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## Monitoring Evaluation

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### Massacre Lakes Allotment and Massacre Lakes Herd Management Area

8/30/2013

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## **Purpose**

The purpose of this monitoring evaluation is to assess the effectiveness of current management practices' in meeting specific resource objectives as identified in the Record of Decision (ROD) for the Surprise Field Office Resource Management Plan (RMP, 2008), and the 1982 revised Allotment Management Plan (AMP), the 1985 Massacre Lakes Herd Management Plan, as well as meeting the land health standards as defined in the Rangeland Health Standards and Guidelines for California and Northwestern Nevada (2000). The monitoring information will also be used to establish a carrying capacity for cattle and wild horses. The number of wild horses will be expressed as the Appropriate Management Level (AML) with a population range.

Data from this evaluation, the completed Rangeland Health Assessment (RHA) and Determination, and public scoping as well as other consultation, will be used to complete an environmental assessment and develop a management plan for livestock and wild horses.

## **Background- Current Information**

### **Allotment Profile**

The Massacre Lakes Allotment lies in northern Washoe County, Nevada, approximately 25 miles east of Cedarville, California. The allotment is comprised of 46,890 acres, of which 2,410 acres are private land. The allotment contains several designations including 25,278 acres of the Massacre Rim Area of Critical Environmental Concern (ACEC), 31,080 acres of the Massacre Rim Wilderness Study Area (WSA), and 3,815 acres of the Black Rock Desert-High Rock Canyon Emigrant Trail National Conservation Area (NCA).

The Massacre Lakes Allotment has five fenced pastures: Juniper, Lake Field, Sand Spring, East Seeding, and West Seeding. Vegetation on the allotment is dominated by typical northern Great Basin plant communities, such as low, Wyoming, and Basin big sagebrushes. Western Juniper is common on the Juniper Pasture. Approximately 2,590 acres of the west pasture is ephemeral lakes (West and Middle Lakes), at an elevation of 4,400 feet. The Juniper Pasture has the highest elevation at 7,100 feet. The Juniper Pasture is approximately 25,210 acres in size and consists mostly of undulating low sagebrush ecological sites, with inclusions of rock outcroppings and rock rims. There have been a total of nine fires within the pasture since 1967, burning a total of about nine acres. An amendment to the Management Framework Plan (MFP) in 1983 modified the Massacre Lakes Allotment and HMA boundary to include the former Sagehen Allotment. Approximately four miles of the allotment boundary fence was removed to combine the Sagehen Allotment with the Juniper Pasture of Massacre Lakes Allotment and HMA. Approximately one mile of this old boundary fence is now included with the Biebe Spring riparian/cultural resource enclosure.

In 1967, 3,867 acres were planted to crested wheatgrass and this project was called "Painted Peak Seeding". This area was later fenced and divided into the East and West Seeding pastures. The East Seeding is 1,544 acres in size; approximately 87 percent was seeded to crested wheatgrass. In 1969 the West Seeding was expanded to approximately 4,957 acres in size, or approximately 55 percent the pasture. Currently, crested wheatgrass is declining on all the seedings, while big sagebrush and rabbitbrush are increasing.

The Lake Field is 8,168 acres in size and is dominated by big sagebrush ecological sites. Approximately 17 percent of the pasture was seeded, and this project was known as the “Massacre Brush Spray and Seeding”. Crested wheatgrass seeding has declined sharply over the last decade and is currently dominated by big sagebrush. Wildfires have not been documented in the Lake Field or the East Seeding.

The Sand Spring Pasture is approximately 7,097 acres in size and is dominated by big sagebrush ecological sites. The only recorded wildfire burned less than an acre in 1996. In 1994 there were two prescribed fires; the Painted Point Burn totaling 287 acres and the Johnson Burn totaling 262 acres.

**Livestock Management:**

In 1982 Allotment Management Plan (AMP) was revised with the assistance of the Massacre Lakes Technical Review Team (TRT) consisting of permittees, Nevada Department of Wildlife (NDOW), BLM staff, and other interested publics. The TRT reviewed monitoring information, the allotment management plan, and conducted site visits. The TRT recommended the grazing system be revised and other management changes were incorporated to the AMP.

One permittee is authorized to graze up to 3,215 Animal Unit Months (AUMs<sup>1</sup>) of cattle use annually between April 16 and September 30. The AMP pasture management strategy is to graze the East Seeding, Juniper, and Sand Spring Pastures in Year 1, and to rest the Lake Field and West Seeding. In Year 2, graze the Lake Field, West Seeding, and Sand Spring Pasture, and then rest the Juniper Pasture and East Seeding. Grazing use in the Sand Spring Pasture is deferred each year until August. Refer to Table 1, for the current livestock numbers and season of use for pastures within the Massacre Lakes Allotment.

**Table 1. Massacre Lakes Allotment Pasture Management Schedule**

	<b>Juniper Pasture</b>	<b>Lake Field</b>	<b>Sand Spring Pasture</b>	<b>West Seeding Pasture</b>	<b>East Seeding Pasture</b>
<b>Year 1</b>	582 C 5/1-8/15	Rest	582 C 8/16-9/30	Rest	582 C 4/16-4/30 8/16-9/30
<b>Year 2</b>	Rest	582 C 4/16-8/15	582 C 8/16-9/30	Used w/ Lake Field	Rest

<sup>1</sup> Animal Unit Month is forage needed support a cow and a calf under 6 months of age, or to support one adult horse, and a foal. After January 1, a horse inventoried is equivalent to one AUM. One adult wild horse for a year requires 12 AUMs.

### **Herd Management Area Profile**

The Massacre Lakes Herd Management Area (HMA) consists of 39,890 acres located entirely within the Massacre Lakes Allotment, including the former Sagehen Allotment. The HMA includes all pastures except the southernmost Sand Spring Pasture. The Record of Decision (ROD) for the Surprise Resource Management Plan (RMP, 2008) estimated the Appropriate Management Level (AML<sup>2</sup>) at 25-35 wild horses. The 1985 Herd Management Plan established an AML of 10-20 wild horses, and the 1982 AMP established an AML of 15-25 wild horses. Based on population inventory and distribution information wild horses mainly occupy the mid and upper elevations of the Juniper Pasture and the Lake Field in early fall and winter; there is some evidence or documentation indicating wild horse use in the East or West seeding pastures

### **Population and Gather Information**

Wild horses were last gathered from the Massacre Lakes HMA in 1984 and 1988. In 1988, 25 wild horses were gathered and 11 head (3 studs and 8 mares) were released back into the HMA. Since 1988, four helicopter population inventories (direct counts) have been completed. The 1997 population inventory estimated 27 wild horses in the HMA. In 2001, the population inventory showed 54 wild horses on the HMA. During this period the herd growth rate averaged between 18 and 20%. The 2007 inventory showed the herd had increased to 110 wild horses. In March 2008 (before foaling season) 108 wild horses were counted on the HMA. Starting in 2010, and through 2012, wild horse population inventories for the HMA were completed with the Tri-State inventory. During this period, the population estimate varied from 149 to 160 head. A population inventory has not completed in 2013. Population estimates are contained in Appendix A. (Refer to attached wild horse inventory maps for population and distribution information).

### **Water Developments**

Water in the Massacre Lakes Allotment is provided by natural and man-made water sources. Several of the natural water sources have been developed and some of these developed waters have been fenced (see Map 6 in Appendix B).

In the Juniper Pasture there are twelve springs and/or seeps: Sagehen Spring is undeveloped and unfenced; Biebe Spring is undeveloped and has an enclosure fence around it; Tuffy Spring is developed and has an enclosure around it; Indian Spring is developed and has an enclosure around it; Post Canyon Spring is undeveloped; and Post Spring is also developed and the riparian area has a enclosure around it. There are four other unnamed springs in this pasture that are not developed or fenced. There are two other seeps in this pasture that are not developed or fenced (Post Canyon seep #1 and #2). This pasture also contains 13 pit reservoirs (Biebe, Weed Lake, Massacre #1, #2, #3, #4, #5, and #6, Miserable, Injun, Yellow Pan #2 and #3, and Stud) and one well (Patch Well also provides water for the Lake Field).

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<sup>2</sup> The Appropriate Management Level (AML) is the number of adult horses or burros (expressed as a range with an upper and lower limit) to be managed within a herd management area. Forage for wild horses and burros (expressed in AUMs) are allocated based on the AML upper limit.

In the Lake Field there is one well (Heard - non-functional) along with two ephemeral lakes (Middle and West). There is a large riparian area known as Alkaline Meadows on the far eastern side of the pasture.

In the West Seeding there is one pit reservoir (Captain Johnson), and two wells (Saddle and Lower Massacre; Lower Massacre also provides water for Sand Spring Pasture). There are no springs in this pasture.

In the East Seeding there are two wells (Nelson and Cowhide, which also provide water for Sand Spring Pasture). There are no pit reservoirs or springs in this pasture.

In the Sand Spring Pasture there is one well (Sand Spring), two pit reservoirs (Little Basin and Massacre #5), and one developed and fenced spring (Sand Spring).

### **Carrying Capacity**

The carrying capacity for the allotment is established at 3,215 active AUMs, and is based on the 1960's range vegetative inventory. The active AUMs is combination of the permitted AUMs for the former Sagehen Allotment (573 AUMs), when added to Massacre Lakes Allotment 2,642 AUMs in 1982.

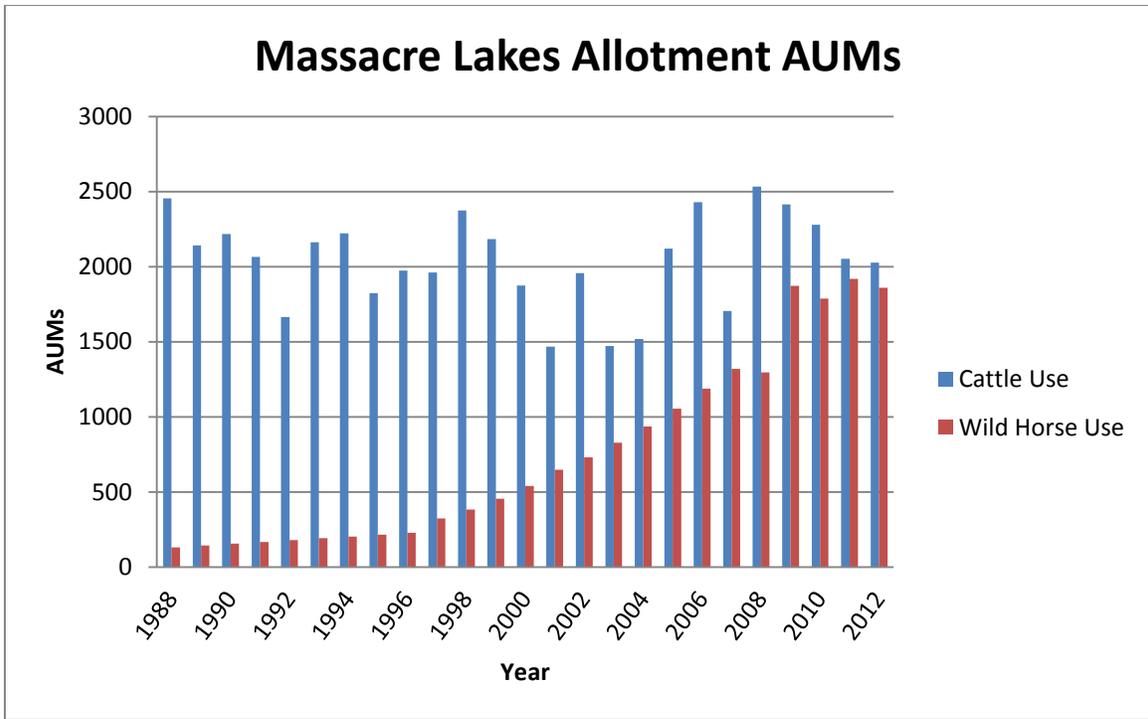
### **Actual use**

#### ***Livestock***

Livestock actual use AUMs are based on annual Actual Grazing Use Reports submitted by the permittee since 1988 (Figure 1 below). The actual use reports for cattle are shown by pasture in Appendix A. From 1988 to 2012 cattle actual use averaged 64% of the 3,215 permitted AUMs.

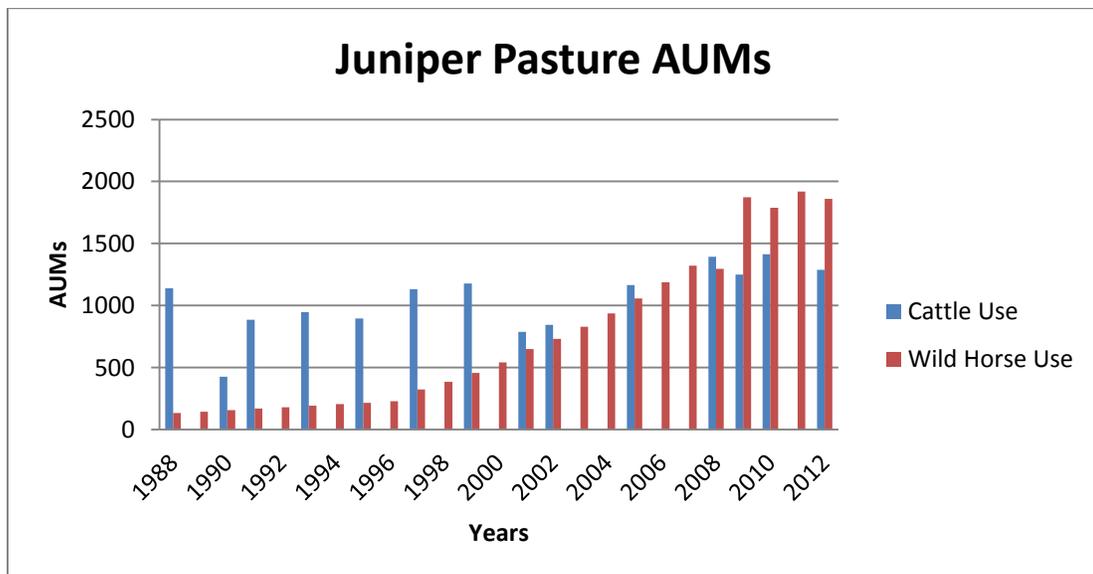
#### ***Wild horses***

Wild horse AUMs displayed in Figure 1 are estimates based on post-gather population inventory, following the 1988 gather; population inventory data conducted by helicopter (direct counts) from 1997, 2001, 2007, 2008, and results from the Tri-State Inventory (2010-2012) using the simultaneous double-count method. For years without inventory data, AUMs use is predicted using the standard annual increase of 20%. Additional cattle and wild horse use is contained in Appendix A.



