

APPENDIX O

Pryor Mountain Wild Hourse Range Plant Species List
By Common Name

Common Name	Scientific Name	Symbol	Horse Preference	Ecological Response
alkali bluegrass (Sandberg bluegrass)	*Poa secunda* J. Presl (*Poa juncifolia*)	POSE	P	I
alkali sacaton	*Sporobolus airoides* (Torr.) Torr.	SPAI	D	D
alpine bentgrass	*Agrostis humilis* Vasey	AGHU	P	I
alpine bladderpod	*Lesquerella alpina* (Nutt.) S. Wats.	LEAL	N	I
alpine draba	*Draba alpina* L.	DRAL2	N	I
alpine foxtail	*Alopecurus alpinus* Sm.	ALAL2	P	D
alpine timothy	*Phleum alpinum* L.	PHAL2	P	D
American bistort	*Polygonum bistortoides* Pursh	POBI6	U	I
American thorow wax	*Bupleurum americanum* Coult. & Rose	BUAM2	N	I
anemone sp.	*Anemone* L.	ANEMO	N	I
aster sp.	*Aster* L.	ASTER	U	I
astragalus sp.	*Astragalus* L.	ASTRA	U	I
ballhead gilia (ballhead ipomopsis)	*Ipomopsis congesta* (Hook.) V. Grant	IPCO5	N	I
ballhead ipomopsis (ballhead gilia)	*Ipomopsis congesta* (Hook.) V. Grant	IPCO5	N	I
ballhead sandwort	*Arenaria congesta* Nutt.	ARCO5	N	I
bastard toadflax	*Comandra umbellata* (L.) Nutt.	COUM	N	I
bearded wheatgrass	*Elymus subsecundus* (Link) A. Love & D. Love	ELSU3	P	D
bentgrass sp.	*Agrostis* L.	AGROS2	P	I
bessey's locoweed (bessey's crazyweed, bessey's loco)	*Oxytropis besseyi* (Rydb.) Blank.	OXBE2	U (poisonous)	I

big bluegrass	*Poa secunda* J. Presl (*Poa ampla*)	POSE	P	I
black sagebrush	*Artemisia nova* A. Nels.	ARNO4	U	I
blanket flower	*Gaillardia* Foug.	GAILL	U	I
blazing star sp.	*Liatris* Gaertn. ex Schreb	LIATR	P	D
blue flax	*Linum perenne* L.	LIPE2	N	I
blue grama	*Bouteloua gracilis* Wild. Ex Kunth) Lag. ex Griffiths			
blue harebell	*Campanula lasiocarpa* Cham.	CALA7	N	I
bluebunch wheatgrass	*Pseudoroegneria spicata* (Pursh) A. Löve	PSSP6	P	D
bottlebrush squirreltail	*Elymus elymoides* (Raf.) Swezey	ELEL5	P	I
bristly miners candle (miners candle)	*Cryptantha interrupta* (Greene) Payson	CRIN9	N	I
broom snakeweed	*Gutierrezia sarothrae* (Pursh) Britt. & Rusby	GUSA2	N	I / V
browse milkvetch	*Astragalus cibarius* Sheldon	ASCI2	P	D
buckwheat	*Eriogonum* Michx.	ERIOG	N	I
bud sagebrush	*Picrothamnus desertorum* Nutt. *(Artemisia spinescens)*	PIDE4	D	D
buff fleabane	*Erigeron ochroleucus* Nutt	EROC	D	I
bunchberry	*Cornus canadensis* L.	COCA13	N	I
bushy princesplume	*Stanleya pinnata* (Pursh) Britt.	STPI	N (poisonous)	I
Canada single-spike sedge	*Carex scirpoidea* Michx.	CASC10	U	I
Cary's penstemon	*Penstemon caryi* Pennell	PECA17	N	I
cheatgrass	*Bromus tectorum* L.	BRTE	U	V
cinquefoil	*Potentilla* L.	POTEN	N	I
cleft-leaf groundsel	*Senecio moresbiensis* (Calder & Taylor) G.W. Douglas & G. Ruyle-Douglas	SEMO10	N	I
Columbia cutleaf	*Hymenopappus filifolius* Hook.	HYFI	N	I
Columbia needlegrass	*Achnatherum nelsonii* (Scribn.) Barkworth *(Stipa columbiana)*	ACNE9	P	D

cous biscuitroot	*Lomatium cous* (S. Wats.) Coult. & Rose	LOCO4	U	I
crested beardtongue	*Penstemon eriantherus* Pursh	PEER	N	I
curl-leaf mountain mahogany	*Cercocarpus ledifolius* Nutt.	CELE3	N	I
Cusick's bluegrass	*Poa cusickii* Vasey	POCU3	P	I
cutleaf daisy	*Erigeron compositus* Pursh	ERCO4	U	I
dandelion	*Taraxacum officinale* G.H. Weber ex Wiggers	TAOF	U	V
desert alyssum	*Alyssum desertorum Stapf*	ALDE	N	V
desert basindaisy	*Platyschkuhria integrifolia* (Gray) Rydb. *var. desertorum (M.E. Jones) W. Ellison*	PLIND	N	I
desert shooting star	*Dodecatheon conjugens* Greene	DOCO	U	I
diamondleaf saxifrage	*Saxifraga rhomboidea* Greene	SARH2	N	I
Douglas chaenactis	*Chaenactis douglasii* (Hook.) Hook. & Arn.	CHDO	N	I
Douglas fir	*Pseudotsuga menziesii* (Mirbel) Franco	PSME	N	I
Drummond's milkvetch	*Astragalus drummondii* Dougl. ex Hook.	ASDR3	N	I
Drummond's pasqueflower	*Pulsatilla* P. Mill.	PULSA	N	I
Drummond's pennyroyal	*Hedeoma drummondii* Benth.	HEDR	N	I
Drummond's rockcress	*Arabis Drummondii* Gray	ARDR	N	V
elkweed	*Frasera speciosa* Dougl. ex Griseb.	FRSP	N	I
Engelmann spruce	*Picea engelmannii* Parry ex Engelm.	PIEN	N	I
erigeron	*Erigeron* sp.	ERGI	U	I
Fendler's sandwort	*Arenaria fendleri* Gray	ARFE3	N	I
Fendler's threeawn	*Aristida purpurea* Nutt. var. *fendleriana* (Steud.) Vasey	ARPUF	U	I / V
fernleaved lousewort	*Pedicularis cystopteridifolia* Rydb.	PECY5	N	I
field chickweed	*Cerastium arvense* L.	CEAR4	N	I
figwort	*Scrophularia* L.	SCROP	N	I

fourwing saltbush	*Atriplex canescens* (Pursh) Nutt.	ATCA2	P	D
fragrant white sand verbena	*Abronia elliptica* A. Nels.	ABEL	N	I
fringed sagewort	*Artemisia frigida Willd.*	ARFR4	U	I
goldenrod	*Solidago missouriensis* Nutt.	SOMI2	N	I
gray aster	*Eurybia glauca* (Nutt.) Nesom	EUGL19	U	I
greasewood	*Sarcobatus vermiculatus* (Hook.) Torr.	SAVE4	D	I
green gentian	*Frasera speciosa* Dougl. ex Griseb.	FRSP	N	I
green rabbitbrush	*Ericameria teretifolia* (Dur. & Hilg.) Jepson	ERTE18	U	I
green sagewort	*Artemisia dracunculus* L.	ARDR4	N	I
groundsel	*Senecio* L.	SENEC	N	I
hairy goldenaster	*Heterotheca villosa* (Pursh) Shinners	HEVI4	N	I
halogeton	*Halogeton glomeratus* (Bieb.) C.A. Mey.	HAGL	N	V
hawkweed	*Hieracium L.*	HIERA	U	I
heartleaf arnica	*Arnica cordifolia* Hook.	ARCO9	N	I
hoary aster	*Machaeranthera canescens* (Pursh) Gray	MACA2	N	I
hoary balsamroot	*Balsamorhiza incana* Nutt.	BAIN	U	I
hoary townsendia	*Townsendia incana* Nutt.	TOIN	U	I
Holboell's rockcress (reflexed American rockcress)	*Arabis holboellii* Hornem.	ARHO2	N	V
Honeysuckle	*Lonicera* L.	LONIC	N	I
Hood's phlox	*Phlox hoodii Richards.*	PHHO	U	I
Hood's sedge	*Carex hoodii* Boott	CAHO5	U	I
Hooker's sandwort	*Arenaria hookeri* Nutt	ARHO4	N	I
Hooker's townsendia	*Townsendia hookeri* Beaman	TOHO	U	I
Idaho fescue	*Festuca idahoensis* Elmer	FEID	P	I

