

**Pah Rah and Virginia PMU Matrix Narrative**  
**DRAFT (17 Mar 03)**

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## Introduction and Background

Sage grouse (*Centrocercus urophasianus*) is a BLM sensitive species. BLM 6840 manual states that BLM shall ensure that actions authorized, funded, or carried out do not contribute to the need to list a species under the provision of the Endangered Species Act.

In 2001, the Carson City Field Office completed a Consolidated Resource Management Plan (CRMP), which incorporated decisions from eight major field office planning documents and five amendments to these plans. Appendix 1 contains portions of actions and objectives which may directly affect the management of sage grouse habitat.

Sage grouse have experienced long-term declines throughout North America, declining by 33 percent over the past 30 to 40 years (Braun 1998). The species has become extirpated in five states and one Canadian province and is at risk in six other states (including Nevada) and two Canadian provinces (Connelly and Braun 1997, Crawford and Lutz 1985).

Sage grouse have specific habitat requirements for the various phases of their life history. The reduction of specific habitat types will result in a decrease or loss of a population. Seasonal movements and home range sizes vary between migratory and non-migratory populations. Telemetry studies have found both a migratory and non-migratory component within some populations. Some non-migratory populations have a home range size of 100 km<sup>2</sup> (Connelly et al. 2000; Guidelines). In migratory populations home ranges may exceed 2,700 km<sup>2</sup> (Hulet 1983 and Leonard et al. 2000).

## PMU Descriptions

The Pah Rah and Virginia PMU's are situated immediately west of Pyramid Lake, and cross into California, south of Honey Lake Valley and North of Interstate 80, Washoe County, NV and Lassen County CA (map 1). The Spanish Springs subdivision has encroached on portions of this PMU altering and usurping substantial portions of winter and nesting habitat.

**Table 1, Acreage of PMU's**

PMU ACERAGE				
PMU	Public Acreage	Private Acreage	Total Acreage	% Public
Pah Rah	82,118	69,525	151,643	54%
Virginia	184,651	19,910	204,561	90%

The habitat in these PMU's varies considerably from mountain sage at the northern portion to low sage in much of the Pah Rah's. Fires have burned substantial portions of the northern area in the past 4 years (map 2). Portions of the Pah Rah's have been plagued by many recurring fires due in part to a lower precipitation zone favoring cheatgrass and many ignitions. Many areas of the Pah Rah's have been converted to the annual grass (map 3), cheatgrass, which offers no habitat for sage grouse. Cheatgrass can

alter the fire regime leading to increased fire frequency often converting the native sagebrush community to a cheatgrass monoculture.

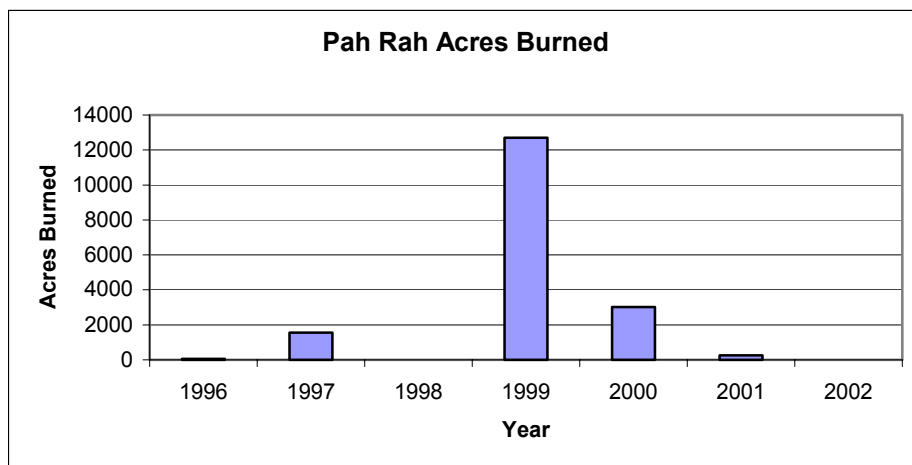
Juniper has encroached on portions of these PMU's (map 3). The Pah Rah PMU contains 22,217 acres of juniper and the Virginia PMU contains 23,900 acres of Juniper, however, not all of these areas represent encroachment. The problem is two-fold. Sage grouse do not use areas near trees; secondly, juniper stands can become so dense as to eliminate the understory which can result in a permanent conversion to annual grass and other invasive alien species after the inevitable fire, thus permanently reducing the habitat available to sage grouse. Conversely in the Pah Rah PMU relatively little juniper remains as a result of increased fire frequency.

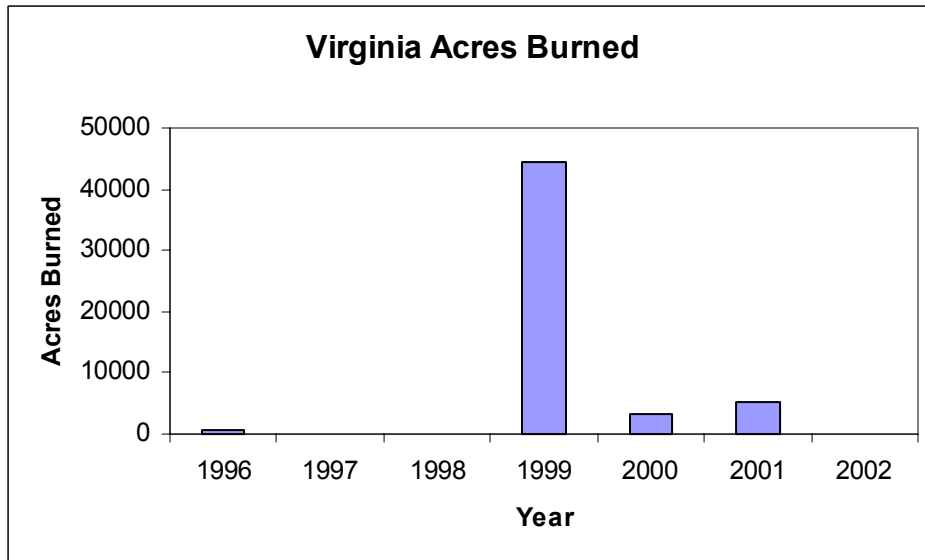
**Table 2 & 3, R-values of the PMU's**

<b>Pah Rah PMU</b>	
<b>R-Value</b>	<b>Acres</b>
R-0	58,969 (36%)
R-1	Included in R-0, <500acres
R-2	25,358 (16%)
R-3	22,217 (14%)
R-4	56,991 (35%)
Total	163,537

<b>Virginia PMU</b>	
<b>R- Value</b>	<b>Acres</b>
R-0	63,395 (24%)
R-1	87,085 (32%)
R-2	50,522 (19%)
R-3	26,595 (10%)
R-4	34,241 (13%)
Total	264,838

**Table 4 & 5, Acres Burned Per Year**





In some areas such as the Dogskins juniper has expanded into sagebrush communities displacing sagebrush and the flora and fauna dependent upon the sagebrush community. However, juniper provides important habitat for many species of wildlife including species of birds and thermal cover for wintering deer. Ideally juniper should be limited to the steeper rockier slopes that have historically supported juniper and removed or suppressed from the range sites that have historically supported a sagebrush community. Utilizing various mechanical techniques to remove juniper is preferred over fire and herbicides, which kill or suppress remaining sagebrush and associated plants.

### **Ecological Thresholds**

Ecologists discuss the concept of thresholds with regard to juniper and exotic species. The idea is that once the density of these species reaches a certain point (threshold) the site cannot be easily reverted back to the pre-invasion community. A large input of energy, which equates to a large fiscal cost, is required to reestablish the pre-invasion community. These species change the site, exclude native species, and produce large quantities of seed that easily dominate the site after a disturbance such as a fire. Thus, limited funds would be better spent, treating sites that have not crossed a threshold.

Juniper management is complex. Historically, fire limited this community to the rocky sites, which would not effectively carry a fire. Later through fire suppression these stands expanded into areas that were historically sagebrush communities. As the canopies expanded the sagebrush community was displaced and the seed sources exhausted so that currently when a juniper stand burns invasive exotic annuals are likely to dominate the site. In the past (pre-invasive era) when a juniper stand burned only native seeds were present or introduced by wind or animals, so succession was only set back not permanently altered. Treating these stands that have crossed the threshold is now a perplexing problem.

Cheatgrass presents another complex problem. Once cheatgrass density reaches a certain point fire frequency increases, eliminating native plant species and essentially creating a cheatgrass monoculture which is vulnerable to invasion by other more noxious nonnative invasive species. Once a site has crossed this threshold like a juniper site much energy is required to reestablish native species. Cheat grass establishment increases fire frequency in two ways, cheat grass often attains much greater densities than the native bunch grasses facilitating the spread of fire; also, cheat grass cures much earlier than the native bunch grasses in effect extending the fire season.

### **Wild Horse Herd Management Areas**

The Virginia PMU contain 3 “wild” horse Herd Management Areas (HMA’s; Flanigan, Granite Peak and Dogskin Mountain) and one very near the PMU (Fort Sage), in addition some horses have strayed from the Pyramid Lake Indian Reservation onto the Pah Rah’s; however, the current number is low and they are not thought to be a problem at this time. Due to fires in much of the Fort Sage and Flanigan HMA’s most of the horses were removed to allow for recovery of the range resulting in a low current population. Horse numbers are also relatively low in the Granite Peak HMA as a result of many horses expanding their home range to include the subdivision of Rancho Haven consequently necessitating their removal following complaints from homeowners.

**Table 6, Horse Numbers**

HMAP	AML	Current #	% Over AML	Acers
Fort Sage	55-65	<36	0	15,000
Flanigan	80-124	50	0	17,101
Dogskin	10-15	100+	567%	6,895
Granite Pk	11-18	24	33%	3,886
Estray Pah Rah	?	?		0

Unfortunately the horse population in the Dogskin HMA is approximately 7 times above the appropriate management level (AML), resulting in severe over utilization of the range exacerbated by 4 years of drought. In some areas of the Dogskin HMA, virtually all herbaceous vegetation has been removed. Consequently, “wild” horses were rated as a high threat within the Dogskin HMA and low elsewhere. However, this threat could be ameliorated by managing the horses within the AML range. Conversely “wild” horses could become a threat in other areas if their population increases unchecked, as frequently is the case due to budget constraints. In other areas of the Dogskins, juniper has encroached, resulting in a paucity of sage grouse habitat. Additionally, OHV use occurs in virtually the entire north, west and southern exposures of the Dogskins.

## **Sage Grouse Habitat Requirements (WAFWA Guidelines)**

The habitat requirements of sage grouse vary by season (winter, pre-laying, leking, nesting, early brood and late brood). Thus, these habitats are often discussed separately. However, within these PMU's the same geographic areas may be used for multiple life history stages and the same risks often apply, i.e. fire will alter or eliminate all sagebrush communities. Therefore, to avoid redundancy where the same risk applies to multiple life history habitat requirements these requirements will be combined under the one risk. The format used is to first provide the WAFWA guidelines, our goal and a brief description of pertinent conditions or factors. Following the habitat descriptions are discussions of the risk factors identified in the *Habitat Risk Assessment Matrix*.

### **Winter Habitat (October through March)**

WAFWA guidelines recommend the maintenance of “**sagebrush communities on a landscape scale, allowing sage grouse access to sagebrush stands with canopy cover of 10-30% and heights of at least 25-35 cm regardless of snow cover.**” The guidelines also recommend that these areas receive high priority for fire suppression.

**Goal: Maintain existing sagebrush communities, which meet the WAFWA guidelines and restore sagebrush on R-4 and R-1 sites.**

Winter habitats must provide adequate amounts of sagebrush because their winter diet consists almost exclusively of sagebrush. Sagebrush canopy can be highly variable. Sage grouse tend to select areas with both high canopy and taller Wyoming big sagebrush (*Artemisia tridentata wyomingensis* and *A. t. vaseyana*). It is crucial that sagebrush be exposed at least 25 to 30 cm above snow level as this provides both food and cover for winter sage grouse (Hupp and Braun 1989). When not covered by snow the low sages (*A. nova* and *A. arbuscula*) are often used.