**Figure 1. Annual AUMs usage for cattle and wild horses on the Massacre Lakes Allotment and Herd Management Area from 1988 through 2012.**

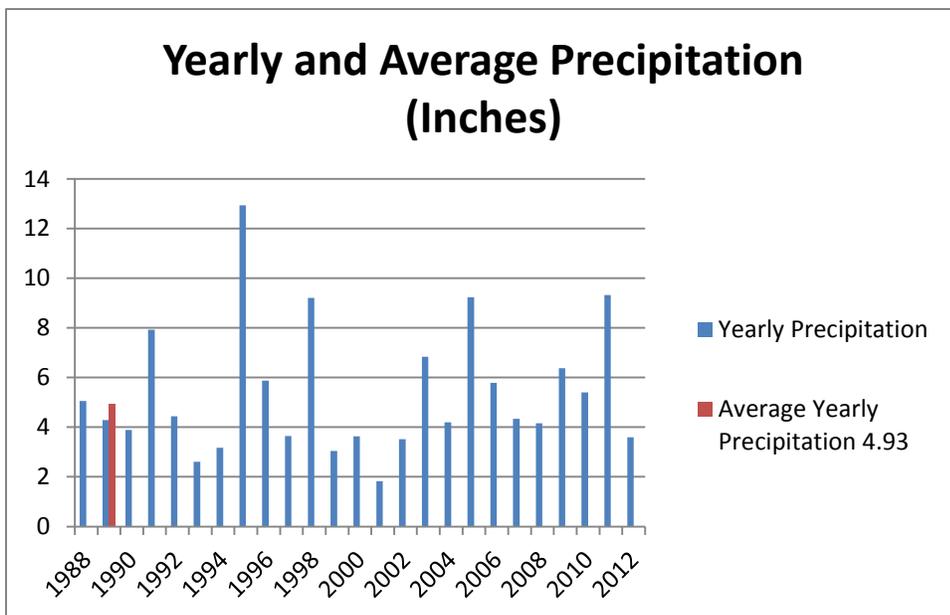
Figure 2 (below) displays annual livestock AUMs used in the Juniper Pasture based on Actual Grazing Use Reports since 1988 and estimated wild horse AUM use. The Juniper Pasture was rested from cattle use for the following years: 1989, 1992, 1994, 1996, 1998, 2000, 2003, 2004, 2006, 2007, and 2011.



**Figure 2. Annual actual use AUMs in the Juniper Pasture of Massacre Lakes Allotment and Herd Management Area from 1988 through 2012.**

**Climate**

The Catnip Mountain Nevada remote automated weather station (RAWS) is located in northern Washoe County on the Sheldon Wildlife Refuge, approximately 12 miles northeast of the allotment at an elevation of 5,740 feet; data from this RAWS is available yearly, monthly, and daily (<http://www.raws.dri.edu/>). This data is considered the best representation of weather conditions for the Massacre Lakes Allotment. Annual precipitation is displayed in Figure 3 for the last 25 years and has varied from 2 to 13 inches, averaging 4.93 inches. The annual precipitation was below average 14 of the 25 years recorded, and above average for 11 years. Most of the precipitation in the Massacre Lakes Allotment falls between the months of April and June and occurs mainly as rain.



**Figure 3. Monthly precipitation data collected by the Catnip Mountain Nevada RAWS was used to compile yearly precipitation amounts (in inches) and to create a 25 year precipitation average for the area.**

**Land Use Plan and Activity Plan Development**

Between 1982 and 2013 grazing management for the Massacre Lakes Allotment followed the guidelines established in the Allotment Management Plan (AMP). This AMP was revised in 1982 to conform to the 1981 Cowhead/Massacre Management Framework Plan (MFP). In 1985 Massacre Lakes Herd Management Plan was developed to assist with manage wild horses on the HMA. On August 12, 1997 the rangeland health fallback standards and guidelines were implemented. These standards and guidelines were applied to all BLM allotments until statewide standards and guidelines were developed. In July 2000, the Northwest California and Northeast Nevada Rangeland Health Standards and Guidelines (land health standards) were

approved. Grazing management for the Massacre Lakes Allotment must conform to the land health standards. This grazing permit renewal decision and wild horse AML decision will update the original 1982 Revised Allotment Management Plan and 1985 Massacre Lakes Herd Management Plan objectives to conform to the land health standards, as well as the management levels, goals and objectives from the Record of Decision (ROD) for the Surprise Resource Management Plan (RMP) of April 2008.

### **Monitoring**

Long term trend monitoring conducted in the Massacre Lakes Allotment includes: one permanent vegetation frequency transect established in 1984 in the Juniper Pasture; and ten 5X5 photo trend plots established between 1969 and 1971 in the Lake Field, West Seeding, Juniper and Sand Spring Pastures.

More recently in 2008, five key areas were established in the Lake Field, Juniper and Sand Spring Pastures. Data collected from these key areas includes gap data, line-point intercept cover data, and soil stability data. Additional line-point intercept data was collected in 2012, and this information is displayed and discussed in the EA for the Massacre Lake Allotment/HMA, Wildlife section, Table 3.7. Utilization monitoring was conducted in 1978 to 1990, 1994; and 2006 to 2009 (see Figure 4). A composite use pattern map from 1978 to 2012 is included in Appendix B (Map 3). Riparian Functional Assessments (RFAs) were completed in 1993, 2008, 2009 and 2013.

### **Wildlife Monitoring**

Wildlife inventories have been conducted by the BLM, Nevada Department of Wildlife (NDOW) as well as by several agency partners or contractors. Sage-grouse lek attendance data was collected in the allotment in 1972 and from 2003-2009 by both BLM and NDOW. Brood rearing and harvest data were collected by NDOW in 1956, 1965, 1967, 1972, 1976, 1978, 1981, 1988, and 1991. Golden eagle nests were located in 1977 and then monitored by BLM personnel in 1979, 2002, 2003, 2006, and 2008. A pygmy rabbit survey was conducted in the allotment in 2006 by a BLM contractor. During the development of the Ruby pipeline project EIS additional surveys were conducted from pygmy rabbit and wildlife. Carson wandering skipper and their habitats were searched for in 2008 and 2009 by the BLM. NDOW has regularly collected big game information since the mid-1970s, and started monitoring other wildlife species in the late 1980s and early 1990s. The Massacre Lakes Allotment is entirely within NDOW's hunt unit 011. Data from this hunt unit is often pooled with other units and presented on a larger "regional" scale; generally units 011-013 are presented together. Mule deer and pronghorn antelope populations are tracked within unit 011.

### **Vegetation Trend Data**

Vegetative frequency trend data was first collected on the Juniper Pasture key area in 1984. The frequency trend data identified three dominant key species; Sandberg's bluegrass, bottlebrush squirreltail, and low sagebrush. Frequency of occurrence of these species was Sandberg's bluegrass (47.5%), bottlebrush squirreltail (40.5%), and low sagebrush (49%). This frequency trend site was not reread because the site is now located within the Biebe Spring enclosure.

### **5X5 Photo Trend Summary Results**

This quantitative method uses photographic record and estimates of vegetation cover and composition within a 5X5 plot as an indication of trend overtime. The 5X5 photo trend plot data is represented by the Trend Index Summary that is comprised of the sum of percent composition of key species, percent cover of live vegetation, number of key species seedlings, and percent litter in the plot. Most of the plots in the Massacre Lakes Allotment were established in the 1960s and were periodically recorded throughout the 1970s and 1980s. In September and October of 2009, five 5X5 photo trend plots (432106, 432013, 422011, 422003, and 422104B) in the Juniper and Sand Spring Pastures and West Seeding were revisited and data was collected.

In 1979 5X5 photo trend plot 432106 in the Juniper Pasture had a total Trend Index Summary of 67.87 with the key species being Sandberg's bluegrass, bottlebrush squirreltail and Thurber's needlegrass. In 2009 this photo trend plot was reread. Over the last 30 years Thurber's needlegrass has disappeared from this transect and live vegetation cover and key species seedling quantity has also declined. In 2009, the percent composition of key species and percent litter in the plot increased. As a result, the overall Trend Index Summary for this site declined to 53.81 in 2009 (20.7% reduction). Other data parameters noted from 1979 to 2009 were a 22.3% reduction in sagebrush composition. The 1979 data indicated forbs being within the plot; however in 2009 no forbs were recorded. The reduction in forb composition could be due to the timing of data collection. Production of forbs is highly variable annually, and is based on timing of precipitation. When comparing photos from 1979 to 2009 it is apparent that soils are being deposited on this plot location.

In 1987 5X5 photo trend plot 432013 in the Juniper Pasture had a total Trend Index Summary of 48.00 with the key species being Thurber's needlegrass, Sandberg's bluegrass, and bottlebrush squirreltail. In 2009 this photo trend plot was reread. Over the last 22 years, live cover of Thurber's needlegrass declined by 97% and bottlebrush squirreltail increased 80%. The number of Sandberg's bluegrass seedlings has increased by six plants. In 2009, percent composition of key species and percent litter in the plot decreased. As a result, the overall Trend Index Summary for site 432013 increased to 49.58 in 2009 (3% increase). Other data parameters noted from 1987 to 2009 were a 0.7% increase in sagebrush composition. The 1987 data recorded forb cover being .36% within the plot; in 2009 forb cover was .37%, a 4% increase. When comparing photos from 1983 to 2009 it is apparent that soils are being eroded and lost from the site.

In 1987 the 5X5 photo trend plot 422104B in the Sand Spring Pasture had a total Trend Index Summary of 32.46 with the key species being bottlebrush squirreltail and Indian ricegrass. In 2009 this photo trend plot was reread. Over the last 22 years, live cover for bottlebrush squirreltail has increased by 83.4% and Indian ricegrass has decreased by 55.8%. The number of key species seedlings is static at 0. The percent composition of key species and percent litter increased in 2009. As a result, the overall Trend Index Summary for site 422104B increased to 37.8 in 2009 (14.1% increase). Other data parameters noted from 1987 to 2009 were a 33.4% increase in sagebrush cover and a 51.6% decrease in rabbitbrush cover. The 1987 data indicated two annual forbs within the plot compared to three annual forbs within the plot in 2009. In this plot, no apparent signs of soil erosion or deposition were observed.

In 1987 the 5X5 photo trend plot 422011 in the Sand Spring Pasture had a Trend Index Summary of 46.30 with the key species being needle-and-thread. In 2009 this photo trend plot was reread. Over the last 22 years, live cover for needle-and-thread has decreased by 64.5% and the number of key species seedlings has decreased by one plant. In 2009 the percent composition of key species and the percent litter in the plot decreased. As a result, the overall Trend Index Summary for site 422011 decreased to 33.25 in 2009 (28.2% reduction). Other data parameters noted from 1987 to 2009 were a 66.4% decrease in rabbitbrush cover. The 1987 data indicated annual forb cover being .05% within the plot compared to .18% in 2009, a 72.3% increase. When comparing photos from 1983 to 2009 no apparent signs of soil erosion or deposition were observed.

In 1977 the 5X5 photo trend plot 422003 in the West Seeding had a total Trend Index Summary of 113.84 with the key species being crested wheatgrass. In 2009 this photo trend plot was reread. Over the last 32 years, live cover for crested wheatgrass declined by 74.8% and the number of crested wheatgrass seedlings decreased by 18 plants. In 2009 the percent composition of key species decreased and percent litter increased. As a result, the overall Trend Index Summary for the site decreased to 33.47 (70.6% reduction) in 2009. Other data parameters noted from 1977 to 2009 were an increase in the number of annual forbs, sagebrush and rabbitbrush plants within the plot. The 1977 data indicated two Indian ricegrass plants within the plot; in 2009 no Indian ricegrass was observed within the plot. After comparing photos from 1977 to 2009, there is no noticeable soil erosion or deposition at the site.

Four of the five trend plots showed a reduction in deep rooted perennial bunchgrasses. This trend is likely the result of heavy grazing use and may have been exacerbated by below average precipitation for 14 of the last 25 years.

**Riparian Functional Assessment Data**

Riparian Functional Assessments were completed for most spring riparian areas in the Massacre Lakes Allotment in 1993, 2008, 2009 and 2013 (Table 2).