Indian ricegrass	*Achnatherum hymenoides* (Roemer & J.A. Schultes) Barkworth	ACHY	P	D
Japanese brome	*Bromus japonicus* Thunb. ex Murr.	BRJA	U	V
kingspike fescue	*Leucopoa kingii* (S. Wats.) W.A. Weber	LEKI2	P	D
kittentails	*Besseya wyomingensis* (A. Nels.) Rydb.	BEWY	U	I
larchleaf beardtongue	*Penstemon laricifolius* Hook. & Arn.	PELA9	N	I
larchleaf penstemon	*Penstemon laricifolius* Hook. & Arn.	PELA9	N	I
lesquerella	*Lesquerella* S. Wats.	LESQU	N	I
Letterman's needlegrass	*Achnatherum lettermanii* (Vasey) Barkworth	ACLE9	P	D
Liddon sedge	*Carex petasata* Dewey	CAPE7	D	I
limber pine	*Pinus flexilis* James	PIFL2	N	I
linearleaf paintbrush	*Castilleja linariifolia* Benth.	CALI4	N	I
little ricegrass	*Piptatherum exiguum* (Thurb.) Barkworth, comb. nov. ined.	PIEX3	P	D
lomatium	*Lomatium* Raf.	LOMAT	U	I
longleaf phlox	*Phlox longifolia* Nutt.	PHLO2	N	I
lupine	*Lupinus* sp.	LUPIN	U	I
malcolmia	*Malcolmia africana* (L.) Ait. f.	MAAF	N	V
many-flowered phlox	*Phlox multiflora* A. Nels.	PHMU3	N	I
mat muhly	*Muhlenbergia richardsonis* (Trin.) Rydb.	MURI	D	I
meadow deathcamas (deathcamas)	*Zigadenus venenosus* S. Wats.	ZIVE	N (poisonous)	I
milkvetch	*Astragalus* L.	ASTRA	U	I
Montana wheatgrass	*Elymus albicans* (Scribn. & J.G. Sm.) A. Löve	ELAL7	P	I
moss campion	*Silene acaulis* (L.) Jacq.	SIAC	U	I
moss phlox	*Phlox hoodii* ssp. *bryoides*	PHHOM	N	I
mountain big sagebrush	*Artemisia tridentata* Nutt. ssp. *vaseyana* (Rydb.) Beetle	ARTRV	U	I

mountain dandelion	*Agoseris glauca (Pursh) Raf.*	AGGL	U	I
mountain deathcamas	*Zigadenus elegans Pursh*	ZIEL2	N (poisonous)	I
mountain snowberry	*Symphoricarpos oreophilus* Gray	SYOR2	U	I
mustard	*Brassica* L.	BRASS2	N	V
nailwort	*Paronychia* P. Mill.	PARON	N	I
needleandthread	*Hesperostipa comata* (Trin. & Rupr.)	HECO26	P	I
needleleaf sedge	*Carex duriuscula* C.A. Mey.	CADU6	D	I
northern bedstraw	*Galium boreale* L.	GABO2	N	I
northern sweetvetch	*Hedysarum boreale* Nutt.	HEBO	U	I
northwestern Indian paintbrush	*Castilleja angustifolia* (Nutt.) G. Don	CAAN7	N	I
Nuttall's goldenweed (white spiny-tipped aster)	*Machaeranthera grindelioides* (Nutt.) Shinners	MAGR2	N	I
Nuttall's rockcress	*Arabis nuttallii* B.L. Robins.	ARNU	N	V
Nuttall's saltbush	*Atriplex nuttallii* S. Wats.	ATNU2	P	D
Nuttall's sandwort	*Minuartia nuttallii* (Pax) Briq. (*Arenaria nuttallii* Pax)	MINU4	N	I
Nuttall's violet	*Viola nuttallii* Pursh	VINU2	U	I
oneflower kelsya	*Kelseya uniflora* (S. Wats.) Rydb.	KEUN	N	I
onespike oatgrass	*Danthonia unispicata* (Thurb.) Munro ex Macoun	DAUN	D	I
Oregongrape	*Mahonia repens* (Lindl.) G. Don	MARE11	N	I
oval-leaved buckwheat	*Eriogonum ovalifolium* Nutt.	EROV	N	I
owl's clover (yellow)	*Orthocarpus luteus* Nutt.	ORLU2	N	I
Parry danthonia (Parry oatgrass)	*Danthonia parryi* Scribn.	DAPA2	D	I
pasqueflower (cutleaf anemone)	*Pulsatilla patens* (L.) P. Mill. ssp. *multifida* (Pritz.) Zamels	PUPAM	N	I
pediocactus (hedgehog-cactus)	*Echinocereus* Engelm.	ECHIN3	N	I
penstemon	*Penstemon sp.* Schmidel	PENST	N	I

pine bluegrass (Sandberg bluegrass)	*Poa secunda* J. Presl	POSE	P	I
pinegrass	*Calamagrostis rubescens* Buckl.	CARU	D	I
plains reedgrass	*Calamagrostis montanensis* Scribn. ex Vasey	CAMO	P	I
prairie cinquefoil	*Potentilla bipinnatifida* Dougl. ex Hook.	POBI10	N	I
prairie junegrass	*Koeleria macrantha* (Ledeb.) J.A. Schultes	KOMA	P	I
prairie smoke	*Geum triflorum* Pursh	GETR	N	I
pricklypear (plains)	*Opuntia polyacantha* Haw.	OPPO	N	I
pricklyphlox	*Leptodactylon* Hook. & Arn.	LEPTO2	N	I
purple clematis	*Clematis columbiana* (Nutt.) Torr. & Gray	CLCO2	N	I
purple prairie clover	*Dalea lasiathera* Gray	DALA4	P	D
purple reedgrass	*Calamagrostis purpurascens* R. Br.	CAPU	P	D
Pursh crazyweed (woollypod milkvetch)	*Astragalus purshii Dougl. ex Hook.*	ASPU9	U	I
pussytoes	*Antennaria* Gaertn.	ANTEN	N	I
rabbitbrush	*Chrysothamnus* Nutt.	CHRYS9	U	I
rabbit-foot crazyweed (haresfoot locoweed)	*Oxytropis lagopus* Nutt.	OXLA2	N	I
robust spurge	*Euphorbia brachycera* Engelm.	EUBR	N	I
rock tansy	*Sphaeromeria capitata* Nutt.	SPCA8	N	I
rockcress	*Arabis* L.	ARABI2	N	V
Rocky Mountain iris	*Iris missouriensis* Nutt.	IRMI	N	I
Rocky Mountain juniper	*Juniperus scopulorum* Sarg.	JUSC2	N	I
Rocky Mountain rockmat	*Petrophyton caespitosum* (Nutt.) Rydb.	PECA12	U	I
rough bluegrass	*Poa trivialis* L.	POTR2	P	I
rough mule's ears	*Wyethia scabra* Hook.	WYSC	N	I
rubber rabbitbrush	*Ericameria nauseosa* (Pallas ex Pursh) Nesom & Baird	ERNA10	U	I
runcinate-leaved skeletonweed (desert	*Stephanomeria runcinata* Nutt.	STRU3	N	I