Much winter habitat has been lost through conversion from perennial sagebrush communities to annual grasses and weeds, principally cheatgrass and tumble-mustard. On dryer sites cheatgrass and other invasive alien species often displace the native species resulting in the loss of considerable habitat.

On sites where invasive annuals are currently dominant, some sort of treatments will be required to restore the sagebrush community. There is no simple proven method to restore these sites. Post fire, a mix of wheat grasses may be of benefit. Some herbicide treatments have shown promise in certain situations; however, this treatment is expensive and until further research has been completed, large-scale herbicide treatments will not be recommended. A major problem in formulating seed mixes is that grass seeds suppress sagebrush establishment. However, some grass seeds may be needed for soil stabilization after a fire.

Resting an area is also a treatment option. Many grasses and forbs will respond favorably when protected from grazing and given enough time can increase in frequency (Valone et al. 2002). This may be the most cost effective treatment in some areas.

### **Breeding Habitat (Leks, Pre-Laying, nesting and early brood; February - May)**

WAFWA guidelines state that: **“These habitats are sagebrush dominated rangelands with a healthy herbaceous understory and are critical for survival of sage grouse populations.”** The WAFWA guidelines recommend managing these **“...habitats to support 15-25% canopy cover of sagebrush, perennial herbaceous cover averaging  $\geq$  18 cm in height with  $\geq$ 15 canopy cover of grasses and  $\geq$ 10% for forbs (Barnett and Crawford 1994, Drut et al. 1994a, Apa 1998) during spring.”** In addition the guidelines further state that **“If sagebrush height is  $>$ 75 cm, herbaceous cover may need to be substantially greater than 18 cm to provide this protection.”**

### **Habitat Goals**

**Maintain existing sagebrush communities, which meet the WAFWA guidelines and restore other sites capable of supporting sagebrush communities to an R-0 rating.**

### **Leks**

Leks are relatively open areas used by males to display in an arena situation for the purpose of gaining copulatory access to females. Leks are generally open areas near sagebrush cover often situated near areas supporting forbs, an important component in the diet of pre-laying hens. In addition leks need to be situated in areas relatively free of disturbances, especially during the early morning hours.

Pre-laying hens require forbs that are high in calcium, phosphorus, and protein all of which are necessary for successful egg production. The availability of these forbs is thought to affect reproductive success (Barnett and Crawford, 1994).

### **Nesting Habitat**

WAFWA guidelines state that: **“These habitats are sagebrush dominated rangelands with a healthy herbaceous understory and are critical for survival of sage grouse populations.”** The WAFWA guidelines recommend managing these **“...habitats to support 15-25% canopy cover of sagebrush, perennial herbaceous cover averaging  $\geq$  18 cm in height with  $\geq$ 15 canopy cover of grasses and  $\geq$ 10% for forbs (Barnett and Crawford 1994, Drut et al. 1994a, Apa 1998) during spring.”** In addition the guidelines further state that **“If sagebrush height is  $>$ 75 cm, herbaceous cover may need to be substantially greater than 18 cm to provide this protection.”**

Wild horses and livestock consume grasses needed to conceal sage grouse nests from predators. Nesting success declines when residual grass cover (droop height of previous years growth) is less than 18 cm (Gregg et al. 1994).

Perhaps the most discussed habitat characteristic involves residual herbaceous cover in nesting habitat. Various interpretations have been offered. Dr. John Connelly, principle author of the WAFWA Guidelines (Connelly et al. 2000) addressed this point in a response titled: *Idaho BLM Response to: “Weaknesses of the Draft Framework to Assist in Making Sensitive, Species Habitat Assessments for BLM – Administered Public Lands In Idaho”* written by Chad Gibson and John Romero (2002).

The following is Dr. Connelly’s response to herbaceous cover in nesting habitat:

#### **Dr. Connelly’s Response**

**Ten studies provided data used in the sage grouse guidelines to formulate recommendations on herbaceous height and cover in sage grouse breeding habitats (Table 1). These data were collected in 8 different study areas in 4 different states. Mountain big sagebrush, Wyoming big sagebrush, basin big sagebrush, black sagebrush, and low sagebrush habitats were sampled (Table 1). In all studies, data were collected along transects radiating out from the nest site and these transects totaled 5 to 60 m in total length, depending on the study. One study (Sveum et al. 1998) reported on herbaceous cover collected at the immediate nest site and within a 5 m radius of the nest but this study did not provide data used for herbaceous height recommendations. A nest bowl and its immediate vegetation occupy about 0.8 m<sup>2</sup>. The studies used for the guidelines measured vegetation in areas ranging from about 20 m<sup>2</sup> to well over 1200 m<sup>2</sup>. One study (Gregg 1991) measured height of herbaceous plants at random locations throughout the study area. Three studies (Wakkinen 1990, Fischer 1994, Apa 1998) also characterized breeding habitat at dependent random sites that occurred within 100m of the nest. Further, Wakkinen (1990) reported that dependent random sites had significantly taller sagebrush with larger areas ( $P \leq 0.05$ ) and significantly taller grass ( $P \leq 0.05$ ) than independent random sites. No studies depended on herbaceous height data collected only at the nest bowl. In 5 of 10 studies (44%), vegetation measurements were made along lines extending 15 m from the nest bowl, sampling areas that were > 700m<sup>2</sup> in size.**

**Four different studies from 4 states indicated that grass height in the nest site vicinity (out to 20 m) and within the stand of vegetation containing the nest was taller and/or denser than grass at random sites (Wakkinen 1990, Gregg 1991, Heath et al. 1997, Sveum et al. 1998). Additionally, two studies from Wyoming (Heath et al.1998, Lyon 2000) provided evidence that grass cover was greater near nest sites than at random sites. All of these studies took measurements along transects extending from the nest out to a distance of 2.5**

to 20 m and sampled areas that ranged from 20m<sup>2</sup> to 1256 m<sup>2</sup>.

Given that 5 of 9 studies reported that average herbaceous heights were > 18 cm (Table 1), the 18 cm recommendation in the sage-grouse guidelines (Connelly et al. 2000a) may be overly conservative (i.e., the current recommended height of herbaceous cover may be too low). However, more data should be collected over a relatively large area before this recommendation can be successfully challenged or modified.

**Table 1. Studies used to characterize sage-grouse breeding habitats for the sage-grouse guidelines (Connelly et al. 2000a).**

Reference	Mean Height (cm)	Sagebrush Habitat	Collected Only at Nest?	Nest Area Sampled (m)	Sampling Method
Wakkinen 1990	18	WBS	No	1256	Measured along transect
Connelly et al. 1991	19-23	WBS / MBS	No	1256	Measured along transect
Gregg 1991	14	WBS / MBS	No	79	Measured along transect
Klott et al. 1993	15-30	WBS / LS / BLS	No	707	Measured along transect
Fischer 1994	22	WBS	No	1256	Measured along transect
Heath et al. 1997	15	WBS / BBS / MBS	No	20	Measured along transect
Apa 1998	34	BBS / MBS	No	1256	Measured along transect
Holloran 1999	18	WBS	No	20	Measured along transect
Lyon 2000	21	WBS / BBS	No	20	Measured along transect
Sveum et al. 1998	-----	WBS	Both	1, 79	Measured along transect

<sup>1</sup>WBS = Wyoming big sagebrush; MBS = mountain big sagebrush; BBS = basin big sagebrush; LS = low sagebrush; BLS = black sagebrush.

Because sage grouse can start nesting as early as March residual grass from the previous years growth is essential.

Nesting occurs too early for same season grass growth to be available for screening nests and creating favorable micro-climates at most northwestern Nevada elevations.

Most nests are located within 6.2 km of a lek, however, some are located more than 20 km from a lek (Autenrieth 1981, Wakkinen et al. 1992, Fischer 1994). Hanf et al. (1994) found that all nests monitored were less than 12.8 km of the nearest lek and that 50 percent were within 8 km of the nearest lek and 25 percent were within 3.2 km of the nearest lek. Klott et al. (1993), reported movements up to 12.4 km from the lek of capture to the eventual nest site.

Results from 3 theses (Heath 1997, Holloran 1999 and Lyon 2000) in Wyoming found that 52% of nests were 2 miles from lek of capture, 67% were 3 miles from lek of capture and 78% of nests were within 4 miles of the lek of capture.

The WAFWA 2000 guidelines (Connelly et al. 2000) recommend managing for sage grouse nesting habitat for 5 km in non-migratory populations and 18 km for migratory populations from leks. The precarious position and declining numbers of most sage grouse populations demands a precautionary approach. In order to be consistent with other Great Basin states, principally Idaho and Wyoming, Field Offices should consider populations to be migratory unless population specific information otherwise indicates (guidance from Nevada State Office).

The Western Association of Fish and Wildlife Agencies (WAFWA) sage grouse guidelines describe nesting habitat as consisting of sage brush 30 – 80 cm tall, with a canopy cover of between 15-25% within a grass and forb community >18 cm tall  $\geq$  15% canopy cover. Migratory sage grouse will nest >18 km from leks.

As the canopy cover of Wyoming big sagebrush increases, the percent of grasses and forbs decreases. Grazing of these communities can affect the habitat in two ways. As grazing pressure increases the height of forbs and grasses decreases as a result of mechanical removal. Secondly, a competitive advantage is conferred to sagebrush as the grasses and forbs must cope with vegetative loss diverting energy to vegetative replacement and conferring to sagebrush a competitive edge.

Nests with tall (18 cm) residual grass cover were associated with greater nesting success of sage grouse (Gregg et al. 1994, Colin 1998, and 9 additional studies cited by Dr. Connelly). There have been 10 nesting success studies that Dr. Jack Connelly cited in a response letter, many of which were theses or dissertations. This office has requested the studies cited by Dr. Connelly, through inter library loan, though, these types of documents are generally slow in arriving. Management practices need to allow for the maintenance of tall, residual herbaceous cover, to conceal the nests from predators. Grazing by domestic livestock and feral horses has the greatest impact on residual grass cover.

DeLong et al. (1995), found that the fate of artificial nests were positively associated with tall grass cover and medium height shrub cover and that no other vegetation, predator, temporal or spatial variables explained any additional variation in the probability of predation. They recommended management practices that increase cover and height of native grasses in sagebrush communities with medium-height shrubs to enhance sage

grouse productivity. They also recommended that where "...sage grouse nesting habitat is an objective, managers should monitor livestock distribution and depletion of grasses to remove livestock before the minimum herbaceous cover and height needed for nesting is reached. Some rangelands may need rest from grazing to increase herbaceous cover and height to desired levels."

Sage grouse are often described as a landscape species meaning that they require large tracts of land for persistence. Sage grouse often nest in low densities distributed widely over the landscape, therefore, large tracts of nesting habitat must be managed for. Within these two PMUs only one lek is known. However, managing for nesting habitat only around the one known lek would place the population in jeopardy of extirpation. Until additional leks are discovered prudent action would dictate managing extensive areas as nesting habitat.

Should their first nest fail sage grouse can re-nest through July. Therefore, to increase sage grouse production, residual grass cover of  $\geq 18$  cm needs to be maintained from March through May, in nesting habitat. Sage grouse generally nest in big sage and low sage plant communities with a healthy forb and insect component essential for chick survival.

If  $\geq 18$  cm droop height of residual grasses cover is maintained, sage grouse would be expected to have good nesting success; however, to maximize nesting success residual grass height would need to be maximized.

Grazing system(s) will need to be developed to allow for residual herbaceous cover in excess of 18 cm within the nesting habitat if the sage grouse population is to persist.

Aside from urbanization and OHV use, livestock and feral horse grazing are the major land use practices affecting sage grouse habitat within these PMU's. In addition to affecting the height of grasses and forbs, livestock grazing can change the species composition of entire plant communities. Various livestock management practices have altered sage grouse habitat over the past century. Facilities such as spring developments, water pipelines, and fencing have distributed livestock use over areas that were sporadically or lightly used in the past (Guidelines). In many areas, grazing has contributed to long-term changes in plant communities and has reduced certain habitat components, such as biological crusts, which contribute to the health of sagebrush habitat (Mack and Thompson 1982; Quigley and Arbelbide; Wisdom et al.)