**Table 2. Summary of the RFA for the Massacre Lakes Allotment Information collected 1993, 2008, 2009, and 2013.**

<b>Massacre Lakes Riparian Functional Assessment</b>		
<b>Source Name</b>	<b>Riparian Functional Rating</b>	<b>Comments</b>
Tuffy Spring	Proper Functioning Condition	2-3 acre lentic riparian site within a 6 acre enclosure. The spring is developed with a livestock trough placed outside the enclosure.
Post Spring	Functional At Risk – downward trend	2 acre lentic riparian site that has been developed and has a 29 acre enclosure around it.
Indian Spring	Proper Functioning Condition	3-4 acre lentic complex of several small seeps and springs. The most dependable spring has been developed and troughs placed outside an approximately 55 acre enclosure.
Biebe Spring	Proper Functioning Condition	4-5 acre undeveloped, lentic riparian

		site within an approximately 1,000 acre enclosure
Sagehen Spring	Non-functional	Approximately 4 acres, undeveloped, lentic riparian site.
Post Canyon Spring	Non-functional 1993	It is developed with a pit, unfenced spring about 2 acres in size.
Post Canyon Seep #1	Proper Functioning Condition	Undeveloped, unfenced lentic riparian site about .0625 acres in size, larger pool at site.
Post Canyon Seep #2	Proper Functioning Condition	Undeveloped, unfenced lentic riparian site about .0625 acres in size, larger pool at site.
Un-named Seep #1	FAR – Trend not apparent	Undeveloped, unfenced site no more than about .0625 acres, little water at site.
Un-named Seep #2	Not rated, but similar to seep #1	Similar to un-named seep #1.
Un-named meadow site #3	FAR – Trend not apparent	Dry meadow site about ½ acre in size. Undeveloped with no fence.
Un-named Seep #4	Proper Functioning Condition	Similar to un-named seeps 1 and 2.
Alkaline Meadows	FAR – downward trend	Large meadow site (approx. 20 acres), highly alkaline water in areas. Severe hoof action from livestock noted at site.

### Rangeland Health Data

In 2007 and 2008 line-point intercept cover data, soil surface stability data and canopy gap data were collected on the Massacre Lakes Allotment at each RHA site. Line-point intercept cover data is used to measure percent canopy cover, percent bare ground, percent basal cover, and percent litter along three one hundred foot transects. Soil surface stability was tested using 18 random soil samples taken at each RHA site (refer to Table 3). Once the sampling and testing process is completed, the results are compared to an Ecological Site Reference Sheet for a particular ecological site. The reference sheet describes a range for each of the 17 indicators based on spatial and temporal variability within each ecological site. The measurable indicators from the reference sheets are displayed in Table 4.

**Table 3 Summary of the 2007 and/or 2008 Line-point Intercept and Soil Stability Data**

RHA Site #	Average % Bare Ground	Average % Canopy Cover	Average % Basal Cover	Overall Average % Litter	Average % Litter in Plant Interspaces	Soil Surface Stability Average
Site #1 (Loamy 8-10" PZ)	32.67	49.33	1.33	40.00	12.3	Sand content to high to test
Site #2 (Claypan)	23.33	57.00	4.00	22.33	12.0	2.5

10-14" PZ)						
Site #3 (Loamy 10-12" PZ)	49.67	26.33	0.00	25.33	22.7	2
Site #4 (Sandy 8-12" PZ)	35.33	37.33	0.67	39.00	24.7	Sand content to high to test
Site #5 (Claypan 14-16" PZ)	20.67	62.00	3.67	19.33	11.3	2.6

**Table 4 Ecological Site Reference Worksheet Numbers for measureable indicators**

RHA Site #	Bare Ground	Shrub Canopy	Basal Cover, Canopy Cover	Plant Interspace Litter	Soil Surface Stability Values
Site #1 (Loamy 8-10" PZ)	+/- 50%	15 to 25%	≤6% Basal Cover	+/- 20%	3 to 6
Site #2 (Claypan 10-14" PZ)	+/- 40%	20 to 30%	+/- 40% Canopy Cover	+/- 25%	3 to 6
Site #3 (Loamy 10-12" PZ)	+/- 40%	15 to 25%	+/- 40% Canopy Cover	+/- 25%	3 to 6
Site #4 (Sandy 8-12" PZ)	30-40%	10 to 15%	20-35% Canopy Cover	+/- 25%	1 to 3
Site #5 (Claypan 14-16" PZ)	+/- 40%	20 to 30%	+/- 40% Canopy Cover	+/- 25%	3 to 6

Gap data is a measurement of the interspace gaps between vegetative canopy along a transect (refer to Table 5); these gaps were measured along the same transects as the line-point intercept. Plant basal gaps (refer to Table 6) were also measured along the same transect. The data is displayed in average percent of line in gaps between 1-2', 2.1-3', 3.1-6', and >6'. Canopy gap data is used to determine whether a site is susceptible to wind and water erosion and exotic plant invasion. Basal gap data is used to determine soil water erosion risk and water infiltration.

**Table 5 Summary of the 2007 and/or 2008 Canopy Gap Data Averages (data represents the average percent of line in gaps)**

Canopy Gap Size	RHA Site #1 Averages	RHA Site #2 Averages	RHA Site #3 Averages	RHA Site #4 Averages	RHA Site #5 Averages
1-2'	9.57	14.70	2.90	4.50	17.47
2.1-3'	8.73	14.60	2.67	6.97	12.13
3.1-6'	18.33	17.50	14.30	19.33	11.93
>6'	19.30	8.60	52.00	30.30	2.80

**Table 6 Summary of 2007 and/or 2008 Basal Gap Data Averages (data represents the average percent of line in gaps)**

Canopy Gap Size	RHA Site #1 Averages	RHA Site #2 Averages	RHA Site #3 Averages	RHA Site #4 Averages	RHA Site #5 Averages
1-2'	6.23	16.57	0.73	2.63	14.63
2.1-3'	6.83	17.30	1.83	1.00	17.07
3.1-6'	18.90	21.37	5.90	4.77	29.43
>6'	62.00	14.00	87.40	87.83	14.40

***Juniper Pasture 2008 RHA***

At site #2 (Claypan 10-14" PZ) - data indicated that of the 17 indicators, eight were rated none to slight, five were rated slight to moderate, three were rated moderate, and one was rated moderate to extreme. The moderate departures were plant community composition and distribution relative to infiltration, functional/structural groups due to a lack of deep rooted perennial grasses (Thurber's needlegrass and bluebunch wheatgrass), and pedestals and/or terracettes throughout the low sagebrush site. The moderate to extreme departure was due to lack of annual production of perennial plants. The below average precipitation in 2007 and 2008 may have contributed to the moderate to extreme departure. Very little cheatgrass is present at this site. Line-point intercept cover data shows that this site has 23.33% bare ground which is 16.67% less bare ground than the reference sheet (+/- 40%), which indicates the soil is well protected. Line-point intercept cover data showed shrub cover being 21.7%, which is within the reference sheet's 20 to 30% range. Line-point intercept cover data showed plant interspace litter cover being 12.0% which is less than the reference worksheet's +/- 25% range. Line-point intercept cover data showed canopy cover being 57% which is 17% more cover than the reference worksheet's +/- 40% range. The soil stability test rating for site #2 was 2.5, which is below the reference worksheet's 3 to 6 range. Wind-scoured, blowouts, and/or deposition areas and invasive plants were rated none to slight which correlates to canopy gap sizes. The canopy gap sizes are appropriate for the site to reduce wind-scoured and invasive plant establishment. Rills, water-flow patterns, and gullies were all rated none to slight which correlates to basal gap sizes; the basal gaps are adequate to dissipate water movement.

At site #5 (Claypan 14-16" PZ) in the Juniper Pasture data indicated that of the 17 indicators, eight were rated as none to slight, two were rated at slight to moderate, and seven were rated moderate. The moderate departures were due to water flow patterns causing slight erosion, the presence of pedestals and/or terracettes, soil surface loss or degradation within plant interspaces, plant community composition and distribution relative to infiltration (lack of Idaho fescue and bluebunch wheatgrass), Functional/structural groups (lack of cool season deep rooted grasses), litter amount and annual production. Some Western juniper is present on this site; however very little cheatgrass was noted. Line-point intercept cover data shows that this site has 20.67% bare ground which is 19.33% less bare ground than the reference worksheet's +/- 40% which indicates the ground cover is adequate. Line-point intercept cover data showed shrub cover being 28.3% which is within the reference worksheet's 20 to 30% range. Line-point intercept cover data showed plant interspace litter cover being 11.3% which is less than the reference worksheet's +/- 25% range. Line-point intercept cover data showed canopy cover being 62%

which is 22% more cover than the reference worksheet's +/- 40% range. The line-point intercept cover data showed basal cover for this site is 3.67%. The soil stability test rating for site #5 was 2.6, which is below the reference worksheet's 3 to 6 range. Wind-scoured, blowouts, and/or deposition areas and invasive plants were rated none to slight which correlates to canopy gap sizes. The canopy gap sizes are appropriate for the site to reduce wind-scoured areas and the establishment of invasive plants (with the exception of Western juniper). Rills and gullies were rated none to slight and water-flow patterns was rated moderate which correlates to basal gap sizes. The basal gap sizes are adequate to dissipate rills and gullies, but are allowing water-flow patterns to slightly erode the soil surface.

### ***Sand Spring Pasture 2008 RHA***

At site #1 (Loamy 8-10" PZ)- data indicated that of the 17 indicators, 12 were rated as none to slight, two were rated at slight to moderate, one was rated moderate, and two were rated moderate to extreme. The moderate departure was due to a lack of deep rooted perennial grasses (Thurber's needlegrass). The moderate to extreme departures were due to lack of annual production and reproductive capability of perennial plants. The below average precipitation in 2007 and 2008 may have contributed to the moderate to extreme departures. Some cheatgrass is present on this Wyoming big sagebrush site. Line-point intercept cover data shows that this site has 32.67% bare ground which is 17.33% less bare ground than the reference worksheet (+/- 50%) has for the site which indicates the ground is well covered. Line-point intercept cover data showed shrub cover being 23.3% which is within the reference worksheet's 15 to 25% range. Line-point intercept cover data showed basal cover being 1.33% which is within the reference worksheet's ≤6% range. Line-point intercept cover data showed plant interspace litter cover being 12.3%, which is less than the reference worksheet's +/- 20% range. Line-point intercept cover data showed overall canopy cover being 49.33%. The indicator wind-scoured, blowouts, and/or deposition areas and invasive plants were rated none to slight which correlates to canopy gap sizes. The canopy gap sizes are appropriate for the site to reduce wind-scoured areas and chance of invasive plant establishment. Rills, water-flow patterns, and gullies were all rated none to slight which correlates to basal gap sizes. The basal gap sizes are adequate to dissipate water movement.

At site #4 (Sandy 8-12" PZ) data indicated that of the 17 indicators, nine were rated as none to slight, five were rated at slight to moderate, and three were rated moderate. The moderate departures were due to plant community composition and distribution relative to infiltration (very few herbaceous perennial including grass), functional/structural groups (missing herbaceous perennial), and annual production. The below average precipitation in 2007 and 2008 may have contributed to the moderate departures. Some cheatgrass is present on this Basin big sagebrush and Wyoming big sagebrush sites. Line-point intercept cover data shows that this site has 35.33% bare ground which is within the reference worksheet's 30 to 40% range. Line-point intercept cover data showed shrub cover being 14%, which is within the reference worksheet's 10 to 15% range. Line-point intercept cover data showed plant interspace litter cover being 24.7% which is within the reference worksheet's +/- 25% range. Line-point intercept cover data showed canopy cover being 37.33% which is slightly more than the reference worksheet's 20 to 35% range. Wind-scoured, blowouts, and/or deposition areas and invasive plants were rated slight to moderate which correlates to canopy gap sizes. The abundance of large canopy gaps is allowing the site to receive slight wind-scoured areas and invasive plant (cheatgrass)

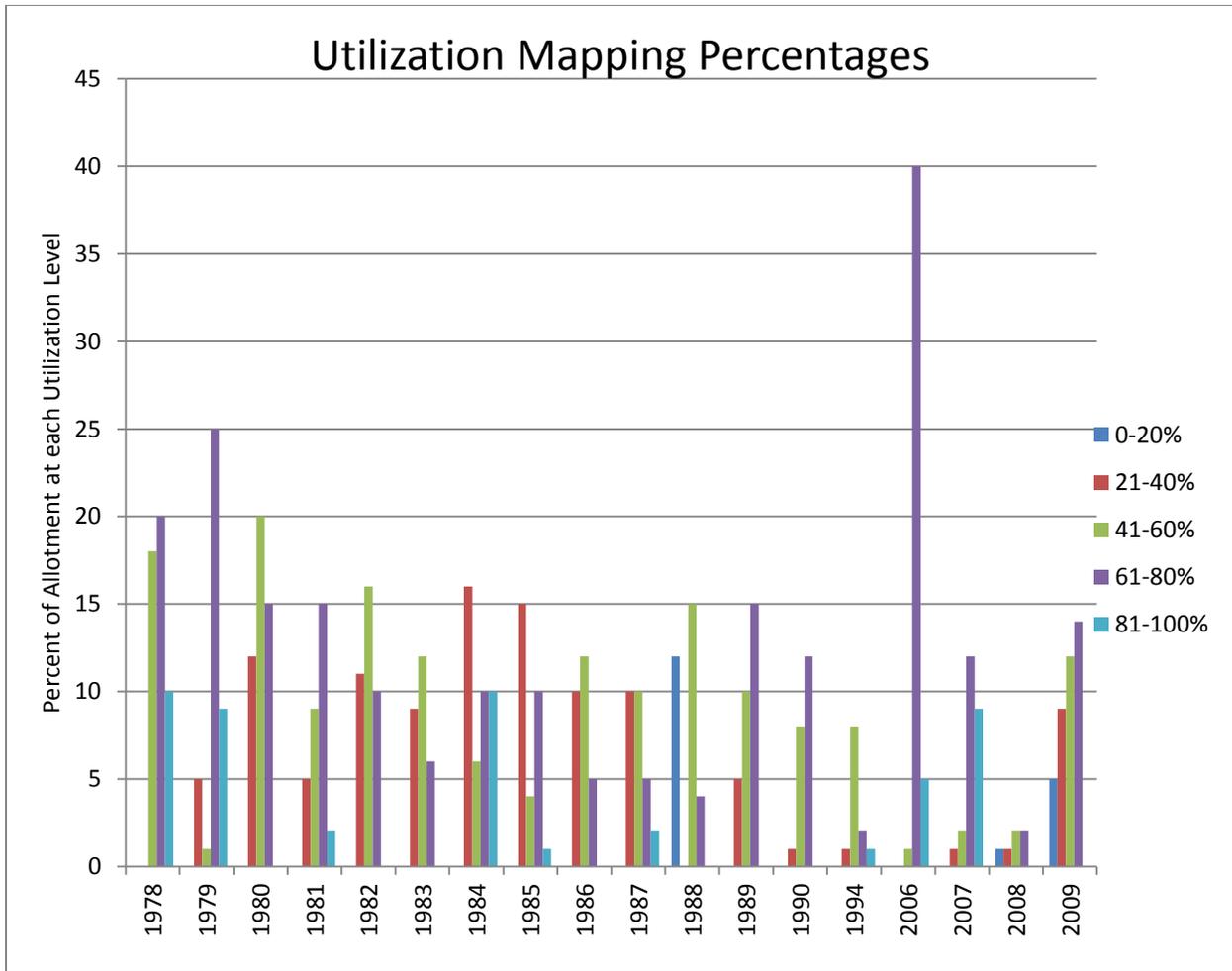
establishment. Rills, water-flow patterns, and gullies were all rated none to slight which correlates to basal gap sizes. The basal gap sizes are adequate to dissipate water movement.