wirelettuce)				
rush skeletonweed	*Lygodesmia juncea* (Pursh) D. Don ex Hook.	LYJU	N	I
Russian knapweed	*Acroptilon repens* (L.) DC.	ACRE3	N	V
Russian thistle	*Salsola kali* L.	SAKA	N	V
salsify (yellow salsify)	*Tragopogon dubius* Scop.	TRDU	U	V
salt cedar	*Tamarix ramosissima* Ledeb.	TARA	N	V
sand dropseed	*Sporobolus cryptandrus* (Torr.) Gray	SPCR	U / D	I
Sandberg bluegrass	*Poa secunda* J. Presl	POSE	P	I
scarlet globemallow	*Sphaeralcea coccinea* (Nutt.) Rydb.	SPCO	N	I
scarlet guara	*Gaura coccinea* Nutt. ex Pursh	GACO5	N	I
sedum	*Sedum* L.	SEDUM	N	I
sego lily	*Calochortus nuttallii* Torr. & Gray	CANU3	D	I
shadscale saltbush	*Atriplex confertifolia* (Torr. & Frém.) S. Wats.	ATCO	D	I
sheep cinquefoil	*Potentilla ovina* Macoun ex J.M. Macoun	POOV2	N	I
sheep fescue	*Festuca ovina* L.	FEOV	P	I
shortstem buckwheat (shrubby buckwheat)	*Eriogonum brevicaule* Nutt.	ERBR5	N	I
Shoshone carrot	*Shoshonea pulvinata* Evert & Constance	SHPU	N	I
showy aster	*Eurybia spectabilis* (Ait.) Nesom	EUSP3	N	I
showy deathcamas	*Zigadenus elegans* Pursh	ZIEL2	N (poisonous)	I
showy paintbrush	*Castilleja pulchella* Rydb.	CAPU10	N	I
silvery lupine	*Lupinus argenteus* Pursh	LUAR3	N	I
slender wheatgrass	*Elymus trachycaulus* (Link) Gould ex Shinners	ELTR7	P	D
small-leaved pussytoes	*Antennaria microphylla* Rydb.	ANMI3	N	I
snowberry	*Symphoricarpos* Duham.	SYMPH	U	I

soapweed yucca	*Yucca glauca* Nutt.	YUGL	N	I
spicate ipomopsis (spike)	*Ipomopsis spicata* (Nutt.) V. Grant	IPSP	N	I
spike fescue	*Leucopoa kingii* (S. Wats.) W.A. Weber	LEKI2	P	D
spiny hopsage	*Grayia spinosa* (Hook.) Moq.	GRSP	U	I
spotted knapweed	*Centaurea biebersteinii* DC.	CEBI2	N	V
Sprengel's sedge	*Carex sprengelii* Dewey ex Spreng.	CASP7	U	I
standing milkvetch	*Astragalus laxmannii* Jacq. var. *tananaicus* (Hultén) Barneby & Welsh	ASLAT3	U (poisonous)	I
stemless daisy	*Townsendia hookeri* Beaman	TOHO	N	I
stemless goldenweed (stemless mock goldenweed)	*Stenotus acaulis* (Nutt.) Nutt. var. *acaulis*	STACA	N	I
Stemless hymenoxies (stemless four-nerve daisy)	*Tetraneuris acaulis* (Pursh) Greene var. *acaulis*			
sticky current	*Ribes viscosissimum* Pursh	RIVI3	N	I
sticky goldenweed	*Haplopappus armerioides* (Nutt.) Gray	HAAR2	N	I
sticky goldenweed	*Stenotus armerioides* Nutt. var. *armerioides*	STARA	N	I
stiffleaf penstemon	*Penstemon aridus* Rydb.	PEAR2	N	I
stiffstem flax	*Linum rigidum* Pursh	LIRI	N	I
stonecrop	*Sedum sp.* L.	SEDUM	N	I
strawberry	*Fragaria virginiana* Duchesne	FRVI	N	I
suada (seepweed)	*Suaeda* sp. Forsk. ex J.F. Gmel.	SUAED	N	I
subalpine fir	*Abies lasiocarpa* (Hook.) Nutt.	ABLA	N	I
sun sedge	*Carex inops* Bailey ssp. *heliophila* (Mackenzie) Crins	CAINH2	U	I
sweetvetch	*Hedysarum* L.	HEDYS	U	I
tapertip hawksbeard	*Crepis acuminata* Nutt.	CRAC2	U	I
ten-petaled menzelia	*Mentzelia decapetala* (Pursh ex Sims) Urban & Gilg ex Gilg	MEDE2	N	I

teton anemone	*Anemone tetonensis* Porter ex Britt.	ANTE3	N	I
thickspike wheatgrass	*Elymus macrourus* (Turcz.) Tzvelev	ELMA7	P	I
threadleaf daisy	*Erigeron filifolius (*Hook.) Nutt.	ERFI2	U	I
threadleaf fleabane	*Erigeron filifolius* (Hook.) Nutt.	ERFI2	U	I
threadleaf sedge	*Carex filifolia* Nutt.	CAFI	P	I
timber danthonia	*Danthonia intermedia* Vasey	DAIN	D	I
timber oatgrass	*Danthonia intermedia* Vasey	DAIN	D	I
tobacco root	*Valeriana edulis* Nutt. ex Torr. & Gray	VAED	N	I
Torrey hymenoxies (sticky hymenoxys, Torrey goldenweed)	*Tetraneuris torreyana* (Nutt.) Greene	TETO	N	I
Townsend daisy	*Townsendia* Hook	TOWNS	N	I
tufted fleabane	*Erigeron caespitosus* Nutt.	ERCA2	U	I
tufted milkvetch	*Astragalus spatulatus* Sheldon	ASSP6	U	I
turpentine cymopterus	*Pteryxia petraea* (M.E. Jones) Coult. & Rose	PTPE	N	I
twinpod	*Physaria* (Nutt. ex Torr. & Gray) Gray	PHYSA2	N	I
Utah juniper	*Juniperus osteosperma* (Torr.) Little	JUOS	N	I
violet	*Viola* L.	VIOLA	U	I
wavyleaf thistle	*Cirsium undulatum* (Nutt.) Spreng.	CIUN	N	I
wax currant	*Ribes cereum* Dougl.	RICE	N	I
weedy milkvetch	*Astragalus miser* Dougl.	ASMI9	N (poisonous)	I
western clematis	*Clematis ligusticifolia* Nutt.	CLLI2	N	I
western meadow-rue	*Thalictrum occidentale* Gray	THOC	N	I
western wallflower (sanddune wallflower)	*Erysimum capitatum* (Dougl. ex Hook.) Greene var. *capitatum*	ERCAC	N	I
western wheatgrass	*Pascopyrum smithii* (Rydb.) A. Löve	PASM	P	I
western yarrow	*Achillea millefolium* L. var. *occidentalis* DC.	ACMIO	N	I