Livestock grazing can markedly reduce the herbaceous understory and increase sagebrush density (Vale 1975, Tisdale and Hironaka 1981). Within the Great Basin vegetation changes from livestock grazing likely occurred because sagebrush steppe in this area did not evolve with intensive grazing by herbivores, as did the prairies of central North America (Mack and Thompson 1982). Wambolt and Payne (1986), suggest that resting Wyoming big sagebrush habitats from grazing may improve the understory production as well as decrease sagebrush cover. The Guidelines state that sagebrush canopy cover greater than 25 percent devalues sage grouse habitat. Gregg (per comm. 2001) feels that

this may be true for mountain big sage (*A. t. vaseyana*), however, in *A. t. wyomingensis* Gregg (per comm. 2001) feels that sage grouse habitat quality declines with canopy cover greater than 12 to 15 percent.

Drought can lead to increased competition between livestock and sage grouse for food and cover, exacerbating the adverse effects of excessive livestock grazing on vegetation and soils (Valentine).

Nesting habitat and possibly brood rearing habitat are most likely limiting these populations. Suitable winter habitat is reasonably abundant. Recent fires (1999 & 2001) within the Virginia PMU have burned substantial acreage resulting in 87,085 acres being classified as R-1 in former nesting and brood rearing habitat. These relatively recent fires in the Virginia PMU took place in areas receiving adequate precipitation for native and introduced (crested wheat) grasses and forbs to become reestablished. Generally mountain sagebrush takes 20 or more years to become reestablished.

The situation in the Pah Rah PMU is worse with past fires (1 in 1999 and 3 in 2000) having burned substantial areas resulting in 56,991 (35%) acres being classified as R-4, which do not provide habitat for sage grouse. However, some of these areas may recover. Currently reestablishment results are mixed, with a combination of cheatgrass native grasses and seeded native grasses becoming established. Few shrubs managed to establish. The establishment of native species was exacerbated by 4 years of drought.

### **Brood Rearing Habitat (April through August)**

As with winter and nesting habitat brood rearing habitat face many of the same threats.

### **Early Brood Rearing Habitat**

WAFWA guidelines state that: **Optimum brood rearing habitat consists of sagebrush stands that are 40 to 80 cm tall with a canopy cover of 10 to 25 percent and an herbaceous understory of 15 percent grasses and 10 percent forb canopy (Guidelines). Ideally this habitat will be found on at least 40 percent of the area that is considered brood rearing habitat (Guidelines).**

Young sage grouse require key invertebrates for the first 2 weeks after hatching and key forbs (Crawford et al. 1992). This high protein diet is essential for the survival of young sage grouse. Taller grasses, brush and forbs provide increased escape cover for young sage grouse over grazed areas.

### **Late Brood Rearing Habitat**

Key forbs on wet meadows become increasingly important to sage grouse chicks as the uplands dry (Savage 1969). Greer (1990) recommended that meadow grazing be delayed until mid-August to promote sage grouse chick survival and growth. Dobkin (1995) recommended that restoration should include removing livestock from wet meadows.

Private land uses will affect the population. Most of the water sources and wet meadows are privately owned. Many of these areas are preferred home sites and development of these areas will adversely affect the population. Negotiating conservation easements and purchasing important areas are effective methods to preserve habitat.

Roads and other factors (pumping ground water) can affect hydrological properties. Roads should be routed away from springs and around riparian areas. Since most water sources within these PMUs are on private property, some sort of out reach program will be necessary to stabilize and improve brood rearing habitat.

While vegetation in undisturbed meadows can become so dense as to limit use by sage grouse use, this appears to occur very rarely. Young sage grouse can scurry about under the taller vegetation, which provides escape cover. Extreme caution should be exercised when devising grazing schemes for meadows. Livestock select the more palatable forbs and grasses avoiding the less palatable wiregrass (*Juncus* spp.) and Iris. They can soon dominate a meadow grazed during the growing season and are of no value to sage grouse. Also the physical compaction of the moist and wet soil by hoofs can degrade the meadow and change hydrological regimes.

**Risks to habitat identified in the Risk Assessment Matrix**

The specific risks discussed are tied to the “Habitat Risk Assessment Matrix”, the for habitat types are identified by L- lek, W-winter, N – nesting and B- brood rearing, the second letter and number tie the risk to a specific risk factor for that category, i.e. W.A.1 identifies the risk to the risk matrix assessment category as winter, sage brush mix of heights and densities not consistent with habitat needs.

**Sagebrush mix of heights and densities not consistent with habitat needs**

**Table 7, Vegetative Goals.**

Seasonal Habitat	Goal	Risk Level	
		Fire	Grazing
Winter (W.A.1)	Sagebrush canopy cover of 10-30% and heights of 25-35 cm above snow.	High (W.A.1)	Low
Leking		(L.A.2)	Low
Nesting (N.A.1)	Sagebrush canopy cover of 15-25%, perennial herbaceous cover averaging $\geq$ 18 cm in height, $\geq$ 15% canopy cover of grasses and $\geq$ 10% forbs.	High (N.A.4)	Moderate (N.A.2)
Brood Rearing (B.A.1)	Sagebrush stands 40 – 80 cm high with a canopy cover of 10 – 25%, $\geq$ 15% canopy cover of grasses and $\geq$ 10% forbs.	High (B.A.4)	Moderate (B.A.2)

Fire and grazing are the primary factors affecting the sagebrush community composition.

This risk of fire was rated high on all habitats due to the number of large fires in these PMUs and potential for more. On some xeric sites annual weeds have replaced the sagebrush community and on the more mesic sites grasses have reestablished. However, sagebrush has not returned. Grazing by domestic sheep can adversely affect sage grouse habitat because domestic sheep consume sagebrush, whereas, cattle prefer grasses and forbs. Since domestic sheep are not grazed in these PMU's the risk of grazing to winter habitats is low.

**Objectives:**

Prevent further loss of habitat and reestablish sagebrush on 80,000 acres of R-1 habitat in the Virginia PMU.

**Conservation Measures (Action):**

At present the best practices will be to suppress fires in sagebrush communities in hopes of preventing further loss of habitat and to reestablish sagebrush communities as opportunities and techniques arise. Fire suppression is critical for the conservation of sage grouse habitats, especially the xeric sites.

Rehabilitating these xeric sites is a difficult problem because reseeding with native species is often unsuccessful. The use of certain exotic species, crested wheat grass and forage kochia often advocated may inhibit the conversion of these sites to annual communities; however, these exotic species do not provide any habitat for sage grouse or most native non-game species. Advocates of crested wheat grass often claim that eventually, greater than 20 years, the seeding will convert back to a native sagebrush community. Opponents often claim that the only benefit derived from these exotic plants is an increase in livestock forage. However, under certain circumstances there is likely merit in seeding with some varieties of exotic wheat grasses, which can out compete invasive exotics and eventually transition back to a native community.

The benefits of seeding non-native species would only occur in low precipitation zones that would otherwise be dominated by annuals for the foreseeable future and could not be seeded directly to native communities. In some of the higher precipitation sites no seeding may be necessary following fires due to the abundance of native seeds and paucity of invasive exotic weeds as is found over much of the Virginia PMU. In sites where seeding is necessary, native seeds should be utilized unless the risk of exotic infestation is sufficiently great to justify the use of non-native species such as some of the wheat grasses.

On sites where invasive annuals are currently dominant some sort of treatments will be required to restore the sagebrush community. There is no simple proven method to

restore these sites. Post fire-a mix of wheat grasses may be of benefit. Some herbicide treatments have shown promise in certain situations; however, this treatment is expensive. Until further research has been completed, large-scale herbicide treatments will not be recommended.

Resting an area is also a treatment option. Many grasses and forbs will respond favorably when protected from grazing and given enough time can increase in frequency (Valone et al. 2002)

Manage Wyoming sagebrush communities to their potential in R-1 and R-2 areas. Where R-0 values are achieved manage to sustain them over the long term. Low sagebrush sites either in association with big sagebrush or standing alone will be managed for R-0 value

- Currently SOP within this Field Office is for full suppression of fires within sage grouse habitat, this policy will be maintained until land use plans are amended, at which time sage grouse habitats can be formally changed to Category A (full suppression).
- Protect unburned islands within the burned area. Do not use “burn out” techniques. These islands will serve as seed sources. The viability of sagebrush seed is  $\leq 3$  years. If unfavorable germination and establishment conditions prevail for 3 years following a fire the only source of seed will be these islands of sagebrush.

A confounding problem occurs with multiple ignitions. If a fire is burning near an urban interface, most resources will be deployed to the urban interface fire leaving fires in the sagebrush habitat essentially unattended until the urban interface fires are controlled. The dry lightening conditions that can start urban interface fires can often simultaneously ignite a fire in sage grouse habitat. Recently the frequency of catastrophic fires has been increasing, often usurping fire suppression resources from many states and further exacerbating the problem of protecting sagebrush habitats.

- Consider firebreaks around subdivisions.
- Reduce cheatgrass and consider green stripping along roads on a site-specific basis.
- Consider naturalized grasses in areas where cheatgrass infestation is likely. Otherwise use a mix (forbs, grasses and brush) of native seeds adapted to the site where seeding is necessary.
- Where natural regeneration of native species after fires is likely, seeding will not be implemented. Where seeding is necessary, use a mix (forbs, grasses and brush) of native seeds adapted to the site.

Despite including sagebrush seeds in the seed mixes for the relatively recent fires within the Virginia PMU few sagebrush seedlings have become established. These mixes included crested wheat grass and other grass species, which can out compete sagebrush.

- Include sagebrush seeds in seeding mixes.
- Avoid using non-native seeds in seeding mixes unless the site is considered to pose a strong risk for invasion by non-native plant species.
- In mesic areas with abundant native vegetation do not apply seeds or apply only species that would benefit sage grouse and other wildlife species. For example if an area dominated by native grasses burns, only seed brush and forb species. If an area dominated by non-native grasses, crested wheat for example, burns, apply native grasses, forbs and brush seeds.
- Reapply sagebrush seed to 16,000 acres of the Virginia PMU per year for 5 years to reestablish sagebrush over the burned areas by 2009.
- The Consolidated Resource Management Plan (CRMP; 2001), states that brush control by herbicides, prescribed burning or mechanical means will be prohibited on sage grouse breeding complexes and wintering grounds. The CRMP further states that BLM will adhere to current habitat modification guidelines prepared by the Western Sage Grouse Committee of the WAFWA. In addition BLM 6840 manual states that BLM shall ensure that actions authorized, funded, or carried out do not contribute to the need to list a species under the provision of the Endangered Species Act.

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners.

**Monitoring:**

The line intercept method would be used to determine percent cover and height. Nesting herbaceous cover height would be measured annually. Percent cover of sagebrush, grass and forbs would be measured every 5 years.

**Additional Factors for Nesting and Brood Rearing Habitats**

**Levels of grazing (N.A.2 & B.A.2)**

Wyoming big sagebrush stands do not consistently attain the herbaceous cover levels common in mountain big sagebrush communities. As the canopy cover of Wyoming big sagebrush increases the grass and forb component decreases.

Grazing of the grass/forb component favors the sagebrush, which will eventually usurp nutrients and water needed by the grass/forb component. Reducing or eliminating grazing from these communities will favor the grass/forb component; however, on the xeric sites it may take in excess of 20 years for a significant response to occur (Valone et al. 2002).

**Risk Level:** Moderate.

The effects of grazing depend on several variables, notably season of use duration and the current years precipitation level and timing. Certain grazing practices will have less of an impact on sage grouse habitat than others. This risk was rated as moderate because grazing removes herbaceous cover, though domestic livestock can be managed.

**Objective:**

Achieve and maintain a 15-25% canopy cover of sagebrush, perennial herbaceous cover averaging  $\geq 18$  cm in height with  $\geq 15$  canopy cover of grasses and  $\geq 10\%$  for forbs.

**Conservation Measures (Actions):**

- Sustain R-0 rated nesting habitat over the long term. Establish and maintain a residual herbaceous height of 18 cm., or as site and species potential will allow. In R-2 areas where existing species of perennial grass do not attain 18 cm. of growth reintroduce native grass species that have greater vertical structure. Graze vegetation in a manner sufficient to facilitate perennial plant seedling establishment, enhance vigor and achieve 18 cm of residual herbaceous cover.
- Modify the “terms and conditions” of grazing permits to assure 18cm, or as site and species potential will allow, of residual herbaceous cover in nesting habitat.

