

**United States Department of the Interior  
Bureau of Land Management**

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**RANGELAND HEALTH ASSESSMENT AND EVALUATION REPORT**

**GRASSY HILLS AMP ALLOTMENT #01121**

December 2015

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## ALLOTMENT INFORMATION

**Field Office:** Jarbidge Field Office (JFO)

**Name of Permittee:** Camas Creek Cattle Association

**Allotment Name/Number:** Grassy Hills AMP (01121)

**Dates of Field Assessment:** June 17, 18, and 27, 2013

**Stream Miles on Public Land (miles):** 400 feet

**Table 1: Grassy Hills AMP Acres**

| Total Acres | BLM Acres | State Acres | Private Acres | Other Acres |
|-------------|-----------|-------------|---------------|-------------|
| 26,457      | 20,357    | 1,920       | 4,180         | 0           |

**Table 2: Assessment Participants**

| Name          | Position                            |
|---------------|-------------------------------------|
| Kate Crane    | TFD Fisheries Biologist             |
| Jim Klott     | JFO Wildlife Biologist              |
| Michael Haney | JFO Wildlife Biologist and Botanist |
| Dan Strickler | JFO Rangeland Management Specialist |
| Elena Shaw    | TFD Resource Coordinator            |
| Bonnie Ross   | GIS Specialist                      |