Wheeler bluegrass	*Poa nervosa* (Hook.) Vasey	PONE2	P	I
white prairie clover	*Dalea candida* Michx. ex Willd.	DACA7	P	D
white spiny-tipped aster (Nuttal's goldenweed)	*Machaeranthera grindelioides* (Nutt.) Shinners	MAGR2	N	I
Whitlow wort (Rocky Mountain nailwort)	*Paronychia pulvinata* Gray	PAPU2	N	I
wild onion	*Allium ascalonicum* L.	ALAS2	U	I
wildparsley	*Musineon* Raf.	MUSIN	U	I
winterfat	*Krascheninnikovia lanata* (Pursh) A.D.J. Meeuse & Smit	KRLA2	P	D
Wood forget-me-not (Asian)	*Myosotis asiatica* (Vesterg.) Schischkin & Sergievskaja	MYAS2	N	I
Woods' rose	*Rosa woodsii* Lindl.	ROWO	U	I
woolly astragalus (woollypod milkvetch)	*Astragalus purshii* Dougl. Ex Hook.	ASPU9	U	I
woolly groundsel	*Packera cana* (Hook.) W.A. Weber & A. Löve	PACA15	N	I
woolly Indian wheat	*Plantago patagonica* Jacq.	PLPA2	N	V
woolly plantain	*Plantago patagonica* Jacq.	PLPA2	N	V
woolly princesplume	*Stanleya tomentosa* Parry	STTO	N (poisonous)	I
Wyoming besseya (blue kittentail)	*Besseya wyomingensis* (A. Nels.) Rydb.	BEWY	N	I
Wyoming big sagebrush	*Artemisia tridentata* Nutt. ssp. *wyomingensis* Beetle & Young	ARTRW8	U	I
Wyoming kittentails	*Besseya wyomingensis* (A. Nels.) Rydb.	BEWY	N	I
yarrow	*Achillea* L.	ACHIL	N	I
yellow miners candle	*Cryptantha cana* (A. Nels.) Payson	CRCA8	N	I

P = Preferred
D = Desirable
U = Undsireable
N = Nonconsumed

D = Decreases in amount with grazing pressure
I = Increases in amount with grazing pressure
V = Generally a non-native and is invasive to disturbed sites

APPENDIX P

Pryor Mountain Wild Horse Range Plant Species List
By Scientific Name

Scientific Name	Common Name	Symbol	Horse Preference	Ecological Response
Abies lasiocarpa (Hook.) Nutt.	subalpine fir	ABLA	N	I
Abronia elliptica A. Nels.	fragrant white sand verbena	ABEL	N	I
Achillea L.	yarrow	ACHIL	N	I
Achillea millefolium L. var. *occidentalis* DC.	western yarrow	ACMIO	N	I
Achnatherum hymenoides (Roemer & J.A. Schultes) Barkworth	Indian ricegrass	ACHY	P	D
Achnatherum lettermanii (Vasey) Barkworth	Letterman's needlegrass	ACLE9	P	D
Achnatherum nelsonii (Scribn.) Barkworth *(Stipa columbiana)*	Columbia needlegrass	ACNE9	P	D
Acroptilon repens (L.) DC.	Russian knapweed	ACRE3	N	V
Agoseris glauca (Pursh) Raf.	mountain dandelion	AGGL	U	I
Agrostis humilis Vasey	alpine bentgrass	AGHU	P	I
Agrostis L.	bentgrass sp.	AGROS2	P	I
Allium ascalonicum L.	wild onion	ALAS2	U	I
Alopecurus alpinus Sm.	alpine foxtail	ALAL2	P	D
Alyssum desertorum Stapf	desert alyssum	ALDE	N	V
Anemone L.	anemone sp.	ANEMO	N	I
Anemone tetonensis Porter ex Britt.	teton anemone	ANTE3	N	I
Antennaria Gaertn.	pussytoes	ANTEN	N	I
Antennaria microphylla Rydb.	small-leaved pussytoes	ANMI3	N	I
Arabis Drummondii Gray	Drummond's rockcress	ARDR	N	V

Arabis holboellii Hornem.	Holboell's rockcress (reflexed American rockcress)	ARHO2	N	V
Arabis L.	rockcress	ARABI2	N	V
Arabis nuttallii B.L. Robins.	Nuttall's rockcress	ARNU	N	V
Arenaria congesta Nutt.	ballhead sandwort	ARCO5	N	I
Arenaria fendleri Gray	Fendler's sandwort	ARFE3	N	I
Arenaria hookeri Nutt	Hooker's sandwort	ARHO4	N	I
Aristida purpurea Nutt. var. *fendleriana* (Steud.) Vasey	Fendler's threeawn	ARPUF	U	I / V
Arnica cordifolia Hook.	heartleaf arnica	ARCO9	N	I
Artemisia dracunculus L.	green sagewort	ARDR4	N	I
Artemisia frigida Willd.	fringed sagewort	ARFR4	U	I
Artemisia nova A. Nels.	black sagebrush	ARNO4	U	I
Artemisia tridentata Nutt. ssp. *wyomingensis* Beetle & Young	Wyoming big sagebrush	ARTRW8	U	I
Artemisia tridentata Nutt. ssp. *vaseyana* (Rydb.) Beetle	mountain big sagebrush	ARTRV	U	I
Aster L.	aster sp.	ASTER	U	I
Astragalus cibarius Sheldon	browse milkvetch	ASCI2	P	D
Astragalus drummondii Dougl. ex Hook.	Drummond's milkvetch	ASDR3	N	I
Astragalus L.	astragalus sp.	ASTRA	U	I
Astragalus L.	milkvetch	ASTRA	U	I
Astragalus laxmannii Jacq. var. *tananaicus* (Hultén) Barneby & Welsh	standing milkvetch	ASLAT3	U (poisonous)	I
Astragalus miser Dougl.	weedy milkvetch	ASMI9	N (poisonous)	I
Astragalus purshii Dougl. ex Hook.	woolly astragalus (woollypod milkvetch)	ASPU9	U	I
Astragalus purshii Dougl. ex Hook.	Pursh crazyweed (woollypod milkvetch)	ASPU9	U	I
Astragalus spatulatus Sheldon	tufted milkvetch	ASSP6	U	I

Atriplex canescens (Pursh) Nutt.	fourwing saltbush	ATCA2	P	D
Atriplex confertifolia (Torr. & Frém.) S. Wats.	shadscale saltbush	ATCO	D	I
Atriplex nuttallii S. Wats.	Nuttall's saltbush	ATNU2	P	D
Balsamorhiza incana Nutt.	hoary balsamroot	BAIN	U	I
Besseya wyomingensis (A. Nels.) Rydb.	kittentails	BEWY	U	I
Besseya wyomingensis (A. Nels.) Rydb.	Wyoming besseya (blue kittentail)	BEWY	N	I
Besseya wyomingensis (A. Nels.) Rydb.	Wyoming kittentails	BEWY	N	I
Bouteloua gracilis (Willd. ex Kunth) Lag. ex Griffiths	blue grama	BOGR2	P	I
Brassica L.	mustard	BRASS2	N	V
Bromus japonicus Thunb. ex Murr.	Japanese brome	BRJA	U	V
Bromus tectorum L.	cheatgrass	BRTE	U	V
Bupleurum americanum Coult. & Rose	American thorow wax	BUAM2	N	I
Calamagrostis montanensis Scribn. ex Vasey	plains reedgrass	CAMO	P	I
Calamagrostis purpurascens R. Br.	purple reedgrass	CAPU	P	D
Calamagrostis rubescens Buckl.	pinegrass	CARU	D	I
Calochortus nuttallii Torr. & Gray	sego lily	CANU3	D	I
Campanula lasiocarpa Cham.	blue harebell	CALA7	N	I
Carex duriuscula C.A. Mey.	needleleaf sedge	CADU6	D	I
Carex filifolia Nutt.	threadleaf sedge	CAFI	P	I
Carex hoodii Boott	Hood's sedge	CAHO5	U	I
Carex inops Bailey ssp. *heliophila* (Mackenzie) Crins	sun sedge	CAINH2	U	I
Carex petasata Dewey	Liddon sedge	CAPE7	D	I
Carex scirpoidea Michx.	Canada single-spike sedge	CASC10	U	I
Carex sprengelii Dewey ex Spreng.	Sprengel's sedge	CASP7	U	I