Livestock can effectively be controlled through active grazing management; however, this method is labor intensive and may be cost prohibitive. Using cattle to decrease cheatgrass would require active management. Rest may be the most cost effective treatment.

**Monitoring:**

Line intercept transects will be conducted annually to assure cover, and height objectives are met in the nesting habitat.

**Responsible Parties:**

BLM/Pyramid Lake Paiute Tribe/Livestock Operators & Private Operators/NRCS.

### **Levels of wild (feral) horse grazing (N.A.3 & B.A.3)**

**Risk Level:** Low-Moderate.

The risks of feral horse grazing are similar to those of domestic livestock grazing with the caveat that livestock in theory can be moved more easily and their numbers more accurately controlled. The Pah Rah range is not part of any HMA; however, there are stray horses in this area. While they are not currently a problem, they could become a factor if their numbers are not controlled. This risk was rated low to moderate because most of the HMA's within the PMU's are below or near AML. However, the Dogskin HMA horse population is approximately 7 times over the AML. Horse gathers are expensive and placing excess horses has been a chronic problem, often resulting in delaying gathers for years.

As previously stated an over population of horses in the Dogskin HMA is devastating sage grouse habitat and that of other native fauna and flora.

#### **Objectives:**

Achieve and maintain a 15-25% canopy cover of sagebrush, perennial herbaceous cover averaging  $\geq 18$  cm in height with  $\geq 15$  canopy cover of grasses and  $\geq 10\%$  for forbs.

#### **Conservation Measures (Actions):**

- Maintain wild horse numbers at the appropriate management levels.
- Remove stray horses.
- Adjust AML's if necessary.

#### **Monitoring:**

Line intercept transects will be conducted annually to assure cover and height objectives are met in the nesting habitat.

#### **Responsible Parties:**

BLM/State/Pyramid Lake Paiute Tribe/Wild Horse and Burro Groups.

### **Juniper Encroachment (L.E.1, N.A.6, B.A.6 & W.A.2)**

A.2. risk factor describes juniper encroached areas where sagebrush is still present and A.3. risk factor describes areas that have crossed the threshold, sagebrush no

longer present. R-3 category captures both areas occupied by juniper as well as areas that were historically dominated by juniper.

**Risk Level:** Low.

Current estimates place 22,217 acres (14%) of the Pah Rah PMU in the R-3 category and 26,595 acres (10%) of the Virginia PMU in the R-3 category. However, the overall threat to the PMU's was considered to be low. Due to the increased fire frequency in the Pah Rah PMU total acreage is decreasing.

Juniper encroachment affects sage grouse in two ways: 1) sage grouse avoid using areas near trees, possibly because trees provide perches for raptors, and 2) eventually trees come to dominate these sites replacing the sagebrush community. Inevitably these stands will burn. However, if the burn occurs after the sagebrush, grass and forb component is lost, the area will likely convert to annual weeds.

**Objective:**

Maintain sagebrush communities where they currently exist, and reestablish sagebrush communities on sites that have been encroached by juniper. Currently the number of encroached acres are unknown, though, it is not thought to be substantial.

**Conservation Measures (Actions):**

- Areas that are reaching R-3 value (<10% juniper cover) will be treated to reduce juniper competition and retain the sagebrush community at an R-0 value. Treatments will usually target seedling and sapling trees leaving some mature trees for use by other wildlife species.
- Areas that have crossed the threshold will require very expensive mechanical treatments. Conservation measures will include taking advantage of grant, or large project initiative funding to complete site treatments, which include removal of dominant species and reseeded with native species.
- Remove 20% of encroaching juniper per year for 5 year, so that all encroached juniper will be eliminated by 2009

**Monitoring:**

Ocular reconnaissance will be used to identify areas where sagebrush under story is present.

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners.

### **Annual Non-Native Herbaceous Species Invasion (N.A.7, B.A.7 & W.A.4)**

As with the juniper encroachment areas we do not have data precise enough to differentiate between areas that have crossed the threshold therefore A.4 and A.5 were combined. Approximately 56,991 acres (35%) of the Pah Rah PMU were placed into the R-4 category and 34,241 acres (13%) of the Virginia PMU were placed into the R-4 category.

#### **Risk Level:** Medium.

In the main these conditions have resulted from past disturbances, primarily fire. As the fire frequency increased as a result of increased cheatgrass densities, native plants associated with the sagebrush communities decreased and in many cases all but disappeared. Non-native herbaceous species do not provide habitat for sage grouse or many other native species. Over all the risk was assessed at medium higher in the Pah Rah PMU, and lower in the Virginia PMU.

Dr. Young of the USDA Agriculture Research Service, Reno, has been conducting studies in Nevada, focused on reestablishing native species in areas dominated by non-native species. One of the study sites is located in the Pah Rah range. This study has not been completed, although last year they were successful in controlling cheatgrass with herbicides. However, due to severe drought conditions at the study site, no native seed germinated.

Dr. Young also stated that infestations of medusa head (*Taeniatherum caput-medusa*) occur within the Pah Rah's and are expanding. The spread is facilitated by the loss of shallow top soils due to past overgrazing and fires. Native perennial establishment is facilitated by the presence of sandy top soils, while medusa head can germinate and establish on the exposed clay soils of the Pah Rah's. However, medusa head does not compete effectively with native perennials. Therefore, if native perennials were to become reestablished, risks from medusa head may be abated.

#### **Objectives:**

Restore R-4 areas to an R-2 or R-0 value– 40,000 acres of R-4 habitat in the Pah Rah PMU and 10,000 acres of R-4 habitat in the Virginia PMU. R-0 - 15-25% canopy cover of sagebrush, perennial herbaceous cover with  $\geq 15$  canopy cover of grasses and  $\geq 10\%$  for forbs.

#### **Conservation Measures (Actions):**

- Continue to study ways to control cheatgrass, and reestablish native vegetation.

- Herbicide treatments followed by seeding, will be necessary to reestablish native vegetation in areas that have crossed the threshold. Once effective methodologies are worked out on experimental plots large areas of R-4 habitat could then be treated with the aim of restoring the sagebrush community.
- Use appropriate grazing management to favor sagebrush in the winter areas and native forbs and grasses in pre-nesting, nesting and brood rearing habitats.
- Treat 10,000 acres of R-4 (8,000 Pah Raw PMU, 2,000 Virginia PMU) per year for 5 years once an effective methodology is developed.

**Monitoring:**

Line intercept transects will be run annually on treated areas

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners.

**Permanent or Long-Term Loss of Habitat (L.D.1, N.C.1, B.B.1& W.B.1)**

Urbanization and utility development are the primary actions responsible for permanent loss of habitat in these PMU's. The Pah Rah's have been impacted to a much greater degree. The obvious effect of urbanization is the direct loss of habitat, though a more subtle but equally deleterious effect is the increase of disturbances (i.e. pets at large, OHV use, etc.).

**Risk Level:** High.

Because of the close proximity of these PMUs to urban areas and known losses of leks due to urbanization the risk level was assessed as high.

**Objectives:**

Prevent further permanent or long-term loss habitat

**Conservation Measures (Actions):**

- The CRMP states that BLM shall ensure that actions authorized funded or carried out do not contribute to the need to list any of these species as T/E. Additionally BLM 6840 manual states that BLM shall ensure that actions authorized, funded, or carried out do not contribute to the need to list a species under the provision of the Endangered Species Act.
- Do not allow utility development which will adversely impact sage grouse, and as much as possible do not allow surface mining in winter habitat.

- Conversion to cultivated agriculture should be avoided, possibly through conservation easements of critical areas.
- Inventory lands prior to disposal so that important areas can be retained. Acquire important areas or negotiate conservation easements.
- Retain tax delinquent parcels in sage grouse habitat.
- Require mitigation for unavoidable habitat disturbance.
- Enter into conservation easements with private landowners.

**Monitoring:**

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**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners/Permitting Agencies/Counties.

**Indirect limiting of habitat (L.B.4, N.B.1, B.C.1 & W.C.1)**

Off Highway Vehicles (OHV) have a detrimental impact to sage grouse. Use in an intrusive manner can adversely affect sage grouse. Excessive activity can disrupt feeding bouts, displaying birds on leks, cause flight response and even cause a shift to less suitable habitats and abandonment of nests. These disturbances can lead to increased movement and concomitant energy expenditures and increased predation risks and possibly displace the birds to less suitable habitat.

**Table 8, OHV Goals**

Seasonal Habitat	Goal	Risk Level
Winter	Avoid excessive disturbance of Birds	High
Leking	Avoid excessive disturbance of Birds	Low
Nesting	Avoid excessive disturbance of Birds	High
Brood Rearing	Avoid excessive disturbance of Birds	Moderate

Again due to the close proximity of these PMUs to the greater Reno – Sparks area this threat was rated as high.

Parts of these PMUs lie within the Southern Washoe County Urban Interface Plan Amendment area which closed several areas to all OHV use and throughout most of the area limited OHV use to existing roads and trails and designated an area as “open use” meaning that within the designated area there is no restriction on OHV

use. The area covered under the plan amendment is south of township 23 north, which runs through Rancho Heaven and is north of Granite Peak. The remainder of these PMU's lie under an open use designation.

Because the only known lek is on private property OHV use is not a threat. One of the roads leading to it is impassable during much of the leking period and the other road is controlled by the landowner. OHV use may be a threat to as yet unknown leks; however, potential threats cannot be assessed at this time.

**Objectives:** Prevent OHV disturbance to leking sage grouse.

**Conservation Measures (Actions):**

- As new leks are discovered, do not release locations to the general public.
- If disturbance becomes a problem, close the area during the leking period.
- If a discovered lek is on private property NDOW will discuss the importance of the area with the landowner.

**Monitoring:**

Agency personnel including NDOW volunteers while doing lek surveys will evaluate various activities to aid in the determination as to whether specific activities are detrimentally affecting sage grouse.

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners/OHV Groups.

**Objectives:**

Limit or minimize disturbance to sage grouse from OHV use throughout their habitat.

**Conservation Measures (Actions):**

- Work with OHV groups to minimize impacts to sage grouse and their habitat.
- If OHV use is identified as a problem, seasonal closures of important areas will be implemented. An emergency closure can be implemented until a seasonal closure can be incorporated into a plan amendment.

**Monitoring:**

Agency personal including NDOW volunteers while doing lek counts and other activities within sage grouse habitat will evaluate various activities to aid in the determination as to whether specific activities are detrimentally affecting sage grouse.

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners/ OHV Groups.

**Loss of Sagebrush Due to Herbicide Applications (L.A.1, N.A.5, B.A.5 & W.A.1)**

Preventing the loss of any sagebrush within these PMU's is important, though it is especially critical to maintain sagebrush cover near leks.

Herbicide treatments are often considered a risk to sage grouse habitat. However, in cases of noxious weed treatments, the benefits clearly outweigh any possible risks. The concern arises over the use in more or less intact habitats where some thinning of sagebrush would be desirable; however, the effect on the understory, is not well understood. Mechanical treatment in these situations would likely be preferable.

**Risk Level:** Low.

The only known lek is located on a 400m wide strip of private property. The landowner is unlikely to remove sagebrush, therefore, this risk was rated low. Additionally, application of herbicide to control sagebrush on public lands would be prevented by the CRMP and the 6840 manual, unless it is shown to benefit sage grouse.

**Objective:**

Prevent loss of sagebrush.

**Conservation Measure (Actions):**

- Herbicide application on public lands to sagebrush will not occur unless it is shown to benefit sage grouse, such as in controlling noxious weeds or cheatgrass monocultures
- Work with private landowners to preserve sagebrush cover especially near leks.

**Monitoring:**

NDOW will work with private landowners, and the BLM will not approve any E.A.'s to apply herbicide within sage grouse habitat unless the action is shown to benefit sage grouse

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners/NRCS.

**Direct Excessive Human Activity During Strutting (L.B.1)**

**Goal: Prevent Human Disturbances to Leking Birds**

Overzealous human observers too close or on leks can cause temporary or permanent abandonment. The only known lek within these PMU's is on private land with restricted access. However, additional leks are almost certain to exist, therefore, conservation measures will also address the unknown leks as they are discovered.