### ***Lake Field Pasture 2008 RHA***

At site #3 (Loamy 10-12" PZ) data indicated that of the 17 indicators, ten were rated as none to slight, five were rated at slight to moderate, and two were rated moderate. The moderate departures were due to the amount of bare ground and soil surface resistance to erosion. A moderate amount of cheatgrass is present on this site. Line-point intercept cover data shows that this site has 49.67% bare ground which is 9.67% more bare ground than the reference worksheet (+/- 40%) which indicates the ground is lacking cover. Line-point intercept cover data showed shrub cover being 11.3% which is lower than the reference worksheet's 15 to 25% range. Line-point intercept cover data showed plant interspace litter cover being 22.7% which is within the reference worksheet's +/- 25% range. Line-point intercept cover data showed canopy cover being 26.33% which is 13.67% less than the reference worksheet's +/- 40% range. The soil stability test rating for site #3 was 2, which is below the reference worksheet's 3 to 6 range. This site is within the crested wheatgrass seeding and the change in plant community composition affects the shrub cover and canopy cover. Wind-scoured, blowouts, and/or deposition areas was rated none to slight and invasive plants was rated slight to moderate which correlates to canopy gap sizes. The canopy gap sizes are appropriate for the site to reduce wind-scoured, blowouts, and/or deposition areas. However, canopy gap sizes are allowing cheatgrass to become established at a moderate level. Rills, water-flow patterns, and gullies were all rated none to slight which correlates to basal gap sizes. The basal gap sizes are adequate to dissipate water movement.

### **Utilization Information**

Utilization monitoring and use pattern mapping has been completed periodically since 1978 in the Massacre Lakes Allotment. Figure 4 represents only the portion of the allotment that was mapped for any given year, resulting in percentages that cumulatively sum less than 100%. (E.g. there may only be 10% shown at 40-60%, 20% shown at 20-40%, and 5% shown at 60-80%, which would mean that only 35% of the allotment was mapped in that year.) See Maps 1, 2 & 3 utilization and composite use pattern maps in Appendix B.



**Figure 4. Amounts of utilization recorded in the Massacre Lakes Allotment from 1978 to 2009, with the Y axis representing the estimated percent of the allotment that was recorded at each utilization level.**

### Carrying Capacity

The evaluation will determine if the existing carrying capacity for livestock (permitted use) and AML is valid or needs to be adjusted (either up or down) based on an analysis of the current available data. If the AML is determined to be no longer valid, a revised AML will be proposed.

### Wildlife Monitoring by Pasture

#### Juniper Pasture:

One active sage-grouse lek is located in this pasture. This lek was discovered in 2003, about four miles from a historic lek which was also located in this same pasture. Since 2003 the active lek has been surveyed every year except 2005. The average bird count for 2003 to 2009 is 32 birds. One golden eagle nest was known to occur at the northwestern edge of this pasture. In 1979 the nest was active with two observed chicks. In 2002, the nest was thought to be inactive based on one visit. In 2003 activity was inconclusive based on one visit. In 2008 no nest was found at the site.

### Lake Field:

One active pygmy rabbit burrow was located in this pasture in 2006. Soils/vegetation information as well as aerial photography indicates that additional suitable habitat may occur in this pasture around West and Middle Lakes. Potential habitat for Carson wandering skipper exists in the Lake Field but none have been found during surveys in 2008 and 2009.

### East and West Seeding:

As late as 1991, NDOW hunt records indicate that the West Seeding was being used in the fall by sage-grouse. The West Seeding is known to have one golden eagle nest. In 1979, 2002, 2003 and 2006 the nest was known to be active with 2 chicks observed in 2003.

### Sand Spring Pasture:

One active pygmy rabbit burrow was located in this pasture in 2006. Soils/vegetation information as well as aerial photography indicates that additional suitable habitat may occur in this pasture.

### Monitoring relevant to the allotment by the Nevada Department of Wildlife:

As stated earlier, the Massacre Lakes Allotment is entirely within NDOW's hunt unit 011. Data from this hunt unit is often pooled with other units and presented on a larger "regional" scale, generally units 011-013. According to NDOW's 2008-2009 big game status report, estimates of mule deer populations for 2008 and 2009 were 2,400 animals in units 011-013 for each year. In 2008 and 2009, the pronghorn antelope population estimate for unit 011 ranged from 1,100 to 1,200 animals. The combined unit 011 and 013 estimate for bighorn sheep for 2008 and 2009 was 40 animals each year. This estimate dropped by more than half from the 2006 and 2007 estimates of 110 animals due to a die-off of bighorn sheep in unit 013. No estimates are made for elk.

NDOW's 2008-2009 report shows fluctuations for big game species over the last 34 years. Looking at all populations throughout Nevada, 2009 estimated populations were above the 5 year average for pronghorn antelope (+14%) but below average for mule deer (-3 %). Statewide, California bighorn sheep were above the 5 year average (+ 13%). Bighorn sheep in units 011 and 013 will likely be lower for some time due to the die-off in unit 013 to the south. Until 2007, bighorn sheep populations were slowly growing in units 011 and 013.

### **Land Health Standards**

The Surprise Field Office Resource Management Plan (RMP) and Record of Decision of April 2008 adopted the Northeastern California and Northwestern Nevada, Standards for Rangeland (Land) Health and Guidelines for Livestock Grazing Management of July 2000. The standards are as follows:

Upland Soils - Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and landform, and exhibit functional biological, chemical and physical characteristics.

Streams – Stream channel form and function are characteristic for the soil type, climate, and landform.

Water Quality – Water will have characteristics suitable for existing or potential beneficial uses. Surface and groundwater complies with objectives of the Clean Water Act and other applicable water quality requirements, including meeting the California and Nevada State standards, excepting approved variances.

Riparian and Wetland Sites - Riparian and wetland areas are in properly functioning conditions and are meeting regional and local management objectives.

Biodiversity – Viable, healthy, productive and diverse populations of native and desired plant and animal species, including special status species, are maintained.

A land health assessment and determination were completed on the Massacre Lakes Allotment in 2010 to determine conformance with Rangeland Health Standards. This assessment information, along with other monitoring information collected since 1993 indicates that riparian resources continue to be impacted by excessive utilization and trampling by livestock and wild horses. Many areas in the allotment lack the desired vegetation composition, and many are being impacted by juniper encroachment.

## **2010 Determination**

A Rangeland Health Determination was completed for the Massacre Lakes Allotment in March 2010. The following is a determination summary for each standard:

The Standard for Upland Soil – The standard for upland soils was not met and not progressing towards. The standard achievement determination was based in part on soil information from the 1999 Soil Survey of Washoe County, North Part and the 2006 Soil Survey of Surprise Valley – Home Camp California and Nevada. The determination is also based on review completed in the Rangeland Health Assessments, 5X5 photo trend data, actual use data and photos taken during the assessment process, management records, monitoring data, and observations on the allotment since 1995.

Soil surface stability test results were low (unstable) for three of the five evaluation sites. Two sites (1 & 4) were unable to be tested due to the sandy soil composition; however, this was not unexpected at site 4 (Sandy 8-12) which should have a low stability rating from 1-3. Although the soil at site 1 is considered loamy with a soil surface stability rating of 3-6, the sandy component contributed to the inability to collect a solid fragment to test and a low rating. Both Claypan sites in the Juniper Pasture showed signs of surface erosion and pedestalling. The moderate departure ratings at these sites for the indicators *pedestals and/or terracettes* and *plant community composition and distribution relative to infiltration* also contributed to a non-functioning rating for Hydrologic Function.

The Massacre Lakes Allotment 5X5 Photo Trend Plot was used to assist with apparent trend determinations. The 5X5 Photo Trend Plot 422104B is adjacent to RHA Site #1 in the Sand Spring Pasture. The RHA Site #1 was rated none to slight for soil erosion indicators, which are also apparent when comparing the 5X5 Photo Trend Plot pictures from 1983 and 2009, no

apparent trend of soil erosion or deposition was observed. Adjacent to RHA Site #2 is 5X5 Photo Trend Plot 432013 in the Juniper Pasture. The RHA Site #2 had a moderate departure rating for soil surface erosion and pedestalling when comparing 5X5 Photo Trend Plot pictures from 1983 and 2009, soils are being eroded from the site. The 5X5 Photo Trend Plot 422011 is adjacent to RHA Site #4 in the Sand Spring Pasture. The RHA Site #4 was rated none to slight for the soil erosion indicators which is also apparent when comparing the 5X5 Photo Trend Plot pictures from 1983 and 2009, no apparent trend of soil erosion or deposition could be seen. The 5X5 Photo Trend Plot 432106 is in the Juniper Pasture. After comparing trend pictures from 1979 and 2009, this plot shows that there is evidence of soil being deposited at this plot location. The 5X5 Photo Trend Plot 422003 is in the West Seeding. After comparing trend pictures from 1977 and 2009, there does not appear to be any noticeable soil erosion or deposition at this plot location.

The Standard for Streams – N/A

The Standard for Water Quality – N/A

The Standard for Riparian Wetland Sites – The standard for riparian areas is not met but progressing towards. The majority of riparian habitats within the allotment are at PFC. Riparian areas in exclosures are providing water and cover for wildlife. Exclosures have effectively removed cattle and wild horse impacts from four sites with the Post Spring site having been modified and riparian habitat showing improvement. Three sites are rated as FAR and one is non-functional. Two other sites were not rated. Field observations indicate that wild horses are currently contributing the most negative impacts to riparian sites within the allotment, especially those in the vicinity of Sagehen Springs. Based on staff observations from the site, wild horses appear to be the sole contributor to the degraded conditions and non-functional status of Sagehen Springs.

The Standard for Biodiversity – The standard for biodiversity is not met and is not progressing towards. There is a lack of grasses in shrub interspaces and grass species diversity is low. Sites 1, 2, 4, and 5 rated functional/structural groups as moderate departures, generally due to lack of deep rooted perennial grasses but forbs are also lacking on some sites. Based on utilization information, grasses are currently being heavily grazed leaving less hiding cover for wildlife, even within sagebrush plants. While plant vigor is good, annual production is lower than expected, which affects foraging capability. Annual production was rated as moderate to extreme departures for sites 1 and 2 and moderate departures at sites 4 and 5. Adjacent to RHA Sites 1, 2, and 4 there are 5X5 Photo Trend Plots that have a Trend Index Summary (TIS) comprised of the sum of composition of key species, percent cover of live vegetation, number of key species seedlings, and percent litter of the total plot. The 5X5 Photo Trend Plot 422104B is adjacent to RHA Site #1 and the TIS has increased from 1987 to 2009 due to a slight increase in composition and litter. The 5X5 Photo Trend Plot 432013 is adjacent to RHA Site #2 and the TIS has increased from 1987 to 2009 due to a slight increase in the number of key species seedlings. The 5X5 Photo Trend Plot 422011 is adjacent to RHA Site #4 and the TIS has decreased from 1987 to 2009 due to a reduction in percent composition of key species, percent cover of live vegetation, number of key species seedlings, and percent litter in the total plot. The 5X5 Photo Trend Plot # 432106 is in the Juniper Pasture and the TIS has decreased from 1979 to

2009 due to a reduction in percent cover of live vegetation and number of key species seedlings. The 5X5 Photo Trend Plot # 422003 is in the West Seeding Pasture and the TIS has decreased from 1977 to 2009 due to a reduction in percent composition of key species and number of key species seedlings. Evidence of chronic and current problems includes some erosion and pedestalling. While fenced riparian areas are functional, half of assessed unfenced sites in 2009 are either FAR or non-functional. In the northern most portions of the allotment, negative impacts to Sagehen Spring and smaller un-named springs in the vicinity are reducing the water holding capacity for riparian habitats. The degraded conditions at riparian areas in the northeast portion of the Juniper Pasture are generally due to year-round use by wild horses rather than seasonal use by livestock.

### **Causal factors for not achieving or making significant progress towards achieving standards.**

#### **Massacre Lakes Allotment**

In the Massacre Lakes Allotment the standard for upland soils was not met and not progressing towards due to pedestalling, lack of litter, lack of organic matter and the slight loss of soil due to water erosion. The continued heavy grazing pressure by wild horses and cattle and below average precipitation 14 out of the last 25 years has caused lower than expected production in native deep rooted perennial as well as seeded bunchgrasses which dissipate water flow patterns, add litter to the soil to protect it, and create organic matter.

The standard for riparian wetland areas was not met, but progressing towards meeting the standard. The majority of riparian habitats within the allotment are at PFC. Riparian areas in enclosures are providing water and cover for wildlife. Enclosures have effectively removed cattle and wild horse impacts from four sites; the Post Spring enclosure fence has been re-built and riparian habitat is showing improvement. Three sites are rated as FAR and one is non-functional. Two other sites were not rated. Field observations indicate that wild horses are currently contributing the most negative impacts to riparian sites within the allotment, especially those in the vicinity of Sagehen Spring. Based on staff observations, wild horses appear to be the sole contributor to the degraded conditions and non-functional status of Sagehen Springs.