## CURRENT PERMITTED LIVESTOCK GRAZING USE

**Total Active Use:** 2,279 Animal Unit Months (AUMs)

**Livestock Type:** Cattle

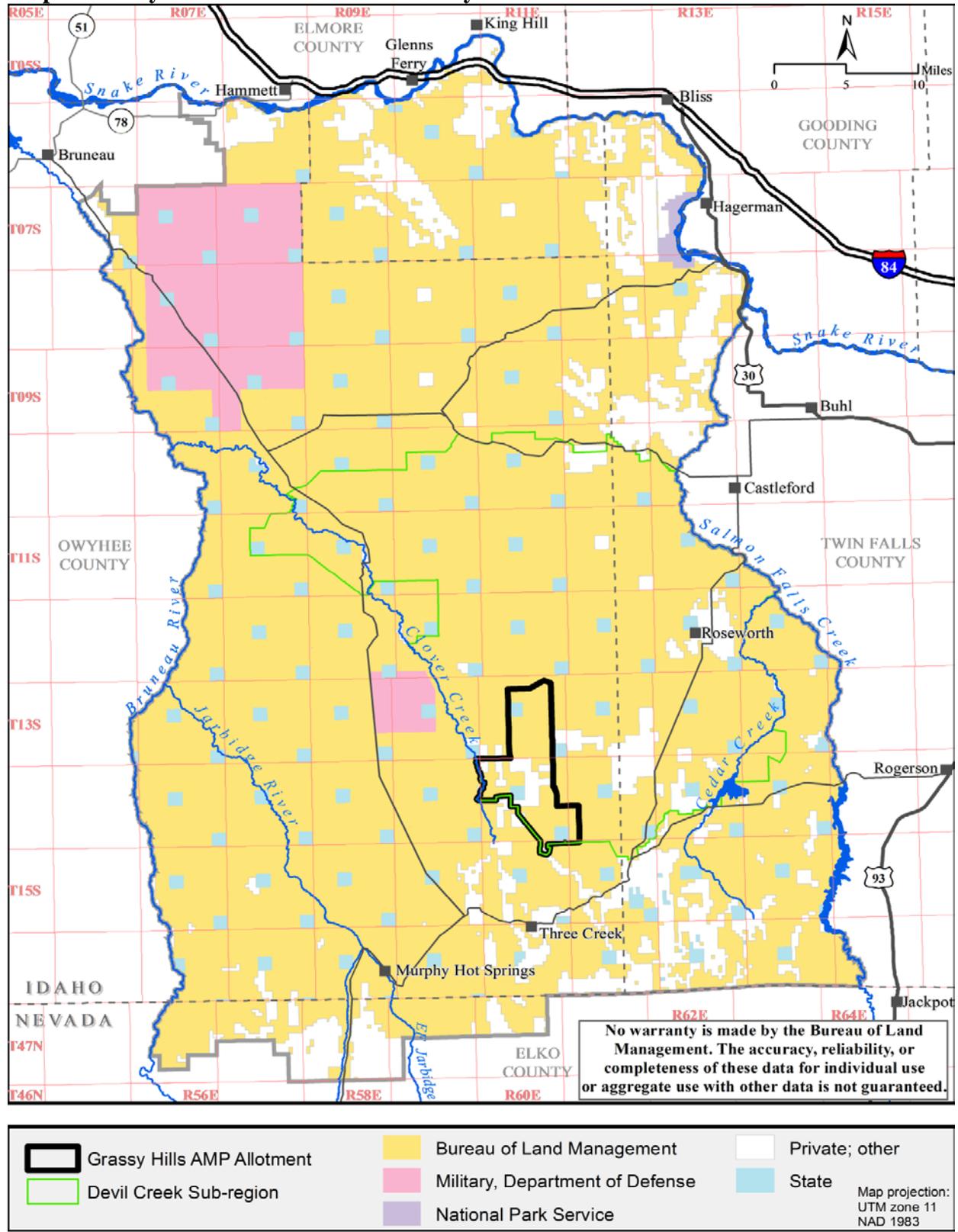
**Livestock Numbers:** 550 Cattle

**Season of Use:** 04/01 to 01/31

**Current Land Use Plan:** 2015 Jarbidge Resource Management Plan (RMP)

**Current BLM Stocking Level:** 8.9 Acres/AUM

**Map 1: Grassy Hills AMP Allotment Vicinity**



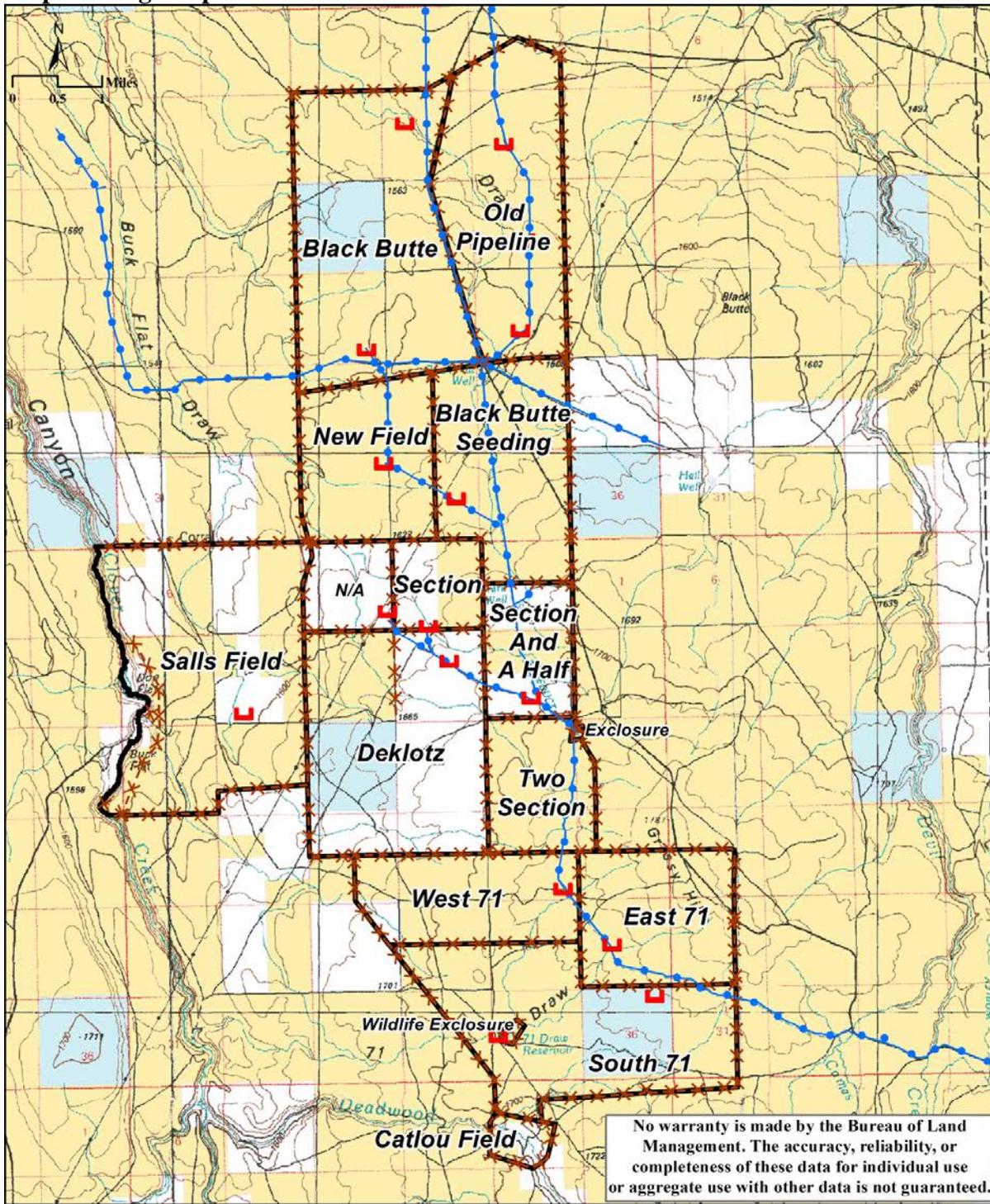
## **ALLOTMENT PROFILE**

The Grassy Hills AMP Allotment is about 11 miles southwest of Roseworth, Idaho (Map 1). The allotment has 13 pastures. Five of these pastures include private land: Salls Field, Section, Section And A Half, Deklotz, and the Catlou Field Pastures. Most the allotment is relatively flat to rolling topography, except for Clover Creek Canyon along the western border of Salls Field Pasture and in the Catlou Field Pasture along Deadwood Creek. Elevation in the allotment ranges from 4,600 feet to 5,200 feet.

Two streams, several reservoirs and ponds, as well as intermittent streams occur in the Grassy Hills AMP Allotment. The two streams are Clover Creek which flows through the Salls Field Pasture and Deadwood Creek which flows through the Catlou Field Pasture. Other streams in the allotment are ephemeral. Ephemeral streams only flow in direct response to precipitation and are above the water table throughout the