**Risk Level:** Low.

Overzealous human observers were rated as a low risk since the only known lek is located on private property with restricted access.

**Objectives:** Maintain the current no to minimum disturbance to leking birds.

**Conservation Measure (Actions):**

- Work with private landowners to limit disturbance.
- Do not publicize lek locations.
- Initiate temporary road closures if necessary.

**Monitoring:**

Agency personal including NDOW volunteers and private landowners, while doing lek counts and other activities within sage grouse habitat will evaluate various activities to aid in the determination as to whether specific activities are detrimentally affecting sage grouse.

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners.

## **Sheep Bedding and Grazing on Leks (L.B.2)**

**Risk Level:** N/A.

Due to the occurrence of bighorn sheep, domestic sheep are not authorized on public lands within these PMU's; therefore, sheep use is not a threat. However, if the Pyramid Lake Paiute Tribe chose to run domestic sheep, a conflict could arise.

### **Objectives:**

No sheep bedding near leks

### **Conservation Measure (Actions):**

- Not needed since domestic sheep are not present within these PMUs.

### **Monitoring:**

Not needed since domestic sheep are not present.

### **Responsible Parties:**

BLM/Pyramid Lake Paiute Tribe/Livestock Operators.

## **Predator Control – Aerial Gunning (L.B.3)**

**Risk Level:** N/A.

Aerial gunning of coyotes requires the use of low flying aircraft, which can disrupt sage grouse leking behavior. However, this practice is usually associated with domestic sheep grazing, therefore, it is not a risk within these PMU's.

**Objectives:** Avoid aerial gunning near leks.

### **Conservation Measures (Actions):**

- Not needed since aerial gunning will not occur.

### **Monitoring:**

Not needed since aerial gunning will not occur.

### **Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Wildlife Services.

**Excessive Aerial Predation, Transmission Lines (L.C.1, N.C.1, B.B.1 & W.B.1)**

The WAFWA guidelines recommend that construction of transmission lines and other tall structures be avoided within 3 km of all sage grouse habitats, and that existing structures be retrofitted with anti-perching devices or transmission lines buried.

In many instances leks have disappeared after transmission lines were constructed. The towers provide perch and nesting sites for raptors and ravens, increasing the nest predation and predation on sage grouse.

**Risk Level:** High.

This risk was assessed as high due to the juxtaposition of these PMUs and developed areas, power sources and likely transmission routes.

**Objectives:**

Prevent new construction of towers within 3.2 km of sage grouse habitats outside of existing corridors and install anti-perching devices on existing towers where a problem exists.

**Conservation Measures (Actions):**

- Do not allow construction of new towers within 3.2 km of sage grouse habitat.
- Do not authorize new corridors within sage grouse habitat, occupied or otherwise.
- Work with utility companies to retrofit existing structures where problems are identified.

**Monitoring:**

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**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Other Permitting Agencies  
(Public Utility Commission, etc./Counties.

**Direct loss of lek (L.D.1)**

Paving, surface mining, converting to cultivated agriculture and urban expansion can all lead to loss of leks however, with regard to these PMU's, urban expansion

is the only serious threat and has resulted in the loss of 1 known lek (Bedelle flat) and probably several unknown leks.

**Risk Level:** High.

**Objectives:**

Prevent additional loss of leks

**Conservation measures:**

Do not permit utility development, which will adversely impact sage grouse leks, and as much as possible do not to permit surface mining in winter habitat. Conversion to cultivated agriculture and sales of riparian habitat will be addressed with private landowners. Inventory prior to disposal, retain lands providing habitat for sage grouse, acquire areas or negotiate conservation easements of critical areas. Retain tax delinquent parcels in sage grouse habitat. Require mitigation for unavoidable habitat disturbance.

**Monitoring:**

Annual lek surveys will assess the status of leks (active or inactive) and the number of male attendance.

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners/Permitting Agencies/NRCS.

**Loss of lek to excessive vegetation (L.E.1)**

**Risk Level:** Low.

Juniper encroachment can invade a lek causing the birds to abandon the area. Although there is no juniper near the only known lek, the threat was still rated as low because unknown leks may be threatened.

**Objectives:**

Prevent encroachment by juniper.

**Conservation measure:**

The only known lek is not in peril, however, if leks identified in the future are in jeopardy, the juniper can be treated to remove the threat.

- Juniper threatening leks on public land will be removed by hand crews.
- If juniper is threatening leks on private land NDOW will contact the land owner and attempt to gain permission to abate the threat.

**Monitoring:**

Annual lek surveys will identify any encroachment threats.

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners/NRCS.

**Collisions with fences when flying to and from leks (L.F.2)**

**Risk Level:** Low.

In some instances many sage grouse have been killed in fence collisions and many more are likely injured increasing their risk of predation. It is thought that fences near leks pose the greatest danger to sage grouse as they often visit these areas under darkness. This threat was rated as low since fences do not exist within flight paths to the only known lek.

**Objective:**

Prevent death or injury to sage grouse resulting for collisions with fences.

**Conservation measures:**

- Avoid construction of fences within 0.8 km of leks. If construction cannot be avoided design fences in which the wires can be removed during the leking period and use anti-perch fence posts.
- NDOW will work with private land owners to advise them of the threat and encourage sage grouse safe construction and placement of fences.

**Responsible Parties:**

BLM/Pyramid Lake Paiute Tribe/Private Land owners.

**Overgrowth and stagnation of meadow vegetation (B.D.1)**

**Risk Level:** Low.

Overprotection of springs and meadows by agencies and landowners was rated low since this has not occurred on these PMU's.

**Objectives:**

Prevent overgrowth of meadow vegetation.

**Conservation Measures (Actions):**

If enclosing a meadow to exclude over utilization or degradation the agency(s) involved must establish adaptive management goals and actions such as grazing the meadows as necessary to maintain diversity of forbs for brood rearing habitat. However, extreme caution must be exercised, because livestock preferentially select the more palatable grasses and forbs, leaving the less palatable species such as juncus, iris etc to dominate the meadow, often resulting in a green patch dominated by unpalatable species of little use to most wildlife.

**Monitoring:**

Yearly ocular reconnaissance will aid in evaluating meadow conditions.

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners.

**Damage to unprotected springs and meadows (wetlands; B.E.1)****Risk Level:** Moderate

Over grazing by livestock and wild horses resulting in loss of vegetation, and trampling of springs and meadows. Maintain proper functioning condition, hydrology, landform, and vegetation composition, i.e. avoid head cutting, loss of vegetation and encroachment of sagebrush. This risk was rated as moderate because domestic livestock can be relatively easily controlled, however, wild horses can only be controlled by removals and fencing of meadows.

**Conservation measures:**

- Manage grazing to promote forbs and structure. Use grazing practices, at a minimum to maintain proper functioning condition and forb diversity.

The effects of grazing depend on several variables, notably season of use, duration, and the current years precipitation level and timing. Certain grazing practices will have less of an impact on sage grouse habitat than others.

Livestock can effectively be controlled through active grazing management; however, this method is labor intensive and may be cost prohibitive.

- Maintain wild horses within the AML ranges.
- Remove stray horses.
- Adjust AML's if necessary.

**Monitoring:**

Line intercept transects will be done annually in September to assure at least 4 inches of meadow vegetation.

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners.

**Roads (B.E.2)**

**Risk Level:** Moderate

Roads can affect the hydrology, by compacting sources and creating channels. This risk was rated moderate because some springs are at risk.

**Objectives:**

Have all springs properly functioning by 2009

**Conservation Measures (Actions):**

- Inventory road impacts on riparian areas.
- Re-route roads to avoid adverse impacts to the hydrology and wet meadows.

**Monitoring:**

Ocular reconnaissance methods will identify springs adversely impacted by roads

**Responsible Parties:**

BLM/CDFG/NDOW/Pyramid Lake Paiute Tribe/Private Land owners.

**Lahontan Rangeland Program Summary**

The Lahontan Rangeland Program Summary Update (December 1989) identified specific management objectives for wildlife within the grazing allotments comprising these PMU's. In 1989, the importance of residual herbaceous cover for successful sage grouse nests was not known. In general the objectives were to maintain 4 inches of growth on

meadows in identified sage grouse habitat by 15 September. Other objectives were to improve a certain amount of acres in the allotments that fell into the “I” (intensive management) category. The “I” allotments within these PMU’s are: Antelope Mountain, Big Canyon, Constantia, Flanigan, Paiute and Winnemucca Ranch. The other allotments within these PMU’s were categorized as “M” (maintain) or “C” (custodial) the main objectives for these allotments were to maintain existing utilization levels and 4 inches of growth on meadows by 15 September: Hallelujah and Hardscrabble were categorized as “M” and Olinghouse, Pah Rah, Red Rock, Spanish Springs/Mustang and White Hills were categorized as “C”.

AMP’s have been completed for Flanigan, Winnemucca Ranch, Big Canyon, Antelope and Paiute grazing allotments. Evaluations have been completed for Flanigan, Winnemucca Ranch, Big Canyon, Antelope and Paiute.

Allotment	Cat.	Date of S&G Eval.	Date of Eval.	Date of MUD	Date of AMP
Antelope Mt.	I	1999	1999	2000	1981
Big Canyon	I	2001	1993		1985
Constantia	I	Scheduled for 2003	1994		1999
Flanigan	I	2001 DNA	1987		1987
Paiute	I	1999	1993	1994	1989
Winnemucca	I	1999	1999	2000	1986
Hallelujah Junction	M	Scheduled for 2003	1990		
Hardscrabble Canyon	M	1999 DNA			
Olinghouse	C	1999 DNA			
Pah Rah	C	2000 DNA			
Red Rock	C	Scheduled for 2006			
Spanish Sp./ Mustang	C	Not Scheduled			
White Hills	C	2000			

DNA – Determination of NEPA Adequacy, used different monitoring procedures than S&G.

All allotments either met S & G standards or changes were made to the permit so that S & G objectives would be met.

The Carson City Field Office uses several methodologies to monitor land health

including: trend, utilization levels, riparian functionality, frequency transects, ESI – ecological site inventory and rangeland health assessments.

### **Monitoring:**

Residual herbaceous height can be measured using the Robel pole method or cover board method. Other methods of randomly measuring residual herbaceous cover within a prescribed distance of nest shrubs would also be suitable.