Castilleja angustifolia (Nutt.) G. Don	northwestern Indian paintbrush	CAAN7	N	I
Castilleja linariifolia Benth.	linearleaf paintbrush	CALI4	N	I
Castilleja pulchella Rydb.	showy paintbrush	CAPU10	N	I
Centaurea biebersteinii DC.	spotted knapweed	CEBI2	N	V
Cerastium arvense L.	field chickweed	CEAR4	N	I
Cercocarpus ledifolius Nutt.	curl-leaf mountain mahogany	CELE3	N	I
Chaenactis douglasii (Hook.) Hook. & Arn.	Douglas chaenactis	CHDO	N	I
Chrysothamnus Nutt.	rabbitbrush	CHRYS9	U	I
Cirsium undulatum (Nutt.) Spreng.	wavyleaf thistle	CIUN	N	I
Clematis columbiana (Nutt.) Torr. & Gray	purple clematis	CLCO2	N	I
Clematis ligusticifolia Nutt.	western clematis	CLLI2	N	I
Comandra umbellata (L.) Nutt.	bastard toadflax	COUM	N	I
Cornus canadensis L.	bunchberry	COCA13	N	I
Crepis acuminata Nutt.	tapertip hawksbeard	CRAC2	U	I
Cryptantha cana (A. Nels.) Payson	yellow miners candle	CRCA8	N	I
Cryptantha interrupta (Greene) Payson	bristly miners candle (miners candle)	CRIN9	N	I
Dalea candida Michx. ex Willd.	white prairie clover	DACA7	P	D
Dalea lasiathera Gray	purple prairie clover	DALA4	P	D
Danthonia intermedia Vasey	timber danthonia	DAIN	D	I
Danthonia intermedia Vasey	timber oatgrass	DAIN	D	I
Danthonia parryi Scribn.	Parry danthonia (Parry oatgrass)	DAPA2	D	I
Danthonia unispicata (Thurb.) Munro ex Macoun	onespike oatgrass	DAUN	D	I
Dodecatheon conjugens Greene	desert shooting star	DOCO	U	I
Draba alpina L.	alpine draba	DRAL2	N	I
Echinocereus Engelm.	pediocactus (hedgehog-cactus)	ECHIN3	N	I

Elymus albicans (Scribn. & J.G. Sm.) A. Löve	Montana wheatgrass	ELAL7	P	I
Elymus elymoides (Raf.) Swezey	bottlebrush squirreltail	ELEL5	P	I
Elymus macrourus (Turcz.) Tzvelev	thickspike wheatgrass	ELMA7	P	I
Elymus subsecundus (Link) A. Love & D. Love	bearded wheatgrass	ELSU3	P	D
Elymus trachycaulus (Link) Gould ex Shinners	slender wheatgrass	ELTR7	P	D
Ericameria nauseosa (Pallas ex Pursh) Nesom & Baird	rubber rabbitbrush	ERNA10	U	I
Ericameria teretifolia (Dur. & Hilg.) Jepson	green rabbitbrush	ERTE18	U	I
Erigeron caespitosus Nutt.	tufted fleabane	ERCA2	U	I
Erigeron compositus Pursh	cutleaf daisy	ERCO4	U	I
*Erigeron filifolius (*Hook.) Nutt.	threadleaf daisy	ERFI2	U	I
Erigeron filifolius (Hook.) Nutt.	threadleaf fleabane	ERFI2	U	I
Erigeron ochroleucus Nutt	buff fleabane	EROC	D	I
Erigeron sp.	erigeron	ERGI	U	I
Eriogonum brevicaule Nutt.	shortstem buckwheat (shrubby buckwheat)	ERBR5	N	I
Eriogonum Michx.	buckwheat	ERIOG	N	I
Eriogonum ovalifolium Nutt.	oval-leaved buckwheat	EROV	N	I
Erysimum capitatum (Dougl. ex Hook.) Greene var. *capitatum*	western wallflower (sanddune wallflower)	ERCAC	N	I
Euphorbia brachycera Engelm.	robust spurge	EUBR	N	I
Eurybia glauca (Nutt.) Nesom	gray aster	EUGL19	U	I
Eurybia spectabilis (Ait.) Nesom	showy aster	EUSP3	N	I
Festuca idahoensis Elmer	Idaho fescue	FEID	P	I
Festuca ovina L.	sheep fescue	FEOV	P	I
Fragaria virginiana Duchesne	strawberry	FRVI	N	I
Frasera speciosa Dougl. ex Griseb.	elkweed	FRSP	N	I

Frasera speciosa Dougl. ex Griseb.	green gentian	FRSP	N	I
Gaillardia Foug.	blanket flower	GAILL	U	I
Galium boreale L.	northern bedstraw	GABO2	N	I
Gaura coccinea Nutt. ex Pursh	scarlet guara	GACO5	N	I
Geum triflorum Pursh	prairie smoke	GETR	N	I
Grayia spinosa (Hook.) Moq.	spiny hopsage	GRSP	U	I
Gutierrezia sarothrae (Pursh) Britt. & Rusby	broom snakeweed	GUSA2	N	I / V
Halogeton glomeratus (Bieb.) C.A. Mey.	halogeton	HAGL	N	V
Haplopappus armerioides (Nutt.) Gray	sticky goldenweed	HAAR2	N	I
Hedeoma drummondii Benth.	Drummond's pennyroyal	HEDR	N	I
Hedysarum boreale Nutt.	northern sweetvetch	HEBO	U	I
Hedysarum L.	sweetvetch	HEDYS	U	I
Hesperostipa comata (Trin. & Rupr.)	needleandthread	HECO26	P	I
Heterotheca villosa (Pursh) Shinners	hairy goldenaster	HEVI4	N	I
Hieracium L.	hawkweed	HIERA	U	I
Hymenopappus filifolius Hook.	Columbia cutleaf	HYFI	N	I
Ipomopsis congesta (Hook.) V. Grant	ballhead gilia (ballhead ipomopsis)	IPCO5	N	I
Ipomopsis congesta (Hook.) V. Grant	ballhead ipomopsis (ballhead gilia)	IPCO5	N	I
Ipomopsis spicata (Nutt.) V. Grant	spicate ipomopsis (spike)	IPSP	N	I
Iris missouriensis Nutt.	Rocky Mountain iris	IRMI	N	I
Juniperus osteosperma (Torr.) Little	Utah juniper	JUOS	N	I
Juniperus scopulorum Sarg.	Rocky Mountain juniper	JUSC2	N	I
Kelseya uniflora (S. Wats.) Rydb.	oneflower kelsya	KEUN	N	I
Koeleria macrantha (Ledeb.) J.A. Schultes	prairie junegrass	KOMA	P	I

Krascheninnikovia lanata (Pursh) A.D.J. Meeuse & Smit	winterfat	KRLA2	P	D
Leptodactylon Hook. & Arn.	pricklyphlox	LEPTO2	N	I
Lesquerella alpina (Nutt.) S. Wats.	alpine bladderpod	LEAL	N	I
Lesquerella S. Wats.	lesquerella	LESQU	N	I
Leucopoa kingii (S. Wats.) W.A. Weber	kingspike fescue	LEKI2	P	D
Leucopoa kingii (S. Wats.) W.A. Weber	spike fescue	LEKI2	P	D
Liatris Gaertn. ex Schreb	blazing star sp.	LIATR	P	D
Linum perenne L.	blue flax	LIPE2	N	I
Linum rigidum Pursh	stiffstem flax	LIRI	N	I
Lomatium cous (S. Wats.) Coult. & Rose	cous biscuitroot	LOCO4	U	I
Lomatium Raf.	lomatium	LOMAT	U	I
Lonicera L.	Honeysuckle	LONIC	N	I
Lupinus argenteus Pursh	silvery lupine	LUAR3	N	I
Lupinus sp.	lupine	LUPIN	U	I
Lygodesmia juncea (Pursh) D. Don ex Hook.	rush skeletonweed	LYJU	N	I
Machaeranthera canescens (Pursh) Gray	hoary aster	MACA2	N	I
Machaeranthera grindelioides (Nutt.) Shinners	Nuttall's goldenweed (white spiny-tipped aster)	MAGR2	N	I
Machaeranthera grindelioides (Nutt.) Shinners	white spiny-tipped aster (Nuttal's goldenweed)	MAGR2	N	I
Mahonia repens (Lindl.) G. Don	Oregongrape	MARE11	N	I
Malcolmia africana (L.) Ait. f.	malcolmia	MAAF	N	V
Mentzelia decapetala (Pursh ex Sims) Urban & Gilg ex Gilg	ten-petaled menzelia	MEDE2	N	I
Minuartia nuttallii (Pax) Briq. (*Arenaria nuttallii* Pax)	Nuttall's sandwort	MINU4	N	I
Muhlenbergia richardsonis (Trin.) Rydb.	mat muhly	MURI	D	I