The standard for biodiversity is not met and not progressing towards. There is a lack of grasses in shrub interspaces and grass species diversity is low. Sites 1, 2, 4, and 5 rated functional/structural groups as moderate departures, generally due to lack of deep rooted perennial grasses but also in some cases forbs. Grasses are currently being heavily grazed leaving less hiding cover for wildlife, even within sagebrush plants. While plant vigor is good, annual production is lower than expected which affects foraging capability. Annual production was rated as moderate to extreme departures for site 1 and 2 and moderate departures at sites 4 and 5. Adjacent to RHA Sites 1, 2, and 4 there are 5X5 Photo Trend Plots that have a Trend Index Summary (TIS) comprised of the sum of composition of key species, percent cover of live vegetation, number of key species seedlings, and percent litter of the total plot. The 5X5 Photo Trend Plot 422104B is adjacent to RHA Site #1 and the TIS has increased from 1987 to 2009 due to a slight increase in composition and litter. The 5X5 Photo Trend Plot 432013 is adjacent to RHA Site #2 and the TIS has increased from 1987 to 2009 due to a slight increase in the number of key species seedlings. The 5X5 Photo Trend Plot 422011 is adjacent to RHA Site #4

and the TIS has decreased from 1987 to 2009 due to a reduction in percent composition of key species, percent cover of live vegetation, number of key species seedlings, and percent litter of the total plot. The 5X5 Photo Trend Plot # 432106 is in the Juniper Pasture and the TIS has decreased from 1979 to 2009 due to a reduction in percent cover of live vegetation and number of key species seedlings. The 5X5 Photo Trend Plot # 422003 is in the West Seeding Pasture and the TIS has decreased from 1977 to 2009 due to a reduction in percent composition of key species and number of key species seedlings. Evidence of chronic and current problems includes some erosion and pedestalling. While fenced riparian areas are functional, half of assessed unfenced sites in 2009 are either FAR or non-functional. In the northern most portions of the allotment, negative impacts to Sagehen Spring and smaller un-named springs in the vicinity are reducing the water holding capacity for riparian habitats. The poor conditions of riparian areas in the northeast portion of the Juniper Pasture are generally due to year-round use by wild horses rather than seasonal use by livestock.

### **Allotment and Herd Management Area (HMA) Objectives**

Allotment and HMA specific management objectives were developed for the Massacre Lakes Allotment and HMA and are contained in the Allotment Management Plan, Herd Management Plan, the 2000 Standards for Rangeland Health Record of Decision, and the 2008 Surprise RMP Record of Decision. These objectives are summarized below:

### **Resource Management Plan (RMP) Objectives**

#### ***Livestock Grazing (P 2-35)***

Adequate forage would be produced to support sustainable levels of livestock grazing where compatible with objectives for other resources and resource users. Continue to modify and adjust grazing management within individual grazing allotments to ensure that a vigorous plant community is sustained in combination with livestock grazing. Adjustments would be prioritized for allotments or areas where plant communities are at risk or have greater potential for improving before they become degraded and less productive. Adjustments may involve:

- development of a improved grazing strategy as implemented through an allotment management plan (AMP), or
- adjusting the season of use with associated actions to improve livestock distribution (fences, water) in allotments without formal management plans.

Work cooperatively with ranchers and other stakeholders to implement treatments to reduce juniper encroachment in sagebrush/grassland communities, with the goal of restoring sagebrush communities to a healthy condition, and thereby maintaining (or potentially increasing) forage production of native grasses, forbs, and shrubs.

#### **1982 Revised Allotment Management Plan Objectives**

##### **Subunit 2B & 2C Objectives**

1. Manage ecological sites for mid-successional vegetative (50-75% climax).
2. Ensure sufficient browse for 90 deer.
3. Provide habitat is satisfactory condition for 150 antelope.

#### **Massacre Lakes Allotment Management Plan Objectives**

1. In the short term, provide livestock forage to satisfy the livestock operator's current active use and season of use (2,642 AUMs). In the long term, provide livestock forage to satisfy the livestock operator's Class I demand (3,302 AUMs).
2. Maintain or improve existing ground cover in order to avoid wind and water erosion.  
Juniper Pasture Objectives
3. Improve livestock distribution.
4. Allow for meadow regrowth and thereby improve conditions for sage grouse brood areas.
5. Maintain conditions to support a viable wild horse herd of 15–25 animals.  
Lake Field Pasture Objectives
6. Maintain seeded area in a healthy and productive condition.
7. Improve livestock distribution in this pasture with earlier use. Later in the summer the cattle seem to hang on the lakes and meadows.
8. Allow for protection on meadow areas between lakes. These areas are used by nesting Canadian geese and some ducks.  
Sand Spring Pasture Objectives
9. Improve forage quality and quantity on the native rangelands and sprayed areas.
10. Increase stand density of Thurber's needlegrass from 5 to 15 percent.  
West Seeding and East Seeding Pastures Objectives
11. Maintain forage quality and increase stand density of desert wheatgrass.
12. Improve livestock distribution on the West Seeding Pasture.

Note: Meeting these objectives will contribute to the fulfillment of Subunit 4C goal of providing big game habitat in such condition that populations of 90 deer and 150 antelope could be supported in Subunit 4C. BLM no longer manages for reasonable numbers of wildlife populations. The RMP replaced reasonable numbers with habitat condition.

#### ***Soil Resources (P 2-43)***

- Maintain areas that currently meet the land health standard for soils. Improve (or mitigate where this is not feasible) the productivity and/or stability of soils not meeting this standard to such a degree that soil health is achievable.
- Prevent or eliminate erosion and sedimentation in sensitive aquatic (or other sensitive) environments to ensure there is no threat to property or human health.
- Confine development (e.g., roads, trails, facilities) to areas with suitable soils.
- Provide sufficient earthen materials to meet the needs of county and state road departments.

#### ***Noxious Weeds and Invasive Species (P 2-67)***

Noxious weeds will be extirpated whenever possible. Where this is not feasible, infestations will be contained and numbers reduced to manageable levels. Special attention would focus on highly invasive species such as cheatgrass and medusahead—on sites where infestation is below the threshold level (for sight conversion) and aggressive treatment is likely to succeed. Measures will be taken to reduce introductions and proliferation by increasing public awareness and imposing stipulations on management activities.

### ***Special Status Plants (P 2-69)***

Identify and protect all species and populations of special status plants in the management area. Take action to maintain reproductive viability and ensure that BLM management actions, and those of its permittees, do not contribute to the decline of any special status plant. Protect these plants in the following order of priority:

1. Federally listed endangered and threatened species
2. Species proposed for federal listing
3. Possible candidates for federal listing
4. State-listed (CA, NV, or OR) endangered and threatened species
5. BLM 'sensitive' species
6. BLM 'special interest' species

### ***Water Quality and Hydrologic Function (P2-76)***

On a priority basis, take action to improve hydrologic function and/or water quality in areas not meeting State standards – especially where hydrologic function and/or water quality problems are major factors inhibiting the success of other resource programs. Ensure that hydrologic function and water quality are preserved in areas where standards have been met.

Actions will be guided by the following objectives from the Standards for Rangeland Health and Guidelines for Livestock Grazing Management on BLM-Administered Lands in Northeastern California and Northwestern Nevada:

- “Maintain the physical, biological, and chemical integrity of waters flowing across or underlying the lands it [BLM] administers”.
- “Protect the integrity of these waters where it is currently threatened.”
- “Insofar as is feasible, restore the integrity of these waters where it is currently impaired.”
- “[BLM must] not contribute to pollution and take action to remedy any pollution resulting from its actions that violates California and Nevada water quality standards, tribal water quality standards, or other applicable water quality requirements.” (e.g., requirements adopted by state or regional water quality control boards in California or the Environmental Protection Agency [EPA] pursuant to Section 303(d) of the Clean Water Act or the Coastal Zone Reauthorization Act)
- “Where action related to grazing management is required, such action will be taken as soon as practicable but not later than the start of the next grazing year (in accordance with 43 CFR 4180.1).”
- “Be consistent with non-degradation policies identified by the States.”
- “Develop and execute a management agency agreement with the States of California and Nevada for the efficient protection of water quality associated with BLM’s management.”
- “Work with the State’s water quality administrative agencies and the EPA to establish appropriate beneficial uses for public waters, establish appropriate numeric targets for 303(d)-listed water bodies, and implement applicable requirements to ensure that water quality on public lands meets objectives for the designated beneficial uses of this water.”
- “Develop and implement ‘best management practices’ 1/ (BMPs) approved by the States to protect and restore the quality and beneficial uses of water, and monitor both implementation and effectiveness of the BMPs. These BMPs will be developed in full consultation,

coordination, and cooperation with permittees and other interests.”

- “State or tribal approved variances or exceptions to water quality standards may be applicable within their ‘basin plans’ for specific types of activities or actions. BLM will follow state or tribal administrative procedures associated with variances.”

### ***Wildlife and Fisheries (P 2-88 to 2-97)***

Manage critical habitats of endangered and threatened wildlife according to recovery plans or habitat management plans.

#### *State-Listed and BLM Sensitive Species*

Manage critical ecosystems and habitats of special status wildlife according to recovery plans, habitat management plans, conservation plans, and conservation recommendations. Employ ‘best management practices’ (BMPs) for habitat restoration and maintenance according to specific management guidelines established for these species.

#### *Ungulates*

Manage wild ungulate habitats to maximize site potential. Activities permitted, funded, or conducted by BLM must comply with (BLM) land health standards, especially Standard 5 (biodiversity). Ensure that viable (genetically diverse and reproductively successful) populations of healthy native ungulates—and the vegetation and water resources on which they depend—are adequately restored and maintained.

- Manage wild ungulate habitats according to CDFG and NDOW management plans, where these exist. Cooperate with state wildlife agencies to amend and update herd management plans for deer, sheep, elk, and pronghorn (where and when appropriate).
- Complete GIS mapping of wild ungulate habitats, and update obsolescent material, in concert with state wildlife agencies. Prioritize identification and mapping of reproductive habitats (kidding, calving, lambing, and fawning grounds).
- Monitor habitat conditions in key ungulate habitats (e.g., aspen, mountain mahogany, and bitterbrush).

#### *Sagebrush-Obligate and Associated Species*

- Use BLM conservation plans and guidelines, especially “Partners in Flight—Birds in a Sagebrush Sea” and related strategies specifically developed for the sagebrush biome. Employ ‘best management practices’ developed for sagebrush-obligate and sagebrush associated wildlife and associated vegetation.
- Cooperate with other federal and state agencies to develop joint strategies and actions capable of restoring sagebrush-steppe habitats.
- Assess sagebrush-steppe habitats and identify management requirements. Prioritize key areas for restoration, maintenance, or enhancement.

#### *Other Native Wildlife Species*

Habitat for native wildlife species will be managed in such a manner that forage, water, and cover, of appropriate diversity and structure, will be present and sufficient to meet their life-cycle requirements.

Surveys will be conducted to determine the occurrence, distribution, and abundance of native wildlife species, as qualified personnel and time may allow.

Proposed reintroductions, augmentations, and translocations of native species will be evaluated according to BLM policy and directives, as well as habitat management goals and objectives. These projects will be coordinated with state agencies, under existing MOUs which outline the process and prior planning procedures.

#### *Native and Non-Native Fish and Other Aquatic Species*

- Manage aquatic, riparian, and upland habitats to meet BLM standards for rangeland health. Use riparian functional assessments and employ BMPs to improve springs and streams that are not in 'proper functioning condition' (PFC) or fail to meet state water quality standards. Ensure that the measures employed achieve, or make significant progress toward achieving, required standards.
- Cooperate with state and federal agencies to monitor fish and other aquatic fauna, as well as riparian and in-stream conditions (e.g., riparian vegetation height/condition, bank stability, stream cover/shading, water quality, and stream cross-sectional analysis).
- Update and revise fisheries plans when no longer accurate or relevant. Employ the latest, most accurate information for this purpose and coordinate planning and actions with the appropriate state wildlife agency.
- Improve degraded upland, riparian, and aquatic habitats in order to re-create suitable habitable conditions for indigenous sport-fish.

#### *Desirable Non-Native Species*

- Maintain populations of desirable non-native game fish and animals within their current areas of distribution.
- As a general rule, do not encourage state fish and wildlife agencies to introduce or translocate "desirable," but non-native, fish or game. However, where appropriate (under circumstances enumerated in BLM Manual 1745), cooperate with state fish and wildlife agencies to augment, translocate, or introduce populations of desirable, non-native game fish or animals according to BLM policy and current MOUs.
- Control desirable non-native game fish and animals were required to protect native wildlife, plants, or habitats.

#### *Wild horse and Burro (P 2-81)*

- Achieve ecological stability so that healthy herds of wild horses can be maintained while making significant progress in achieving BLM land health standards within the life of this RMP. Toward this end, ensure that wild horses are limited to established herd management areas and maintained at appropriate management levels so that vegetation, native wildlife, soils, and archaeological sites are not degraded, but maintained.
- Maintain historically typical herd characteristics (i.e., type, confirmation, size, and color) in all HMAs by selecting suitable animals for release as breeding stock during periodic 'gathers.'
- Promote and manage wild horses in a manner that will encourage tourism and boost economic development.

### **1985 Herd Management Plan Objectives**

1. Maintain a healthy and viable wild, free-roaming herd in the Massacre Lakes Herd Management Area Plan (HMAP).
2. Maintain a minimum of 10 head and a maximum of 20 head of wild horses.
3. Assess the amount of interchange between the Massacre Lakes HMAP wild horses and the surrounding HMAPs in the Surprise Resource Area and the Bitner Butte Herd of the Sheldon NWR.
4. Strive to achieve 100% adoptability of all wild horses that are excessed from this herd through the regular adoption program.
5. Prevent inbreeding problems from occurring in the Massacre Lakes HMAP.