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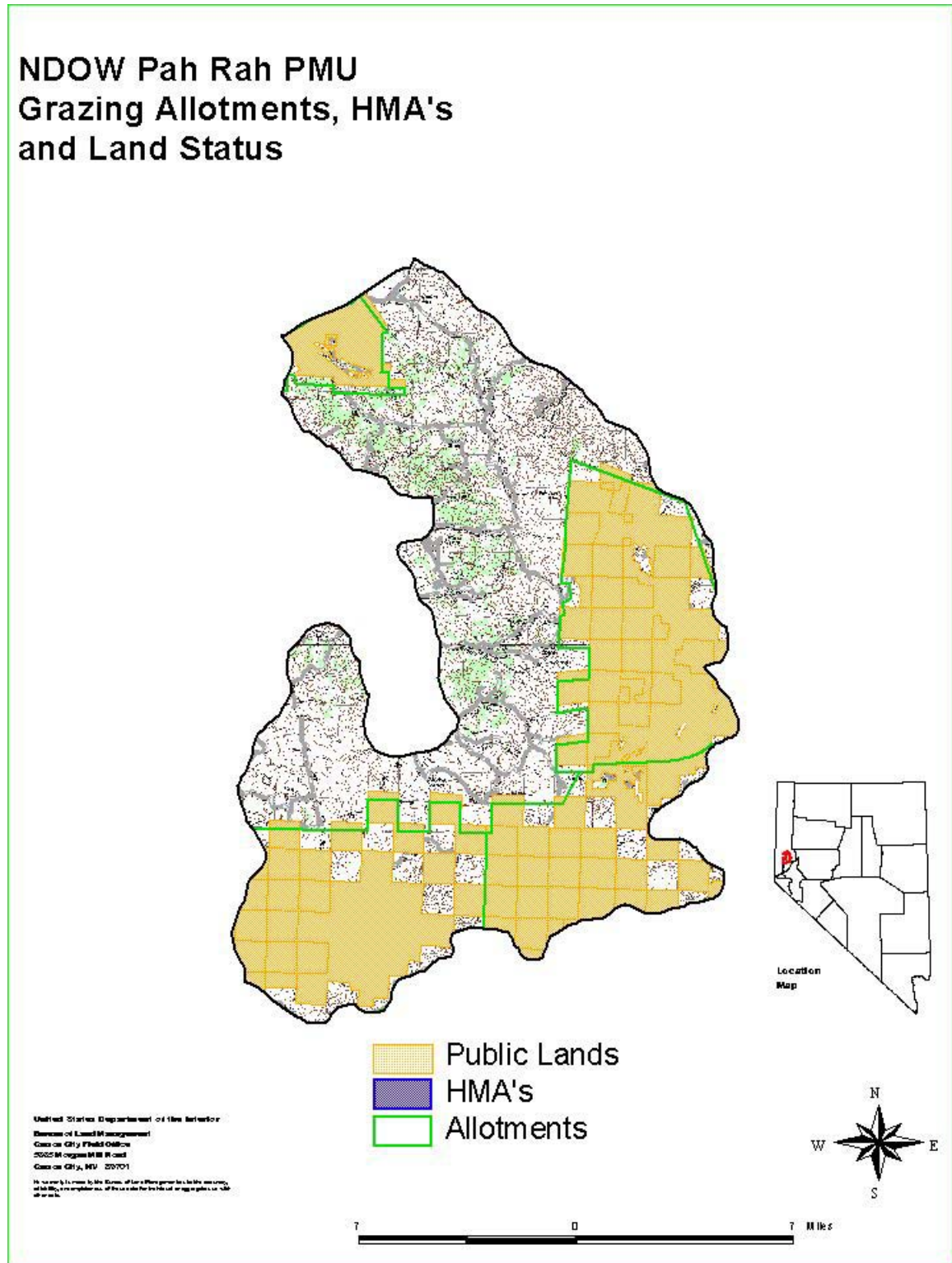
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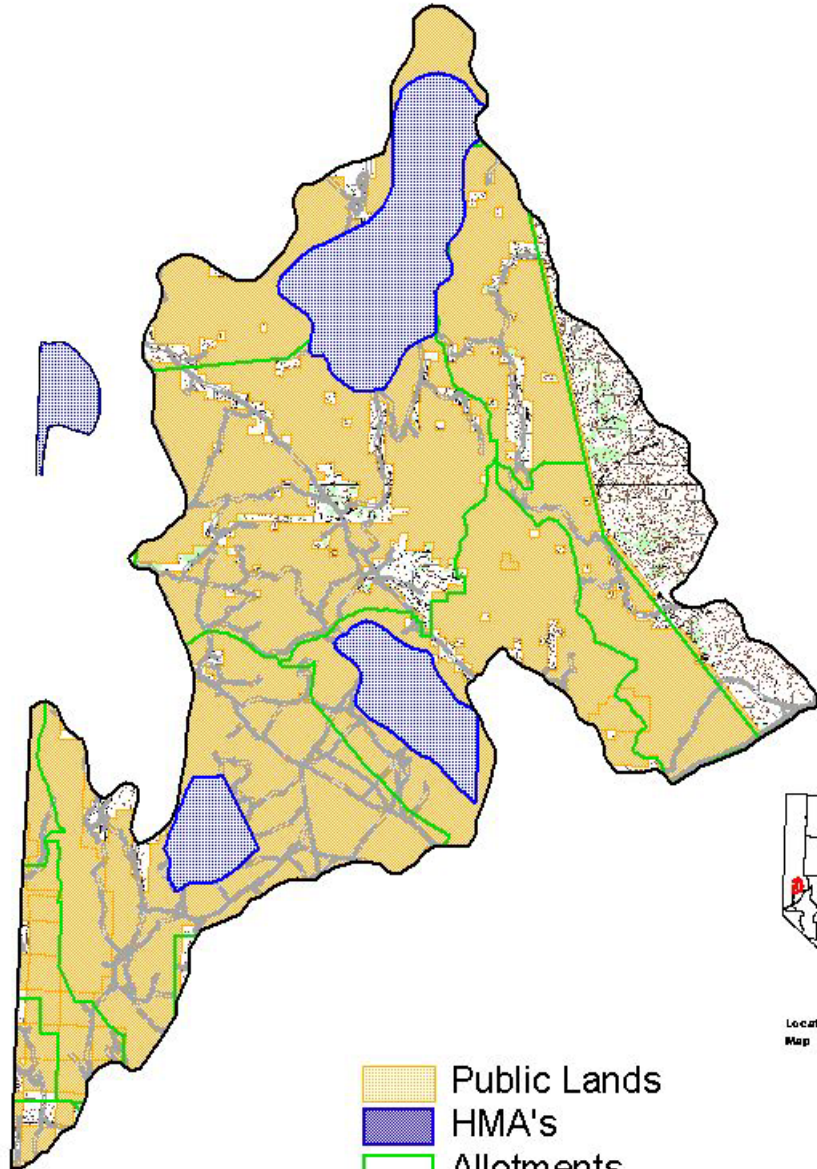
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Map 1 – Land Status, PMU’s, HMA’s, & Grazing Allotments



# NDOW Virginia PMU Grazing Allotments, HMA's and Land Status



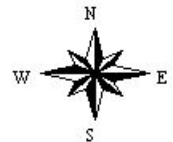
- Public Lands
- HMA's
- Allotments

United States Department of the Interior  
Bureau of Land Management  
Case on City Field Office  
2025 Morgan Mill Road  
Case on City, NV 89701

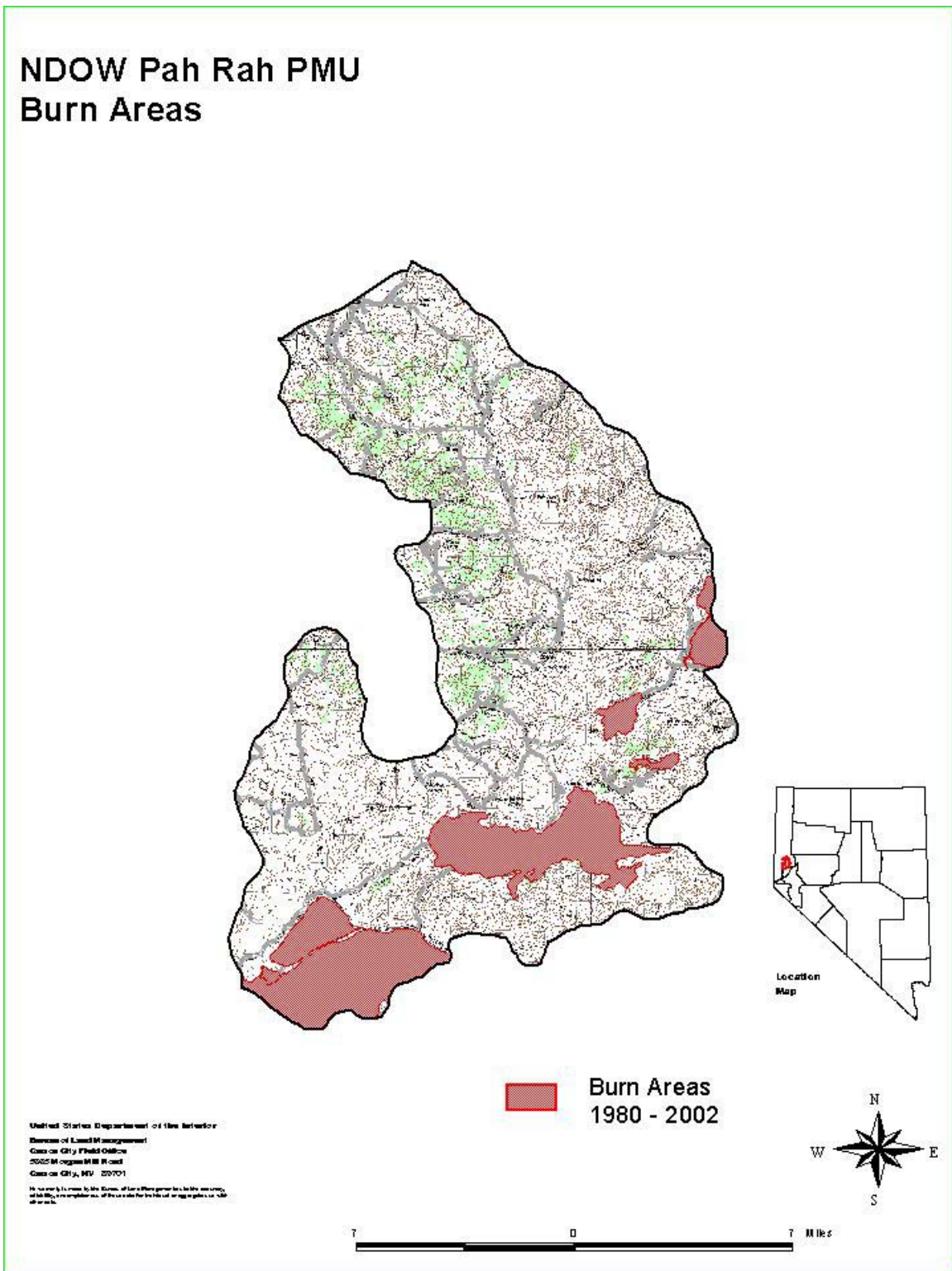
It is hereby certified to the State of Nevada that the accuracy of this map is in compliance with the standards for the use of maps in Nevada.