Musineon Raf.	wildparsley	MUSIN	U	I
Myosotis asiatica (Vesterg.) Schischkin & Sergievskaja	Wood forget-me-not (Asian)	MYAS2	N	I
Opuntia polyacantha Haw.	pricklypear (plains)	OPPO	N	I
Orthocarpus luteus Nutt.	owl's clover (yellow)	ORLU2	N	I
Oxytropis besseyi (Rydb.) Blank.	bessey's locoweed (bessey's crazyweed, bessey's loco)	OXBE2	U (poisonous)	I
Oxytropis lagopus Nutt.	rabbit-foot crazyweed (haresfoot locoweed)	OXLA2	N	I
Packera cana (Hook.) W.A. Weber & A. Löve	woolly groundsel	PACA15	N	I
Paronychia P. Mill.	nailwort	PARON	N	I
Paronychia pulvinata Gray	Whitlow wort (Rocky Mountain nailwort)	PAPU2	N	I
Pascopyrum smithii (Rydb.) A. Löve	western wheatgrass	PASM	P	I
Pedicularis cystopteridifolia Rydb.	fernleaved lousewort	PECY5	N	I
Penstemon aridus Rydb.	stiffleaf penstemon	PEAR2	N	I
Penstemon caryi Pennell	Cary's penstemon	PECA17	N	I
Penstemon eriantherus Pursh	crested beardtongue	PEER	N	I
Penstemon laricifolius Hook. & Arn.	larchleaf beardtongue	PELA9	N	I
Penstemon laricifolius Hook. & Arn.	larchleaf penstemon	PELA9	N	I
Penstemon sp. Schmidel	penstemon	PENST	N	I
Petrophyton caespitosum (Nutt.) Rydb.	Rocky Mountain rockmat	PECA12	U	I
Phleum alpinum L.	alpine timothy	PHAL2	P	D
Phlox hoodii Richards.	Hood's phlox	PHHO	U	I
Phlox hoodii ssp. *bryoides*	moss phlox	PHHOM	N	I
Phlox longifolia Nutt.	longleaf phlox	PHLO2	N	I
Phlox multiflora A. Nels.	many-flowered phlox	PHMU3	N	I
Physaria (Nutt. ex Torr. & Gray) Gray	twinpod	PHYSA2	N	I

Picea engelmannii Parry ex Engelm.	Engelmann spruce	PIEN	N	I
Picrothamnus desertorum Nutt. *(Artemisia spinescens)*	bud sagebrush	PIDE4	D	D
Pinus flexilis James	limber pine	PIFL2	N	I
Piptatherum exiguum (Thurb.) Barkworth, comb. nov. ined.	little ricegrass	PIEX3	P	D
Plantago patagonica Jacq.	woolly Indian wheat	PLPA2	N	V
Plantago patagonica Jacq.	woolly plantain	PLPA2	N	V
Platyschkuhria integrifolia (Gray) Rydb. var. *desertorum* (M.E. Jones) W. Ellison	desert basindaisy	PLIND	N	I
Poa cusickii Vasey	Cusick's bluegrass	POCU3	P	I
Poa nervosa (Hook.) Vasey	Wheeler bluegrass	PONE2	P	I
Poa secunda J. Presl	pine bluegrass (Sandberg bluegrass)	POSE	P	I
Poa secunda J. Presl	Sandberg bluegrass	POSE	P	I
Poa secunda J. Presl (*Poa juncifolia*)	alkali bluegrass (Sandberg bluegrass)	POSE	P	I
Poa secunda J. Presl (*Poa ampla*)	big bluegrass	POSE	P	I
Poa trivialis L.	rough bluegrass	POTR2	P	I
Polygonum bistortoides Pursh	American bistort	POBI6	U	I
Potentilla bipinnatifida Dougl. ex Hook.	prairie cinquefoil	POBI10	N	I
Potentilla L.	cinquefoil	POTEN	N	I
Potentilla ovina Macoun ex J.M. Macoun	sheep cinquefoil	POOV2	N	I
Pseudoroegneria spicata (Pursh) A. Löve	bluebunch wheatgrass	PSSP6	P	D
Pseudotsuga menziesii (Mirbel) Franco	Douglas fir	PSME	N	I
Pteryxia petraea (M.E. Jones) Coult. & Rose	turpentine cymopterus	PTPE	N	I
Pulsatilla P. Mill.	Drummond's pasqueflower	PULSA	N	I
Pulsatilla patens (L.) P. Mill. ssp. *multifida* (Pritz.) Zamels	pasqueflower (cutleaf anemone)	PUPAM	N	I
Ribes cereum Dougl.	wax currant	RICE	N	I

Ribes viscosissimum Pursh	sticky current	RIVI3	N	I
Rosa woodsii Lindl.	Woods' rose	ROWO	U	I
Salsola kali L.	Russian thistle	SAKA	N	V
Sarcobatus vermiculatus (Hook.) Torr.	greasewood	SAVE4	D	I
Saxifraga rhomboidea Greene	diamondleaf saxifrage	SARH2	N	I
Scrophularia L.	figwort	SCROP	N	I
Sedum L.	sedum	SEDUM	N	I
Sedum sp. L.	stonecrop	SEDUM	N	I
Senecio L.	groundsel	SENEC	N	I
Senecio moresbiensis (Calder & Taylor) G.W. Douglas & G. Ruyle-Douglas	cleft-leaf groundsel	SEMO10	N	I
Shoshonea pulvinata Evert & Constance	Shoshone carrot	SHPU	N	I
Silene acaulis (L.) Jacq.	moss campion	SIAC	U	I
Solidago missouriensis Nutt.	goldenrod	SOMI2	N	I
Sphaeralcea coccinea (Nutt.) Rydb.	scarlet globemallow	SPCO	N	I
Sphaeromeria capitata Nutt.	rock tansy	SPCA8	N	I
Sporobolus airoides (Torr.) Torr.	alkali sacaton	SPAI	D	D
Sporobolus cryptandrus (Torr.) Gray	sand dropseed	SPCR	U / D	I
Stanleya pinnata (Pursh) Britt.	bushy princesplume	STPI	N (poisonous)	I
Stanleya tomentosa Parry	woolly princesplume	STTO	N (poisonous)	I
Stenotus acaulis (Nutt.) Nutt. var. *acaulis*	stemless goldenweed (stemless mock goldenweed)	STACA	N	I
Stenotus armerioides Nutt. var. *armerioides*	sticky goldenweed	STARA	N	I
Stephanomeria runcinata Nutt.	runcinate-leaved skeletonweed (desert wirelettuce)	STRU3	N	I
Stephanomeria runcinata Nutt.	runcinate-leaved skeletonweed	STRU3	N	I
Suaeda sp. Forsk. ex J.F. Gmel.	suada (seepweed)	SUAED	N	I