year (BLM, 1998). Aikers, 71 Draw, Grassy Hills, and Shirk Reservoirs, as well as several unnamed reservoirs also occur in the allotment. A fence, built-in the late 1980's, surrounds the 71 Draw Reservoir. The purpose of the fence is to enhance wetland and wildlife habitat.

Range improvements in the Grassy Hills AMP Allotment include the House Creek Pipeline and troughs, allotment and pasture boundary fences, a wildlife enclosure, and fencing along Clover Creek (Map 2). There are roughly 38 miles of allotment boundary fences and 31 miles of pasture fences. About 23 miles of the House Creek Pipeline lies in the allotment, providing livestock water to all pastures except for the Salls Field and Catlou Field Pasture. Livestock water in the Salls Pasture is on private land, both on the uplands and in Clover Creek. Livestock water is provided in Deadwood Creek via a pond located on public land and along the creek on private land.

**Map 2: Range Improvements**



## Climate

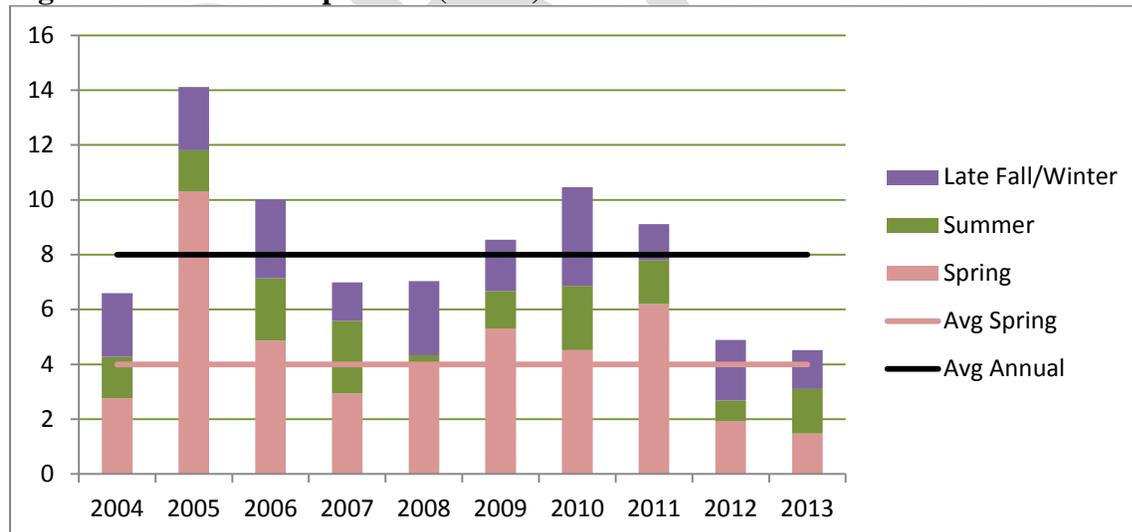
Typical climatic conditions within the allotment display low humidity, clear skies, large diurnal variation in temperature, and wind patterns reflecting the westerly direction of the prevailing storm track. Annual rainfall in the Grassy Hills AMP Allotment ranges from 10 to 13 inches. Most of the moisture typically falls as rain from late fall through late spring.