Location Map

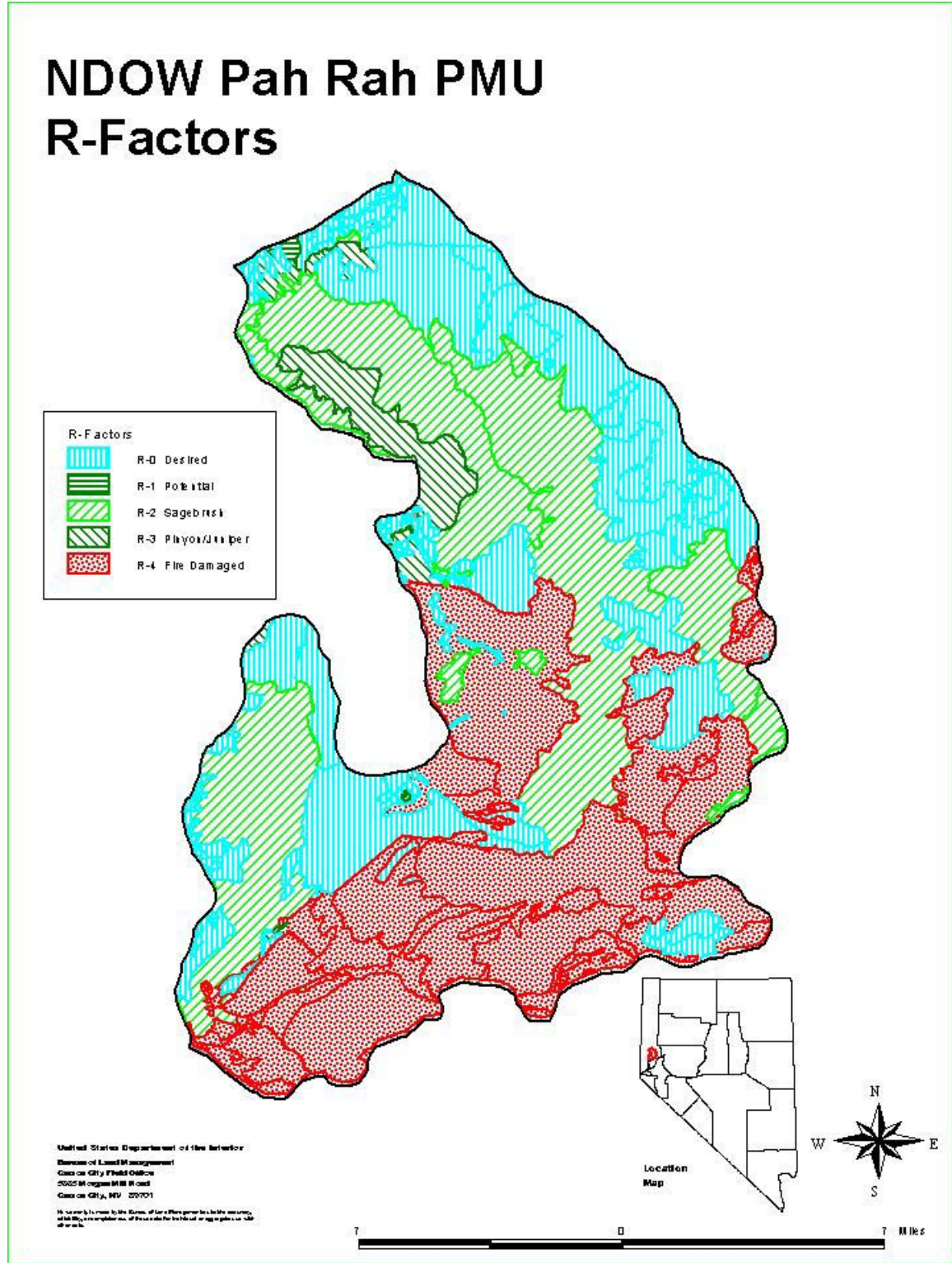


Map 2 – Burned Areas

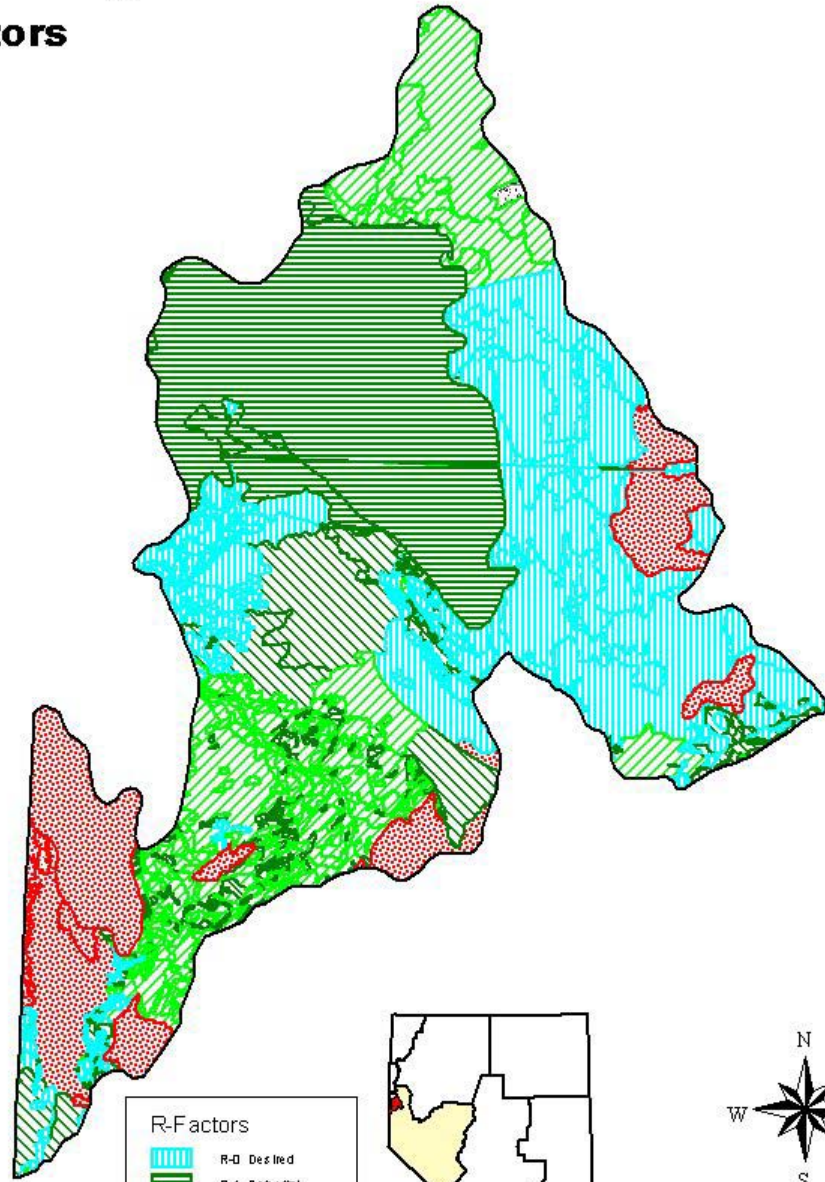




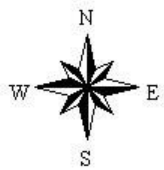
Map 3 – R  
Values



# NDOW's Virginia PUM R-Factors



R-Factors	
	R-0 Desired
	R-1 Potential
	R-2 Sagebrush
	R-3 Phytodiversity
	R-4 Fire Damaged



The land shown is property of the State of Nevada  
 Bureau of Land Management  
 Carson City Field Office  
 2025 Virginia Hill Road  
 Carson City, NV 89701  
 All names & symbols are those of the Bureau of Land Management or its authorized agents.

## **Appendix 1. Risk Matrix (file not merged yet, do we want it separate?)**

## **Appendix 2. Consolidated Resource Management Plan (CRMP)**

In 2001, the Carson City Field Office completed a Consolidated Resource Management Plan (CRMP), which incorporated decisions from eight major field office planning documents and five amendments to these plans. The CRMP was created through a plan maintenance action and does not change the scope of the decisions made in previous land use plans or amendments to these plans. Portions of actions or objectives, which may directly affect the management of sage grouse habitat, are outlined below:

### **Wildlife**

National Policy: (BLM Manual Section 6500- Wildlife and Fisheries Management 06/17/88)

The general policies below are supplemented by more specific policies in BLM Manual Sections 1622 and 6501-6880. It is BLM policy to manage habitats with emphasis on ecosystems to ensure self-sustaining populations and a natural abundance and diversity of wildlife, fish and plant resources on the public lands. To carry out this responsibility, the BLM will:

5. Ensure all activity plans (HMPs, AMPs, etc.) include site-specific objectives for wildlife, fish and special status species and actions necessary to achieve those objectives.
6. Monitor ongoing management actions and determine if habitat management objectives are being met.

*Standards and Guides monitoring has been completed for both the Winnemucca and Big Canyon allotments, both met the criteria.*

## **RMP Level Decisions**

### **Desired Outcomes**

4. Maintain and improve wildlife habitat, including riparian/stream habitats, and reduce habitat conflicts while providing for other appropriate resource uses.
5. Maintain or improve the habitat condition of meadow and aquatic areas. Habitat condition for any wildlife species can be defined as the ability of a specific area to supply the forage, cover, water and space requirements of an animal. Habitat condition, therefore, is a measure of habitat quality and is determined by assessments, surveys and studies.

6. Maintain or improve the condition of the public rangelands so as to enhance productivity for all rangeland values (including wildlife).

### **Land Use Allocations**

#### **Reno Planning Area**

4. Limit OHV use to designated roads and trails in the Petersen Mountain and Sand Hills crucial deer areas.
5. Close Bedell Flat strutting ground to OHV use from March 1 to May 30 each year (strutting ground has been abandoned).
13. All riparian areas will be given special management consideration through the consultation and coordination process to provide for adequate protection.

### **Implementation level decisions**

1. Implement range improvement projects to protect and improve (big game) mule deer, bighorn sheep, sage grouse, fisheries and riparian habitat and to improve livestock and wild horse distribution and vegetation utilization.

*Seven spring exclosures have been completed in within the Virginia PMU and two within the Pah Rah PMU.*

2. Rehabilitate 6,000 acres of burned deer winter range (Petersen Mountain).

### **Administrative actions**

5. Riparian protection measures would involve implementation and evaluation of grazing management systems and techniques, which have been designed to enhance riparian habitat before initiating extensive fencing of specific areas to exclude wild horses and livestock. Riparian and fisheries habitat protection measures will involve fencing of some specific areas to prevent over-utilization and trampling. Some grazing uses by livestock and wild horses could occur on those riparian areas where monitoring studies indicate the area has recovered to a good or better condition class. The degree and season of grazing use will be determined through consultation and coordination with affected livestock permittees and other interested parties.

### **Standard operation procedures**

15. Brush control by herbicides, prescribed burning, or by mechanical means will be in accordance with the Memorandum of Understanding between the Nevada Division of Wildlife and the Bureau of Land Management. The procedures specify, among other things, that vegetation control measures will be prohibited on sage grouse breeding complexes, wintering grounds or within 100 yards of a stream or meadow. .... All vegetation management actions in Nevada will

conform with decisions in the final Environmental Impact Statement on B>M Lands in Thirteen Western States and Record of Decision 1991. All vegetation management action in California will conform with decisions in the California Vegetation Management Final Environmental Impact Statement and Record of Decision 1988.

16. BLM will adhere to current habitat modification guidelines prepared by the Western Sage Grouse Committee of the Western Association of Fish and Wildlife Agencies (WAFWA).

### **Special Status Species**

D. Retain in federal ownership all habitat essential for the survival or recovery of any T/E species, including habitats used historically by these species.

Livestock Grazing management:

## **RMP Level Decisions**

### **Reno Planning Area**

5. Within ten years of the objective of the proposed action is to cause an overall shift in ecological condition of the native ranges follows: (1) increase excellent condition by 3,017 acres, (2) increase good condition by 28,448 acres, (3) reduce fair condition by 12,687 acres and poor condition by 18,778 acres.

*A second ecological site inventory has not been funded, therefore, the status of the objectives is unknown.*

### **Walker and Lahontan Rangeland Program Summary (RPS)**

6. The long-range objectives of the grazing management program are to manage, maintain, and improve the rangeland conditions on the public lands through the following:

A. Maintain a sufficient quality and diversity of habitat and forage for livestock, wildlife and wild horses through natural regeneration and/or vegetation manipulation methods.

B. Improve the vegetation resource and range condition by providing for the physiological needs of key plant species.

C. Reduce soil erosion and enhance watershed values by increasing ground cover and litter.

D. Improve and maintain the condition of the riparian habitat. (Reno RPS 1984).

## **Land Use Allocations, Lahontan Resource Area**

2. Discontinue livestock grazing in allotments where grazing is no longer practical due to land ownership patterns, real estate development, and disposal of the connected base properties. (1). Dry Lake, (2) Pah Rah Mountains, (3) Peavine Watershed, (4). Haskell peak.

### **Land Tenure Decisions**

Initiate land exchanges with the Southern Pacific Railroad and the private owners in the Spanish Springs to block up public lands in the White Hills and Olinghouse allotments.

### **Implementation Level Decisions**

2. The Selective Management Policy. It is the policy of the BLM to address rangeland management problems through a selective management approach. This approach assigns management priorities among allotments within a planning area. This is based on identifying allotments with similar management needs, resource characteristics, and potential for improvement in both resource and economic returns.

The similarity among the allotments allows them to be grouped into three categories with each having its own objective. The three categories and their objectives are: Maintain current satisfactory condition; Improve current unsatisfactory condition; or manage the allotments Custodially, while protecting existing resources. The use of these allotment categories will help to establish priorities for distributing available funds and personnel in such a way as to achieve cost-effective improvement of rangeland production and condition. These funds will be used to develop grazing treatments and systems and install range improvements in order to resolve grazing related problems. The priorities identify those allotments where more intensive management is needed.

Allotments have been placed in the (M) Maintenance, (I) Improvement, and (C) Custodial categories using the criteria outlined in Appendix D of the draft RMP.

3 Allotment Management Plans. Allotment management plans would be developed for all Category I allotments, and Category M and C allotments as needed. These plans would be multiple-use in nature. They would be developed in consultation with interested parties and coordinated with wildlife, wild horse and burro, watershed, and wilderness plans. Key components of AMPs are allotment specific objectives, monitoring studies, grazing systems, range improvements, and evaluations.

4. Grazing Treatments and Systems. A grazing treatment describes the level of grazing use and periods-of-use for a unit (usually a pasture) of an allotment, or an entire allotment in one or more years. Grazing treatments are the building blocks of the grazing plan, and are designed to improve rangeland condition by manipulating livestock grazing to accomplish objectives of management. The deferment of grazing or complete rest from grazing during the critical growth period of key management species would allow these species to maintain and/or increase their density, composition, vigor, production, and reproduction. The following rest treatments (singly or in various combinations) would be combined with scheduled grazing treatments to form grazing systems in amps for specific allotments.