Symphoricarpos Duham.	snowberry	SYMPH	U	I
Symphoricarpos oreophilus Gray	mountain snowberry	SYOR2	U	I
Tamarix ramosissima Ledeb.	salt cedar	TARA	N	V
Taraxacum officinale G.H. Weber ex Wiggers	dandelion	TAOF	U	V
Tetraneuris acaulis (Pursh) Greene var. *acaulis*	stemless hymenoxies (stemless four-nerve daisy)	TEACA2	N	I
Tetraneuris torreyana (Nutt.) Greene	Torrey hymenoxies (sticky hymenoxys, Torrey goldenweed)	TETO	N	I
Thalictrum occidentale Gray	western meadow-rue	THOC	N	I
Townsendia Hook	Townsend daisy	TOWNS	N	I
Townsendia hookeri Beaman	Hooker's townsendia	TOHO	U	I
Townsendia hookeri Beaman	stemless daisy	TOHO	N	I
Townsendia incana Nutt.	hoary townsendia	TOIN	U	I
Tragopogon dubius Scop.	salsify (yellow salsify)	TRDU	U	V
Valeriana edulis Nutt. ex Torr. & Gray	tobacco root	VAED	N	I
Viola L.	violet	VIOLA	U	I
Viola nuttallii Pursh	Nuttall's violet	VINU2	U	I
Wyethia scabra Hook.	rough mule's ears	WYSC	N	I
Yucca glauca Nutt.	soapweed yucca	YUGL	N	I
Zigadenus elegans Pursh	mountain deathcamas	ZIEL2	N (poisonous)	I
Zigadenus elegans Pursh	showy deathcamas	ZIEL2	N (poisonous)	I
Zigadenus venenosus S. Wats.	meadow deathcamas (deathcamas)	ZIVE	N (poisonous)	I

P = Preferred
D = Desirable
U = Undesirable
N = Nonconsumed

D = Decreases in amount with grazing pressure
I = Increases in amount with grazing pressure
V = Generally a non-native and is invasive to disturbed sites

APPENDIX Q

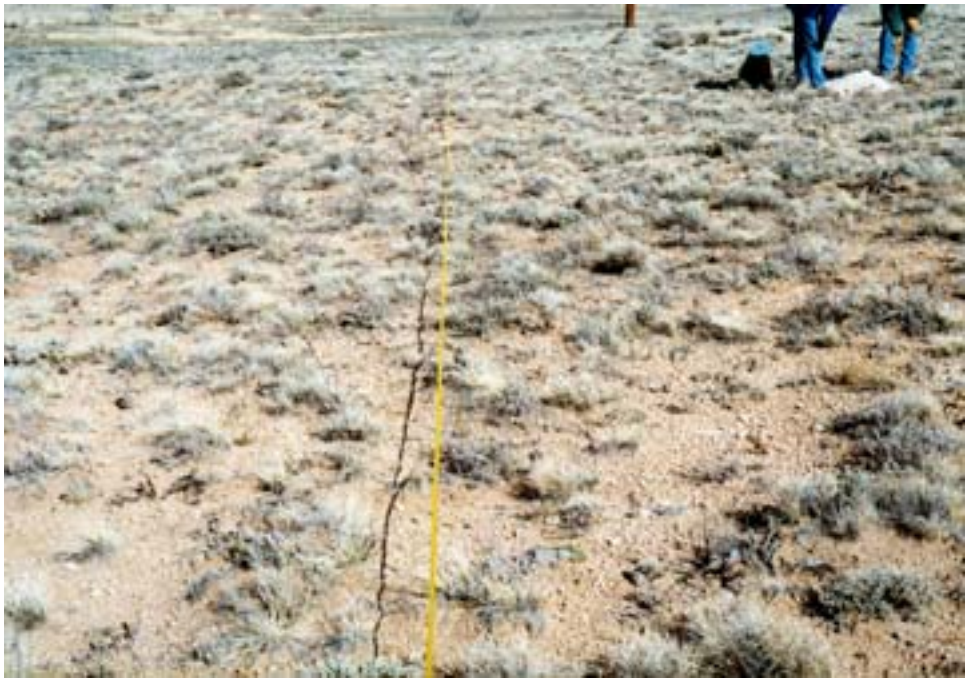
Pryor Mountain Wild Horse Population Demographics 1971-2003

Date	Live Foals	Recorded Mortality	Removals	Annual Count**	Adopted
Pre-1971	n/a	n/a	60	~200	n/a
1971	n/a	n/a	45	~155	35
1973	11	n/a	35	~120	35
1975	11	15	25	~140	25
1977	26	0	25	~145	25
1978	15	~72	0	~87	0
1979	23	5	0	105	0
1980	27	7	1	127	1
1981	35	1	6	155	6
1982	35	3	43	144	43
1983	30	6	21	147	21
1984	25	18	13	141	13
1985	25	2	25	139	25
1986	29	13	0	155	0
1987	32	17	23	147	23
1988	26	17	26	130	26
1989	20	12	21	122	21
1990	32	n/a	3	133	3
1991	28	5	16	120	16
1992	38	n/a	46	115	46
1993	22	n/a	1	143	1
1994	34	3	51	118	51
1995	28	0	0	146	0
1996	29	5	0	175	0
1997	32	4	46	147	46
1998	23	4	0	158	0
1999	26	23	1	173	1
2000	27	18	0	188	0
2001	27	27	46	160	46
2002	23	18	0	170	0
2003	22	30	7	161	7

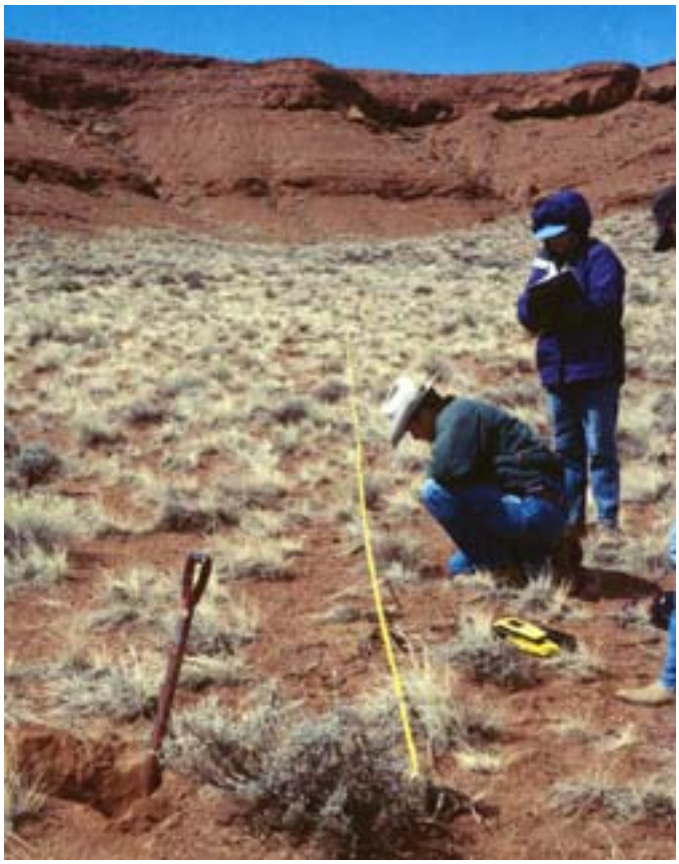
*n/a Indicates No Available Data
**Annual Count -Fall Postfoaling and Postremoval (1995 and on). Does not include animals within the uncertain status category.
All Data Approximate Numbers
Recorded Mortality includes foal mortality.