### **RMP Wild Horse Management Objectives**

Wild horse management objectives are needed to ensure the Massacre Lakes Allotment/HMA would move towards meeting land health standards and ensuring that a thriving natural ecological balance is met while providing for a healthy and viable wild horse herd.

1. Manage Nut Mountain, Bitner, Wall Canyon, and Massacre Lakes HMAs as a Complex. Currently the combined AML for the Complex is 85-135 horses.
2. Prioritize selection of animals returned to BLM-administered lands after gathers based on traits desirable by public for adoption (color, size, and conformance).
3. Maintain Massacre Lakes HMA population within the established appropriate management level (AML) by conducting periodic gathers.
4. Implement fertility control if needed to assist in maintaining populations at AML.
5. Adjust AMLs when monitoring data indicates wild horse populations are not achieving a thriving natural ecological balance. Remove wild horses found outside HMAs.
6. Maintain a healthy and viable wild, free-roaming horse herd in the Massacre Lakes HMA.
7. Strive to achieve 100% adoptability of all horses that are excessed from this herd through the adoption program.
8. Prevent inbreeding problems from occurring in the Massacre Lakes HMA.

### **Objective Attainment Conclusions**

#### **2009 5 X 5 Photo Trend Conclusions**

Two 5X5 photo trend plots (432106 and 432013) in the Juniper Pasture were read in September of 2009. Both of these plots were in an area used by cattle and wild horses. At both plots composition of deep-rooted perennial bunchgrasses is declining. Reasons for this include 14 out of the last 22 years having below average precipitation and these plants are more accessible and preferred by grazers. Sandberg's bluegrass has been able to reseed itself due to the fact that it has a high drought tolerance, is less preferred by grazers and it is an early season plant which means it matures faster and dries out while the cool season deep rooted bunch grasses are still growing. With the loss of cool season deep rooted perennial bunchgrasses, it appears that carrying capacity has declined.

Two 5X5 photo trend plots (422011 and 422104B) in the Sand Spring Pasture were read in September of 2009. This pasture is outside the HMA and is only used by cattle. Plot 422011 is in a downward trend due to a reduction in key species composition, cover, seedlings and litter. The number of mature key species plants has been greatly reduced. Plot 422104B is in an upward trend. At this plot the number of mature key species plants is increasing with an associated increase in litter.

The one 5X5 photo trend plot (422003) in the West Seeding was read in October 2009. This pasture is accessible to wild horses but is mainly used by cattle. This plot is in a downward trend due to a reduction in key species composition, cover, and seedlings. At this plot litter has increased due to an increase in sagebrush and rabbitbrush.

### **2009 Determination Conclusions**

Livestock grazing as well as year-round wild horse use have contributed to the non-achievement of standards. Utilization records and use pattern maps dating back to 1978 indicate repeated heavy use in portions of all pastures in the allotment. This repeated heavy use has had a negative impact on rangeland health throughout the allotment.

### **2007-2008 Rangeland Health Assessment Conclusions**

At RHA site #1 in the Sand Spring Pasture and RHA site #2 in the Juniper Pasture there is a lack of deep rooted perennial grasses potentially due to heavy grazing use and is likely to have been exacerbated by below average precipitation for 14 of the last 22 years. At RHA sites #3 in the Lake Field, RHA #4 in the Sand Spring Pasture, and RHA #5 in the Juniper Pasture it was noted that there is a lack of herbaceous cover which may be the result of repeated heavy grazing use, near drought conditions in 2007 and 2008, and below average precipitation for 14 of the last 25 years.

### **Recommendations**

#### **Establish Carrying Capacities for Wild horses and Cattle**

Review the current available information and complete an in-depth evaluation of the monitoring data on the HMA/allotment-specific basis. The carrying capacity methodology would follow BLM Technical Reference 7: Rangeland Monitoring – Analysis, Interpretation Evaluation, Appendix 1, page 1. The AML determination would also be follow procedures outlined in *H-4700-1 (Wild Horses and Burros Management Handbook, BLM, July 2010)*. The evaluation would specifically address the carrying capacity (AML) for the Juniper pasture, where nearly all the wild horse grazing use occurs.

The proposed carrying capacity would then be analyzed in DOI-BLM-CAN070-2013-0021-EA Livestock Grazing Authorization and Wild Horse Appropriate Management Level Establishment. The environmental assessment analyzes five alternatives: 1) Proposed Action - *Reduced Stocking Rate, Rest/Rotation/Deferred Use & 25 – 45 Wild Horse AML*; 2) *No Action (Current Management)*; 3) *TRT Recommendations*; 4) *Allocation by Pasture* (wild horse alternative); and 5) *No Grazing*.

The carrying capacity was developed using the Weighted Average Utilization based on utilization information collected from 2008-2012, in the Juniper pasture. An eight month period is used for this calculation because the utilization data to determine the carrying capacity is based on annual forage production for Massacre Lakes HMA/Allotment forage production begins in late March. Utilization is typically measured in October, and until snow cover occurs, usually in November. However, this data does not account for the additional utilization throughout the winter months until the following March. The cumulative utilization with wild horse grazing would be substantially higher. The detailed area-specific evaluation is contained in the following graphs. The AUM calculator for carrying capacity uses various utilization classes based on the recommended light use levels from EA's Alternatives 1, 3 & 4. Moderate Use levels Alternative 2.

<b>Massacre Lakes AML Calculator</b>					<b>Moderate, Heavy &amp; Severe in Juniper Pasture</b>						
Heavy & Severe Classes in Juniper Pasture					Moderate, Heavy & Severe in Juniper Pasture						
Current Population: 150					Current Population: 150						
Utilization Monitoring Period 8 months					Utilization Monitoring Period 8 months						
Utilization Class		Acres		Weighted Utilization		Utilization Class		Acres		Weighted Utilization	
Heavy		3142		71.83%		Moderate		5219		58.70%	
Severe		317				Heavy		3142			
Desired Utilization		30%				Severe		317			
Desired Utilization		30%				Desired Utilization		30%			
Utilization Period Wild Horse Harvest					Utilization Period Wild Horse Harvest						
1200					1200						
Wild Horse Allocation (AUMs)					Wild Horse High AML						
501.2					42						
					Wild Horse Allocation (AUMs)						
					613.3						
					Wild Horse High AML						
					51						
<p>Weighted Average Utilization was based upon the production of forage grasses. This period effectively begins in late March and ran through October when the cumulative utilization was measured in the field. For Massacre Lakes HMA/Allotment green-up normally begins in March and with most of the growth of forage species occurring after April until late June of each year</p>											
<b>Cattle and Wild Horse AUM Calculator Juniper Pasture</b>					<b>Cattle and Wild Horse AUM Calculator Juniper Pasture</b>						
Year	Cattle	WH 12 Mo	WH 8 Mo	total 8 Mo	Year	Cattle	WH 12 Mo	WH 8 Mo	total 8 Mo		
2008	1,514	1,104	736	2,250	2008	1,514	1,104	736	2,250		
2009	1,249	1,320	880	2,129	2009	1,249	1,320	880	2,129		
2010	1,413	1,596	1,064	2,477	2010	1,413	1,596	1,064	2,477		
Averages	1,392	1,340	893	2,285	Averages	1,392	1,340	893	2,285		
Weighted Utilization		Desired Utilization			Weighted Utilization		Desired Utilization				
71.83%		30%			58.70%		30%				
Actual Harvest (monitoring period)					Actual Harvest (monitoring period)						
Available Forage					Available Forage						
2008	2,250	940			2008	2,250	1,150				
2009	2,129	889			2009	2,129	1,088				
2010	2,477	1,034			2010	2,477	1,266				
Average	2,285	954			Average	2,285	1,168				
Allocations					Allocations						
Cattle Months		Head			Cattle Months		Head				
Cattle	60%	2	286		Cattle	60%	2	350			
Horse	40%	32			Horse	40%		39			

## **Implement New Permit Terms and Conditions for livestock grazing**

The following terms and conditions would be a requirement of the grazing permit:

1. Grazing use offered or authorized by BLM is subject to all provisions of the grazing regulations (43 CFR Parts 4100) and other applicable law and regulation. Grazing authorizations may be modified in accordance with regulation to attain progress towards achieving rangeland health standards (subpart 4180.1 and 4180.2 Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration).
2. All grazing use will be in accordance with the Field Manager's Final Decision. All other past documents governing livestock use are superseded.
3. Billing will be based on actual use reports submitted 15 days following the last authorized take off date for the permit. If actual use reports are not submitted, the permittee may be financially liable and billed for their full permitted active use and actual use billing may be revoked.
4. A pre-season annual operating meeting will be held with the permittee to discuss previous years use and document current years grazing schedule. Livestock may not be turned out before this meeting has been conducted and without prior written approval from the authorized officer.
5. The scheduled time and period of authorization in each pasture cannot be exceeded without prior approval from the authorized officer. Moving livestock between pastures could occur within a 10 day period beginning five days prior to the scheduled move date.
6. Additional adjustments in livestock use may be required by BLM annually based on utilization, drought, water availability or other conditions.
7. Salt and mineral supplements may be used in the allotment. These supplements must not be located closer than ¼ mile from any natural or artificial water source, archaeological site, aspen stand, riparian area or 0.6 mile of an active sage-grouse lek during the breeding season.
8. All range improvements that the permittee is required to maintain must be maintained prior to livestock turnout and inspected periodically throughout the period of scheduled use to ensure livestock are restricted to those areas they are scheduled to be in. All required fence maintenance must be completed annually, even if the permit is not being used that year. Failure to complete required fence maintenance may result in temporary or permanent suspension of the grazing authorization.
9. Maximum allowable use for key upland native and seeded grass species is 40% in all use areas and pastures as measured by approved BLM utilization monitoring protocol as contained in Interagency Technical Reference 1734-3, 1996.

10. Permitted livestock AUMs will be reevaluated on a four-year cycle; if short-term objectives are not being met after four years at the permitted grazing use, authorized AUMs for the next cycle will be adjusted based on the desired stocking rate formula (BLM Technical Reference 4400-7, 1985), using actual use and utilization data.
11. If utilization exceeds 40% by livestock in any pasture, use in the pasture will be adjusted using the desired stocking rate formula; if utilization exceeds 60% the pasture will be rested for the following scheduled season of use. If 20% utilization is exceeded in a pasture that is scheduled for rest, that pasture will be rested the following scheduled season of use. Adjustments related to the Juniper Pasture will be made taking cattle and wild horse use into consideration.
12. Permittee is responsible for determining when annual allowable use will be reached and for moving livestock into the next scheduled use area or off the allotment. Permittee is advised that allowable use may be reached before the scheduled move date and should act accordingly. Any adjustments in move dates or numbers must be communicated to BLM within 7 days of the change and shall be recorded accurately on the actual use report. BLM will monitor the permittee's annual performance in meeting utilization objectives at the end of the grazing season.
13. The BLM will coordinate with the permittee to ensure that livestock are not turned out within 6/10th mile of an active sage-grouse lek site.

## **Proposed Projects**

The proposed improvements are needed for meeting rangeland health standards, protecting cultural resources, and to implement livestock management.

The following range improvement projects are proposed:

- Sagehen Spring and the associated meadow complex would be fenced within the Massacre Rim WSA. The purpose of this project is to protect the wet meadow from further deterioration due to year round use by wild horses. The project is needed because continued grazing at the site by wild horses would maintain less than desired condition of the meadow habitat for the greater sage-grouse and other wildlife and continue degradation of prehistoric cultural resources. The fenced area would be approximately 17.2 acres in size enclosed by about 0.66 miles of barbed wire fence.
- A water storage tank would be installed at Sand Spring Well in the Sand Spring Pasture to improve water availability and livestock distribution.

Barbed wire fences would be constructed to meet BLM fencing specifications for wildlife passage.