Treatment one: Rest from livestock grazing for two consecutive growing seasons (approximately April 1 of one year to August 31 of the following year. Two growing seasons of rest would allow key management species to improve vigor, increase litter accumulation, seed production, and seedling establishment. Rest for two growing seasons is required in order for grass seedlings to develop adequate root growth to withstand appreciable grazing and trampling (Hormay 1970.)

Treatment two: Livestock grazing from midsummer to fall (approximately July 16 to November 15 dates vary with allotments). Grazing after seed-ripe would provide better seed dispersal and trampling. When coupled with other treatments that provide for spring rest the following year, this treatment would allow an improvement in plant vigor and seedling establishment for key grass species and many shrubs.

Treatment three: Provide rest from livestock grazing for two years, until seedlings are established or until it is determined that a vegetation manipulation or recovery project is unsuccessful. This treatment provides the protection necessary for establishment or recovery of key management species following wildlife seeding, burning, or herbicide spraying projects.

Treatment four: Defer livestock grazing from early spring to midsummer each year (approximately April 1 to June 30). This treatment may be required yearly and could be retained until the systems are implemented. Improved vigor and reproduction of key management species in each allotment would result. Where intensive grazing management systems are implemented, utilization levels may be exceeded during each grazing cycle. The periodic rest from grazing would allow the key management species to increase in vigor and production.

Treatment five: For key deer winter range where bitterbrush is the key species, a special grazing treatment is recommended. This requires two years of rest, followed by one year of grazing after seed-ripe and finally one year of season-long grazing. Variations of this treatment are acceptable as long as they include the two-year rest period required for bitterbrush seed production.

6. Resource Monitoring. Future adjustments in livestock and wild horses will be based on consultation with interested parties and an analysis of data from monitoring studies. This involves the use of vegetation study techniques to measure ecological status and trend, grazing utilization and distribution, actual use information, and climatic data. Category I allotments have the greatest number of resource conflicts and potential for improvement. Therefore, more intensive range monitoring efforts, including frequency transects (1981 Nevada Range Monitoring Procedures), key area utilization, ecological status, use pattern mapping, actual use, and precipitation studies will be implemented or continued in these allotments to determine whether management objectives are being met with proposed management treatments. Management and/or grazing use levels may be changed based upon results of these studies.

Few changes in management or treatments are anticipated for Category M and C allotments. Therefore, less intensive range monitoring efforts, including utilization, actual use, precipitation, and perhaps a few frequency studies within selected key areas will be implemented or continued to determine whether current conditions are being maintained, and existing resources protected with present management.

### **Reno Planning Area**

16. Allotments in Category C will receive such management as is necessary to prevent resource deterioration. These allotments will be monitored to detect change in resource condition, should situations change an allotment may be moved into the intensive management category.

18. Through consultation and coordination in a public process develop or revise intensive grazing systems with monitoring that will insure proper periods of use as part of allotment management plans. Prioritization of Category I allotments will be made through consultation and coordination. CRMP is the preferred process. Completed

### **Standard Operating Procedures**

5. Application of herbicides such as 2,4-D on treatment areas to reduce sagebrush and other plant species would be in accordance with procedures established in Bureau Manual 9222 and other applicable regulations, laws, and court orders to ensure non-impairment of other than target species.

6. All disturbed areas will be rehabilitated where such action is necessary and practical to replace ground cover and prevent erosion.

8. Livestock permits will be adjusted, if necessary, to reflect decreases in public land acreage available for livestock grazing use within an allotment as a result of land disposal.

10. Livestock grazing will be deferred for at least two growing seasons on all vegetation manipulation projects, including prescribed burns, to allow vegetation to be established.

### **Activity Plans**

Lahontan Resource Area Rangeland Program Summary Update      December  
1989.

#### Allotment Management Plans

#### Northern CCFO

Antelope Mountain	03001	Frenchman Flat	03024
Carson	03003	Horse Springs	03032
Big Canyon	03004	Hole In the Wall	03030
Constantia	03012	Mountain Well-Laplat	03039
Red Rock	03014	Paiute	03043
Dixie Valley	03018	Rock Springs	03049
Flanigan	03022		

## **Wild Horse and Burro**

**National Policy:** (BLM Manual Section 4700 - Wild Free-Roaming Horse and Burro Management 11/23/88)

It is the policy of the Bureau of Land Management, in accordance with the Wild Free-Roaming Horse and Burro Act (Public Law 92-195, as amended) and other laws governing the public lands, to:

1. Protect, manage, and control wild horses and burros on public lands as an integral part of the public land's ecosystem. Appropriate management levels shall be determined for Wild horses and burros through the resource management planning process. Wild horses and burros shall be considered comparable with other resource values on each herd area in the formulation of resource management plans and managed as self-sustaining populations of healthy animals in balance with other uses and the productive capacity of their habitat. Current inventories of herd management areas shall be maintained. Management of wild horses and burros shall be constrained as necessary to ensure the protection of the habitat of a candidate, threatened, or endangered species. Management actions shall be at the minimum feasible level that allows attainment of herd and habitat objectives and protects the range from deterioration associated with over population. Wild horse and burro ranges shall be designated when it is determined to be in the public interest to manage herd management areas principally, but not necessarily exclusively, for wild horses and burros.

Remove excess wild horses and burros from public lands to preserve and maintain a thriving ecological balance and multiple-use relationship. Priority shall be given to removing wild horses and burros from private land when the landowner submits a written request to BLM for their removal.

### **RMP Level Decisions**

#### **Desired Outcomes**

Wild horse and burro management in specific areas will be guided by HMAPs. The plans will be developed through consultation with interested parties and coordinated with livestock, wildlife, and watershed plans. They will be focused on wild horse and burro management through maintaining or improving wild horse and burro populations and habitats, development of water sources, and population and habitat monitoring studies.

#### **Standard Operating Procedures**

5. Riparian area fencing will be utilized when necessary to protect these areas. Spring development and protection may be undertaken to increase the quantity

and quality of water at these sources for the use by wild horses, wildlife and livestock.

## **Riparian Management**

**National Policy:** (BLM Manual Section 1737 Riparian-Wetland Area Management 12/10/92)

**Departmental Policy.** The Department of the interior has a mandate for management of the Nation's natural resources, including riparian-wetland areas. The Department's policy is to:

Exercise leadership and take action to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of wetlands and floodplains.

Avoid the direct or indirect support of wetland or floodplain projects whenever here is a practical alternative.

- I. **BLM's Policy.** In accordance with the laws, EO's, and Departmental policy to maintain, restore, or improve riparian-wetland ecosystems to achieve a health proper functioning condition that assures biological diversity, productivity, and sustainability, it is the BLM's policy to:
- II.
  - A. Use an interdisciplinary team to conduct and maintain an inventory of all riparian-wetland areas, quantifying physical, biological, chemical condition and potential.
  - B. Focus management on entire watersheds using an ecosystem approach and involving all interested landowners and affected parties whenever possible.
  - C. Achieve riparian-wetland area improvement and maintenance objectives through management of existing and future uses wherever feasible.
  - D. Ensure that new resource management plans (RMP's) and activity plans, and existing plans when revised, recognize the importance of riparian-wetland values, and initiate management to maintain, restore, improve or expand them.
  - E. Prescribe management for riparian-wetland values that is based upon site-specific characteristics and settings.
  - F. Use an interdisciplinary team approach to monitor and evaluate management activities in riparian-wetland areas and revise management practices where objectives are not being met.

G. Ensure public involvement in the planning and management of riparian-wetland ecosystems. This includes federal, state, local governments, and industry organizations sharing information, implementing management actions, coordinating activities, and providing education on the value, productivity, and management of riparian-wetland areas.

H. Retain riparian-wetland areas in public ownership unless disposal would be in the public interest, and acquire riparian-wetlands as determined in the land use planning system.

I. Identify, encourage, and support research and studies needed to ensure that riparian-wetland area management objectives can be properly defined and met. Incorporate research findings into the planning and management of riparian-wetland ecosystems.

### **Implementation Level Decisions**

1. Riparian protection measures would involve implementation and evaluation of grazing management systems and techniques which have been designed to enhance riparian habitats before initiating extensive fencing of specific areas to exclude wild horses and livestock. Riparian and fisheries habitat protection measures will involve fencing of some specific areas to prevent over-utilization and trampling. Some grazing uses by livestock and wild horses could occur on those riparian areas where monitoring studies indicate the area has recovered to a good or better condition class. The degree and season of grazing use will be determined through consultation and coordination with affected livestock permittees and other interested parties.

Table XX, Conservation Measures and Actions

<b>Action</b>	<b>Implementation Date</b>	<b>Achieved</b>
Provide for full suppression of fires in sage grouse habitat	SOP	Met, ongoing
Protect unburned islands within burns	SOP	Met, ongoing
Consider firebreaks around subdivisions		
Reduce cheatgrass and consider green stripping along roads on a site-specific basis		
Where natural regeneration of native species after a fire is likely, seeding will not be implanted.	2003	
Where seeding is necessary use a mix of native forbs, grasses and brush	2003	.
Include sagebrush in seeding mixes	SOP	
Avoid using non-native seeds in seeding mixes unless the site is considered to pose a strong risk for invasion by non-native plant spp.	2003	
Reapply sagebrush seed to 16,000 acres of the Virginia PMU per year for 5 years.	2004	
Avoid brush control and herbicide use in sage grouse habitat unless it is shown to benefit sage grouse	CRMP, 2001	Met
Maintain 18 cm or as site potential will allow of residual herbaceous cover in nesting habitat	2004	

Modify Terms and Conditions of grazing permits to assure 18 cm, or as site potential will allow of residual herbaceous cover in nesting habitat.	2004	
Maintain wild horse numbers as AML	2004	
Remove stray horses	2004	
Remove 20% of encroaching juniper per year for 5 years	2004	
Use appropriate grazing management to favor sagebrush in winter habitat and native forbs and grasses in pre-nesting, nesting and brood rearing habitats	2004	
Treat 10,000 acres of R-4 per year for 5 years.	2004	
Do not allow utility development which will adversely impact sage grouse and as much as possible do not allow surface mining in winter habitat.	CRMP, 2001	
Conversion to cultivated agriculture should be avoided, possibly through conservation easements of critical areas.	2004	
Inventory lands prior to disposal to retain important areas.	CRMP, 2001	
Retain tax delinquent parcels in sage grouse habitat.	2004	
Require mitigation for unavoidable habitat disturbance.	2004	
Do not release lek locations to the general public.		
If disturbance becomes a problem close area to the public.	CRMP, 2001	
NDOW will discuss the importance of leks with private property owners.		

Work with OHV groups to minimize impacts to sage grouse and their habitat.	2004	
If OHV use is identified as a problem, instigate seasonal closures.	CRMP, 2001	
Prevent herbicide application on public lands to sagebrush unless it is shown to benefit sage grouse.	CRMP, 2001	
Work with private landowners to preserve sagebrush cover, especially near leks.		
Do not allow construction of new towers within 3.2 km of sage grouse habitat.	CRMP, 2001	
Do not authorize new corridors within sage grouse habitat occupied or otherwise	CRMP, 2001	
Work with utility companies to retrofit existing structures where problems are identified.		
Remove juniper from if discovered leks are threatened by juniper encroachment.	2003	
If juniper encroachment is discovered to threaten leks on private land NDOW will work with the landowner and attempt to gain permission to abate the threat.	2003	
Avoid construction of fences within .8 km of leks.	CRMP, 2001	
NDOW will work with private landowners to encourage sage grouse safe construction and placement of fences.	2003	
Manage grazing to promote forbs and structure. Use grazing practices, at a minimum to maintain proper functioning condition and forb diversity.	2004	
Maintain wild horses within the AML ranges	2004	On going
Remove estray horses	2004	On going
Adjust AML's if necessary		On going

Inventory road impacts on riparian areas	2004	
Re-rout roads to avoid adverse impacts to the hydrology and wet meadows.	2004	