Appendix R: Ecological Reference Sites

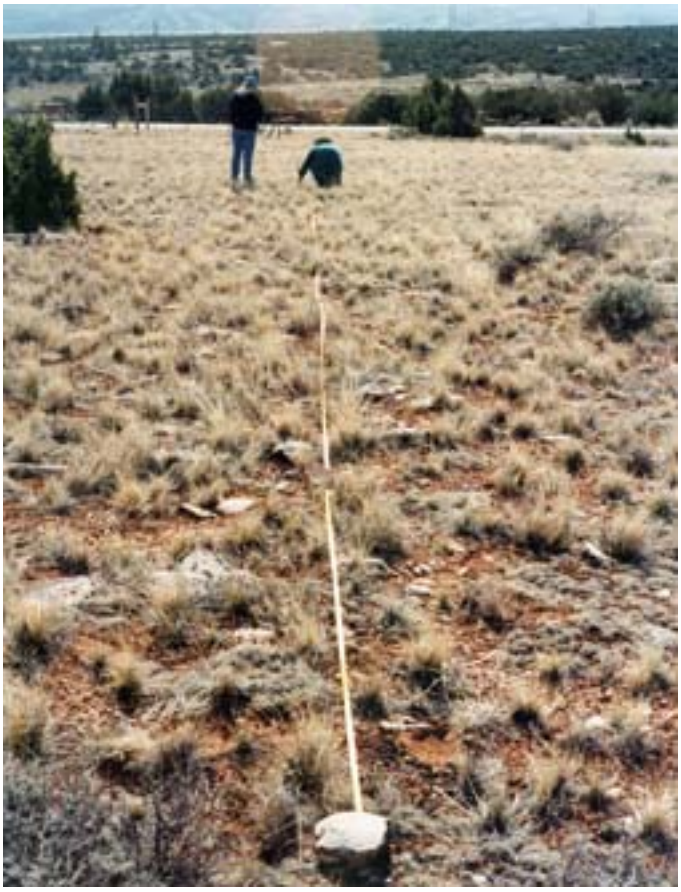
Transect Number	Ecological Site Data	Resource Area	Similarity Index (%)	Date	Last Grazed
Horseshoe Bend	Si-Ly, 6” ppt.	Desertic Basins	50	4/02	1967



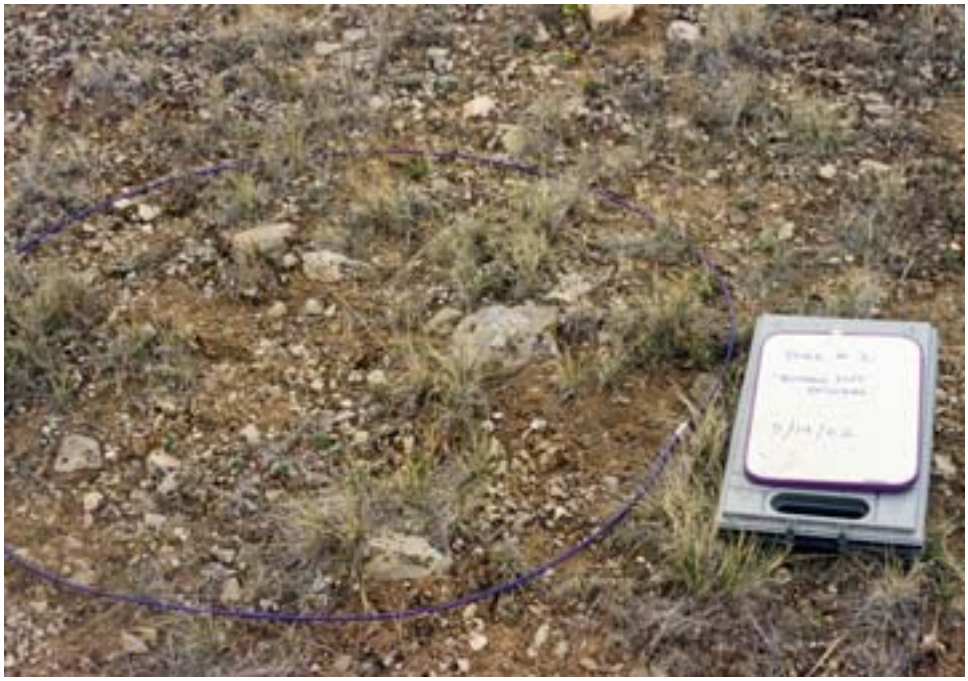
Transect Number	Ecological Site Data	Resource Area	Similarity Index (%)	Date	Last Grazed
Horseshoe Bend	Si-Ly, 6” ppt.	Desertic Basins	60	4/02	1967



Transect Number	Ecological Site Data	Resource Area	Similarity Index (%)	Date	Last Grazed
Layout Creek	Si-Ly-D, 9”ppt.	Northern Rocky Mountains South	60	4/1/2002	1994



Transect Number	Ecological Site Data	Resource Area	Similarity Index (%)	Date	Last Grazed
1 - Mustang Flat Exclosure (National Park Unit)	Si-Ly-D, 10”ppt.	Northern Rocky Mountains South	46	5/14/2002	



Transect Number	Ecological Site Data	Resource Area	Similarity Index (%)	Date	Last Grazed
Forest Service Unit	Si-D, 24” ppt.	Northern Rocky Mountains South	44	8/27/2003	


BURNT
TIMBER
EXCLOSURE
(WEST 1/3)
9-9-03


BURNT
TIMBER
EXCLOSURE
(WEST 1/3)
9-9-03

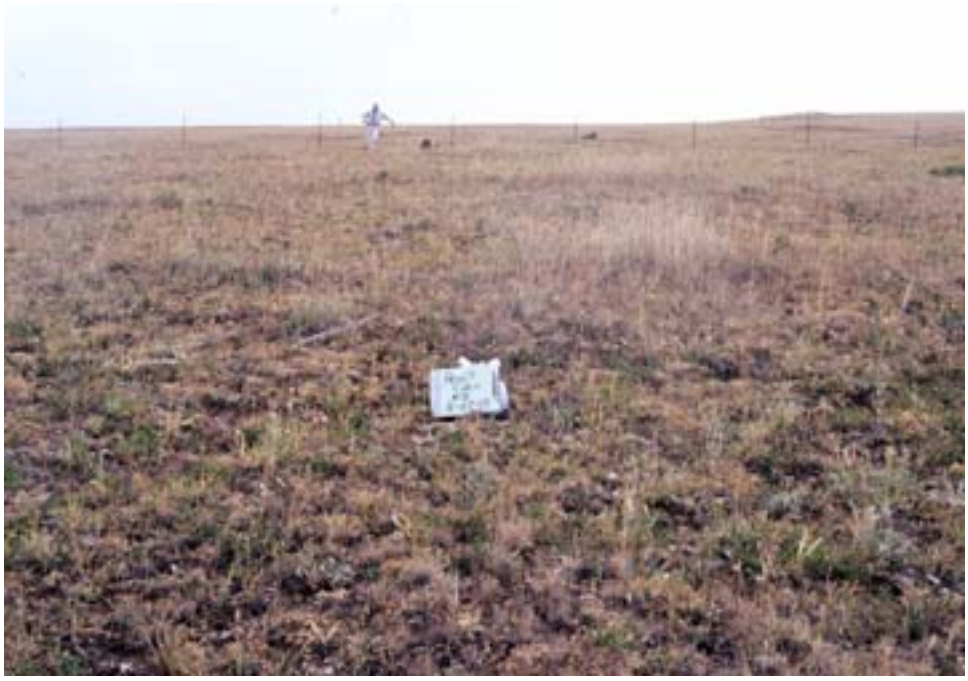

BURNT
TIMBER
EXCLOSURE
(WEST ½)
9-9-93

Transect Number	Ecological Site Data	Resource Area	Similarity Index (%)	Date	Last Grazed
Penn's Cabin Unit, East Pryor Exclosure, NW Corner	Si, 26" ppt.	Northern Rocky Mountains South	20	9/9/2003	


EAST PRYOR
EXCLOSURE
9-9-03

Transect Number	Ecological Site Data	Resource Area	Similarity Index (%)	Date	Last Grazed
16 - East Pryor Exclosure, SW Corner	Si, 26” ppt.	Northern Rocky Mountains South	14	8/27/2003	


Penn's
Cabin
#16
8-27-03



Transect Number	Ecological Site Data	Resource Area	Similarity Index (%)	Date	Last Grazed
	Reference curl-leaf mountain mahogany shrub, 8” ppt.			05/02