## Appendix A Actual Use Data

**Annual actual use data- showing dates of use, approximate number of cattle and wild horses, and actual use (AUMs) by pasture within the Massacre Lakes Allotment.**

Massacre Lakes Allotment Cattle Actual Use and Horse Estimated Use								
Year	Estimated Horse use AUMs	Actual Use Cattle AUMs	% use of Active Permit	Juniper	Lake Field	Sand Spring	West Seeding	East Seeding
1988 Cattle		1,054	83	4/16-9/01 210C/ 1,054 AUMS				
1988 Horse	132			11H				
1989 Cattle		2,141	66			4/14-9/16 423C/ 2,141 AUMS		
1989 Horse	144			12H				
1990 Cattle		2,643	69	4/17-9/10 462C/ 2,643 AUMS Distributed between all pastures				
1990 Horse	156			13H				
1991 Cattle		2,638	64				4/16-9/25 400C/ 2,638 AUMS Distributed between all pastures	
1991 Horse	168			14H				
1992 Cattle		1,664	52			4/15-8/14 424C/ 1,664 AUMS Distributed between all pastures		
1992 Horse	180			15H				
1993 Cattle		2,162	67	6/10-8/14 443C/ 947 AUMS			4/16-6/9 443C/ 787 AUMS 8/15-10/8 403C/716	

							AUMS	
1993 Horse	192			16H				
1994 Cattle		2,167	69		6/5-8/19 421C/ 983 AUMS		4/16-10/08 443C/ 1,184 AUMS	
1994 Horse	204			17H				
1995 Cattle		1,824	57				4/15-8/16 483C/ 1,824 AUMS	
1995 Horse	216			18H				
1996 Cattle		1,975	61		6/10-8/14 495C/ 1,074 AUMS	4/29-9/11 341C/ 427 AUMS		5/2-8/22 483C/ 474 AUMS used w/ Sand Spring
1996 Horse	228			19H				
1997 Cattle		1,962	61		6/20-8/29 491C/ 1,146AUMS		5/5-10/31 491C/ 816 AUMS	
1997 Horse	324			27H population inventory				
1998 Cattle		2,374	74		6/20-9/1 563C/ 1,592 AUMS	5/8-6/20 125C/ 225 AUMS used w/ East Seeding		5/3-6/20 159C/ 557 AUMS
1998 Horse	384			32H				
1999 Cattle		2,183	68		6/10-8/14 551C/ 1,196 AUMS		4/26-9/30 551C/ 987 AUMS	
1999 Horse	456			38H	some horses seen in this pasture in December			

2000 Cattle		1,875	61		6/15-8/1 554C/ 874 AUMS	5/14-8-24 107C/ 333 AUMS used w/ East Seeding		5/6-9/20 123C/ 668 AUMS
2000 Horse	540			45H	some horses seen in this pasture in October			
2001 Cattle		1,469	46		6/11-9/16 388C/ 950 AUMS dispersed in all pastures	dispersed between all pastures	dispersed between all pastures	4/30-6/10 388C/ 519 AUMS dispersed in all pastures
2001 Horse	648			54H population inventory				disperse d between all pastures
2002 Cattle		1,958	61		6/20-8/14 467C/ 860 AUMS			5/1-6/19 491C/ 679 AUMS 8/15-10/5 450C/ 419 AUMS
2002 Horse	732			61H				
2003 Cattle		1,452	46		6/20-8/28 377C/ 864 AUMS	5/18-6/20 338C/ 330 AUMS used w/ East Seeding		8/28- 9/22 377C/ 258 AUMS
2003 Horse	828			69H				
2004 Cattle		1,518	47		6/16-8/10 401C/ 738 AUMS	5/17-6/15 287C/ 273 AUMS 9/05-9/17 230C/ 57AUMS used w/ East Seeding		5/15- 6/15 114C/ 120 AUMS 8/11- 9/04 401C/ 330 AUMS
2004 Horse	936			78H				

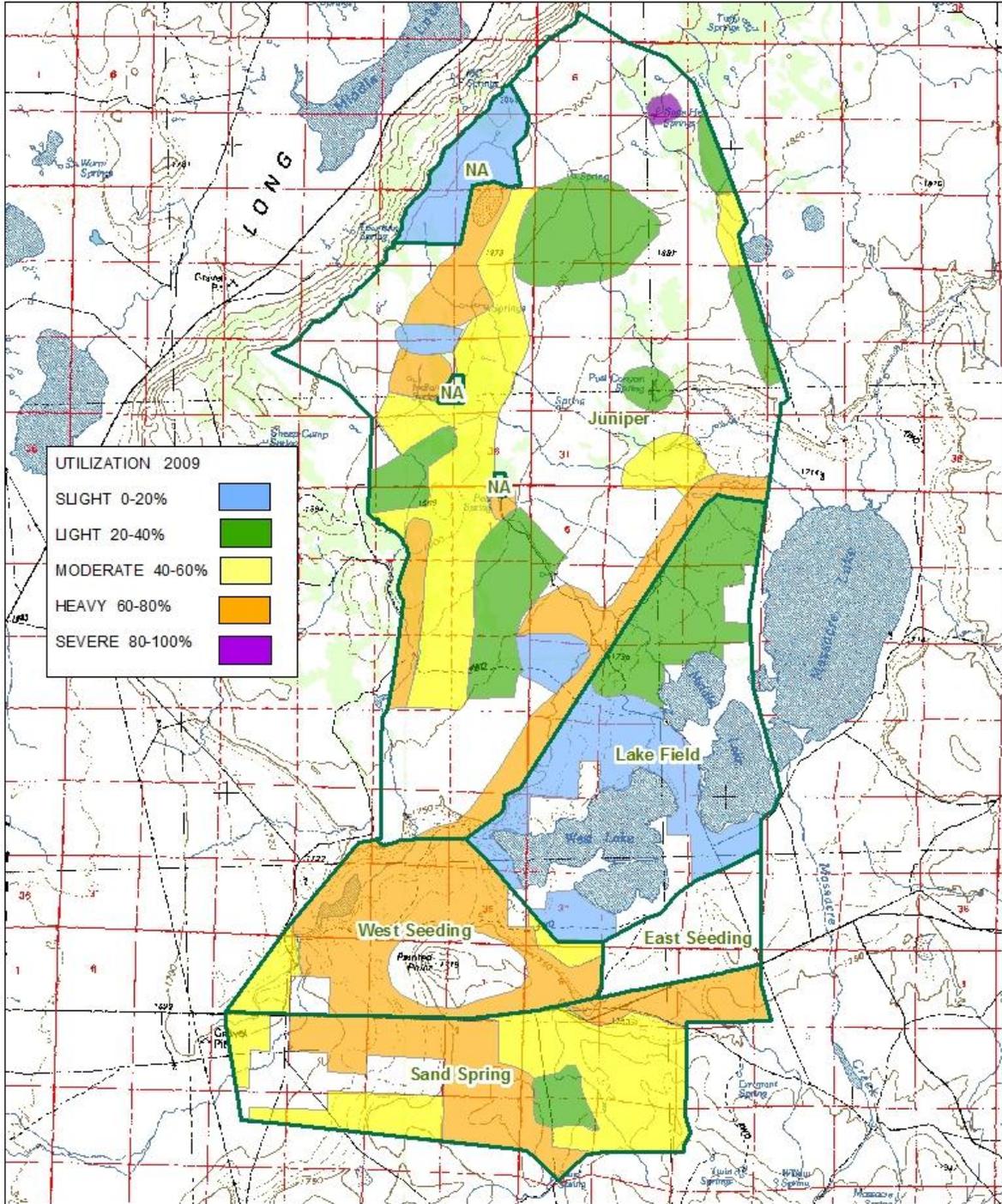
2005 Cattle		2,120	66	6/25-9/30 521C/ 1,678 AUMS	used w/ West Seeding		5/20-6/24 447C/ 442 AUMS	
2005 Horse	1056			88H	some horses seen in this pasture in February			
2006 Cattle		2,429	75		6/19-8/16 558C/ 1,082 AUMS	8/17-9/27 558C/ 702 AUMS		5/15- 6/18 558C/ 645 AUMS used w/ Sand Spring
2006 Horse	1188			99H				
2007 Cattle		1,706	53		5/28-7/29 446C/ 924 AUMS	8/24-9/15 305C/ 42 AUMS used w/ West Seeding	4/30-5/27 446C/ 363 AUMS 7/30-8/23 446C/ 367 AUMS 9/15-10/09 21C/10 AUMS	
2007 Horse	1320			110H population inventory flight)	some horses seen in this pasture in January			
2008 Cattle		2,533	79	5/06-10/13 546C/ 1,393 AUMS	7/30-9/26 525C/ 1,002 AUMS	9/5-9/26 200C/ 138 AUMS		
2008 Horse	1296			108H (population inventory flight)	some horses seen in this pasture in January			
2009 Cattle		2,415	75	6/21-9/14 570C/ 1,249 AUMS		8/15-10/22 475C/ 441 AUMS	5/9-6/20 570C/ 725 AUMS	
2009 Horse	1872			156 H				

2010 Cattle		2,280	71	5/13-8/06 493C/ 1,413 AUMS		8/15-9/14 493C/ 725 AUMS	Unscheduled use with Juniper pasture	5/08- 8/15 380C/ 142 AUMs
2010 Horse	1788			149 H*- 1,763 AUMs	25 AUMs			
2011 Cattle		2,053	64		6/04-8/21 448C/ 1,128 AUMs	8/22-10/26 448C/ 493 AUMS	5/08-7/27 448C/ 432 AUMs	
2011 Horse	1920			160 H*- 1,763 AUMs	25 AUMs			
2012 Cattle		2,028	63	5/08-9/18 483C/ 1,288 AUMS	Unschedule d use with Juniper pasture	7/1-10/17 304C/ 698 AUMS	Unscheduled use with Juniper pasture	5/05- 5/11 327C/ 42 AUMs
2012 Horse	1860			155 H*- 1,785 AUMs	25 AUMs			

\* Tri-State inventory results

# Appendix B Maps

## Map 1 2009 Utilization

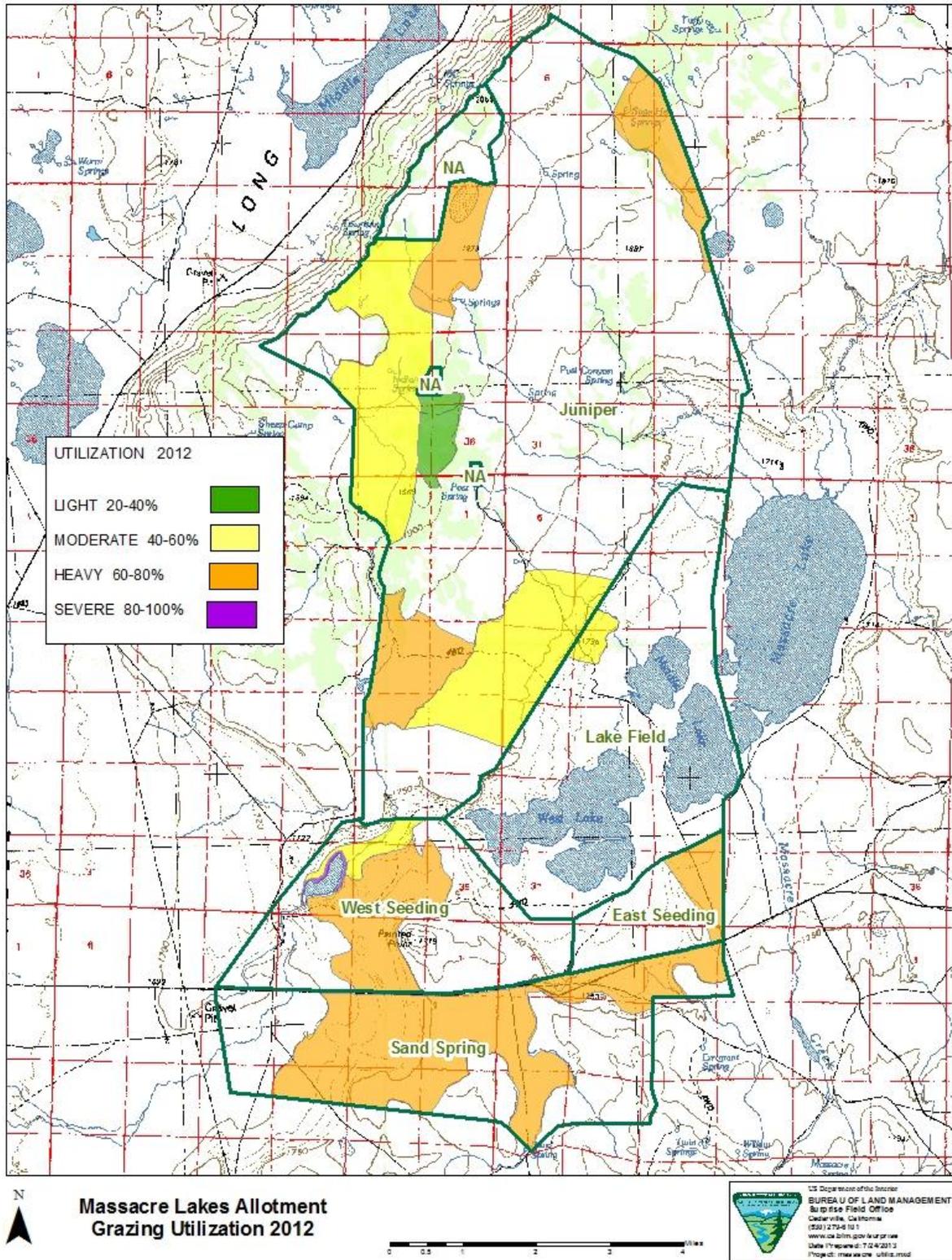


**Massacre Lakes Allotment  
Grazing Utilization 2009**

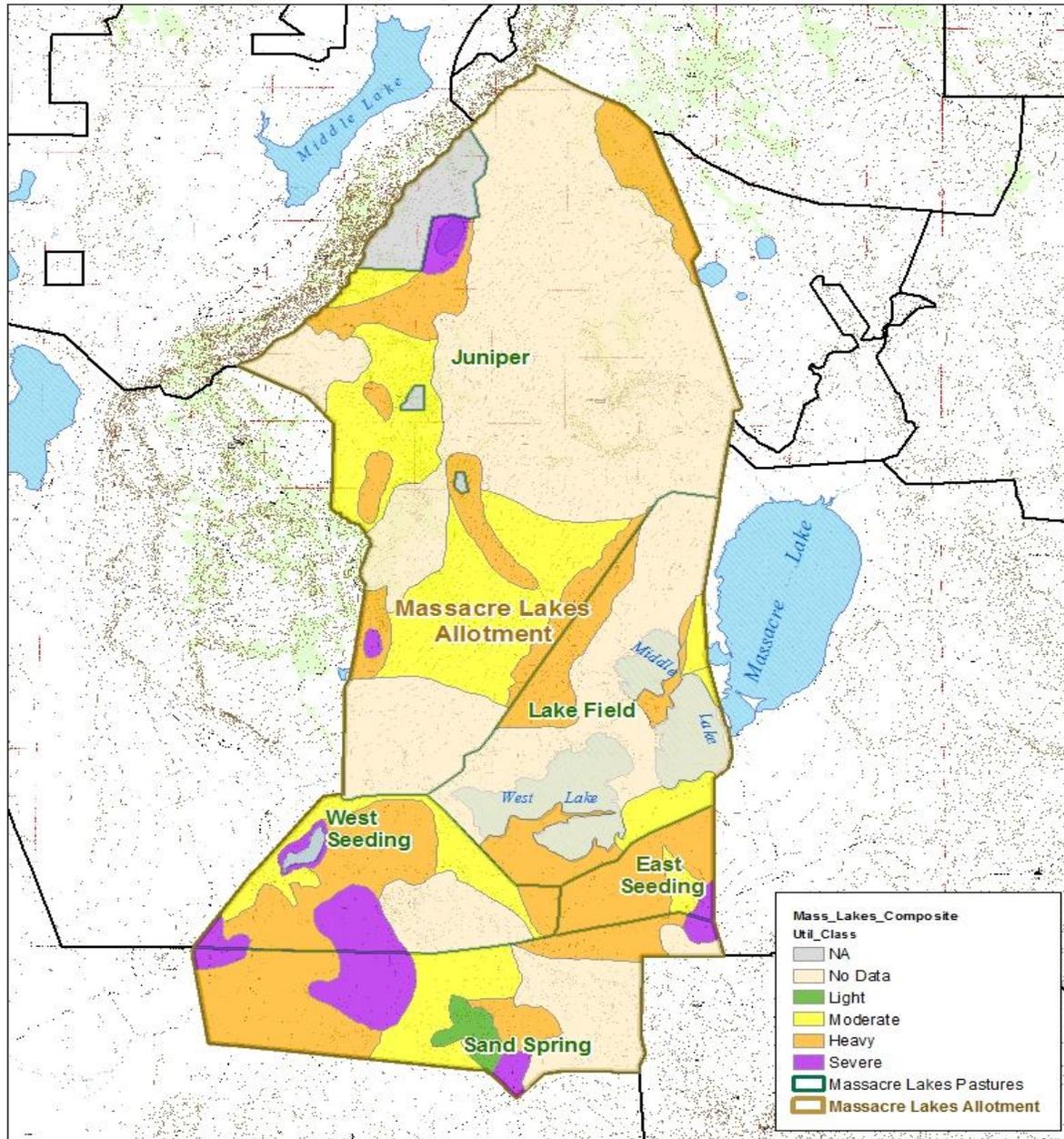


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Project: massacre\_utiliz.msld

## Map 2 2012 Utilization



Map 3 Composite Use Pattern Map 1978-2012

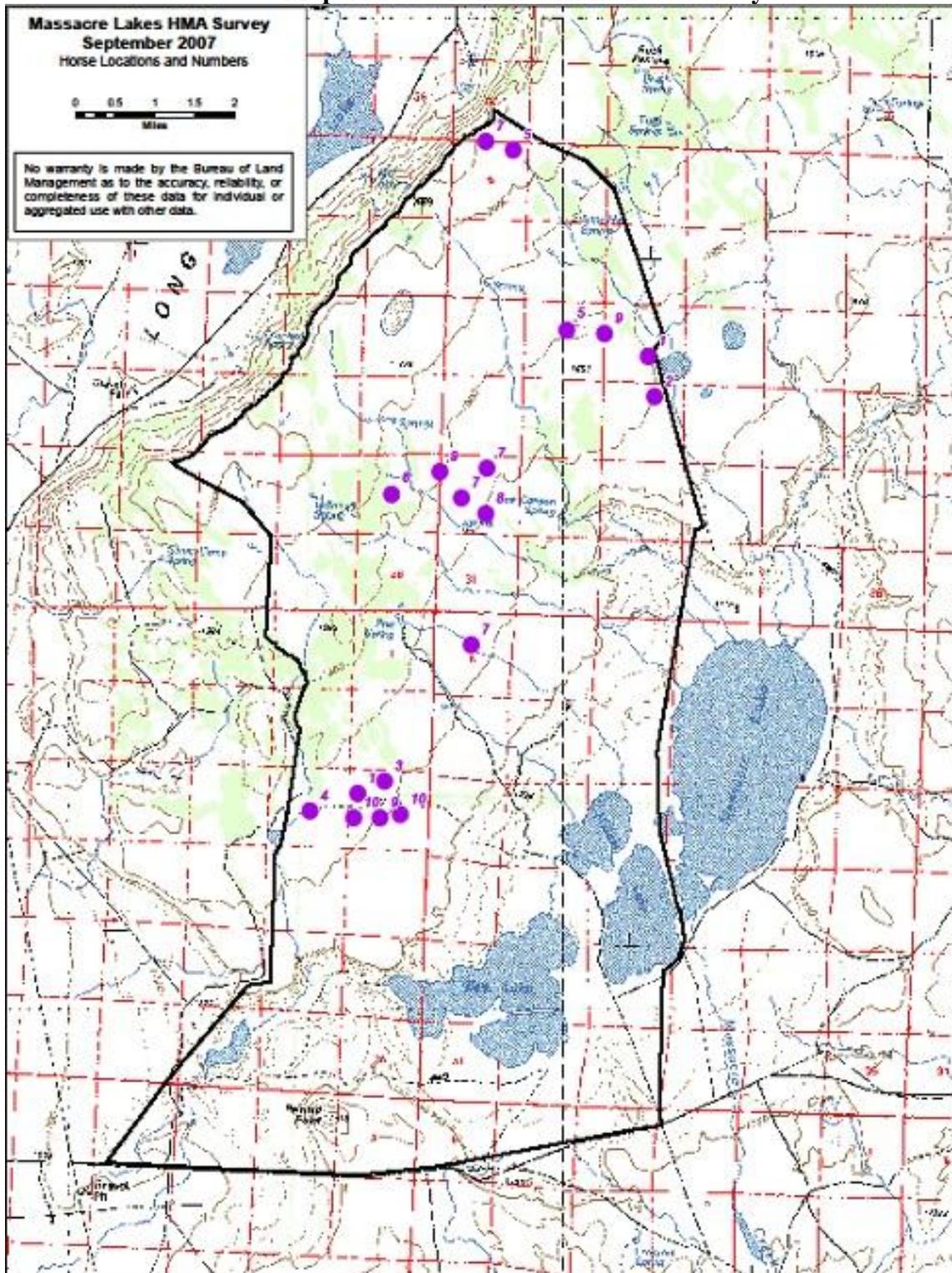


Massacre Lakes Allotment Composite Utilization

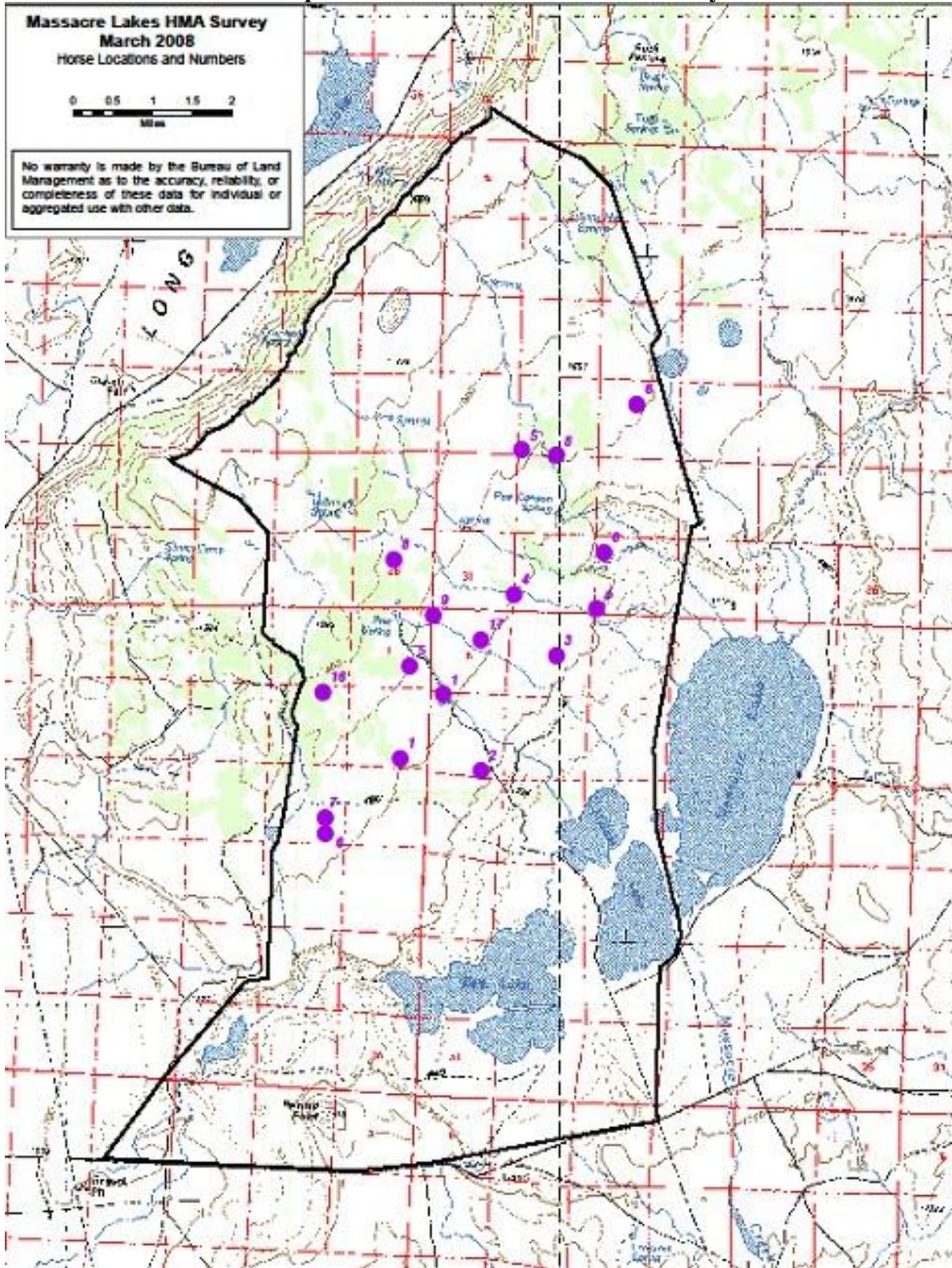



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 Date Prepared: 4/2/2013  
 Project: Map 1206, Comp Utilization.mxd

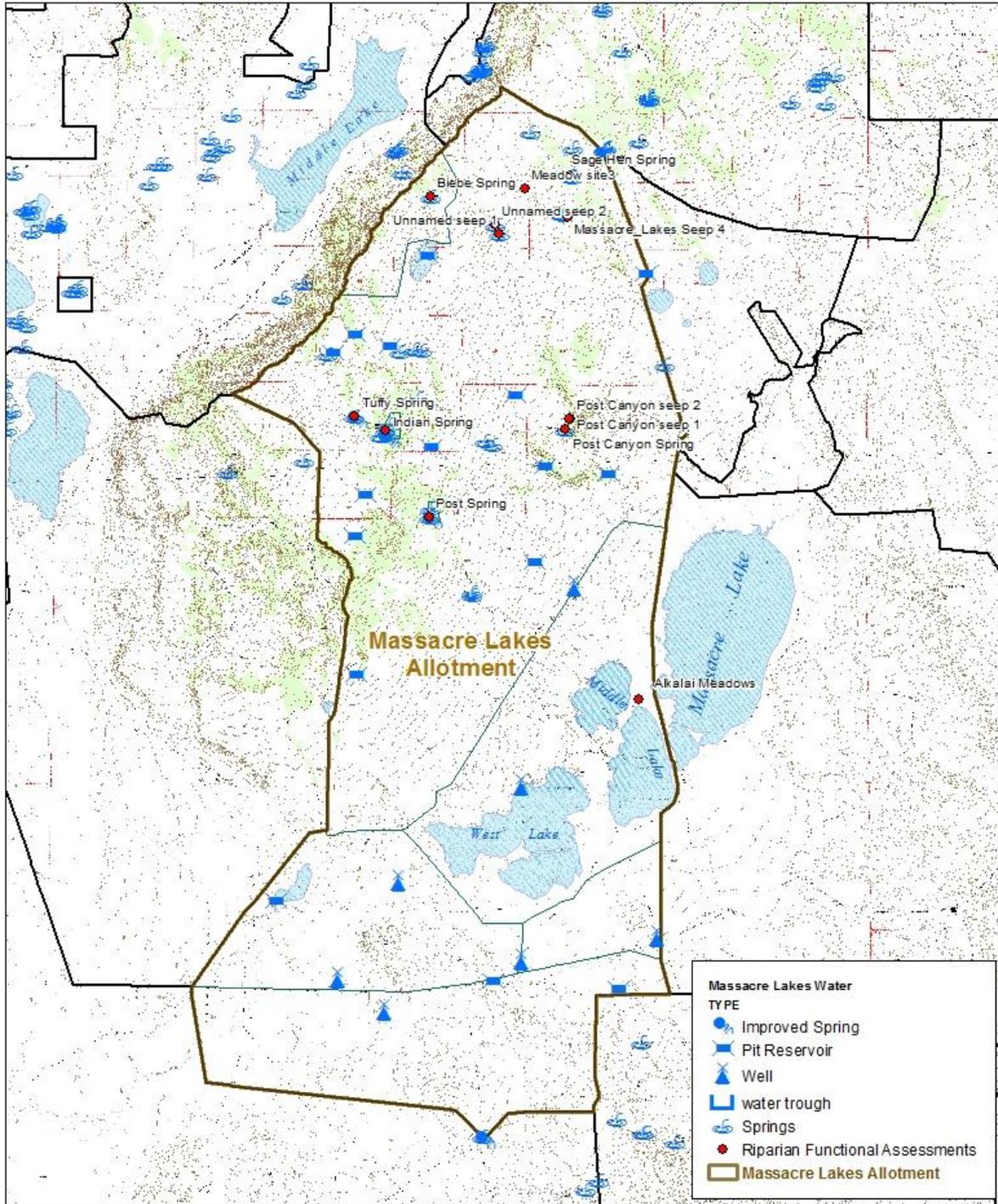
Map 4 Massacre Lakes HMA 2007 Survey



Map 5 Massacre Lakes HMA 2008 Survey



Map 6 Massacre Lakes Allotment Water Distribution



Massacre Lakes Allotment  
Water Sources and  
Riparian Functional Assessment



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