Precipitation and temperature trends (2004 to 2013) were assessed using weather data collected at the Horse Butte RAWS Station. The RAWS station is in an 8-10 inch precipitation zone about eight miles northwest of the allotment. The data collected at the RAWS station should show any trends in temperature and precipitation due to its general proximity to the allotment.

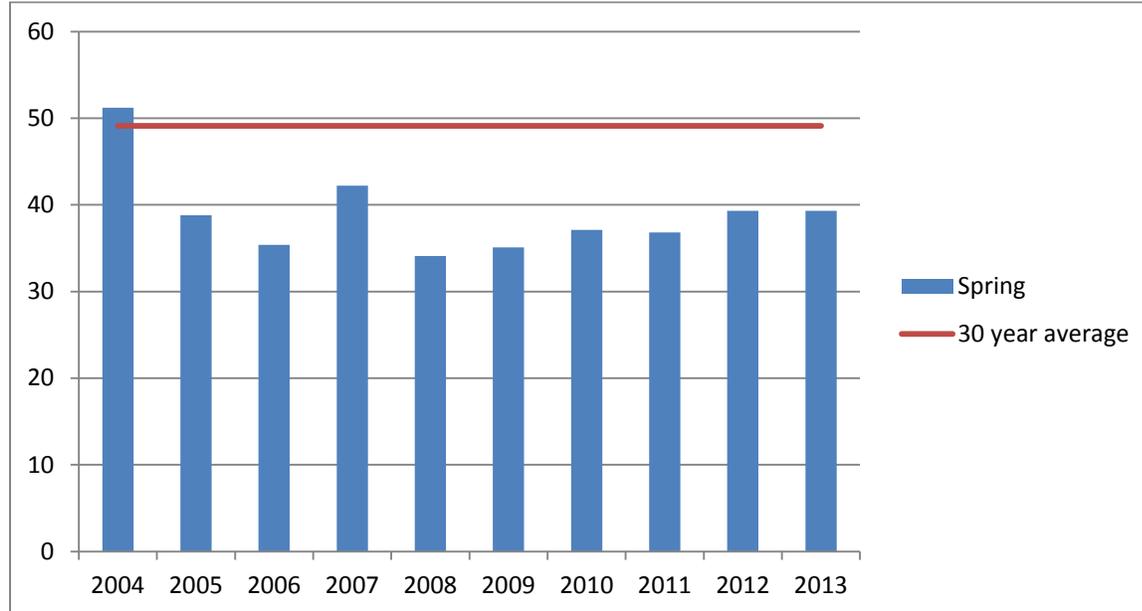
The thirty-year annual average precipitation at the Horse Butte RAWS station is 8.1 inches. Annual precipitation at the station was below the thirty-year average during five of the ten years, especially in 2012 and 2013 (Figure 1). Total rainfall in 2012 was 4.89 inches and in 2013 it was 4.52 inches. Rainfall was above the thirty-year average the remaining years. Moisture exceeded the thirty-year average by at least two inches in 2005 (14.12 inches), 2006 (10.1 inches), and 2010 (10.46 inches).

The thirty-year average for rain that fell during the growing season (March–June) is 4". Growing season precipitation was below the thirty-year average during four of the ten years (2004, 2007, 2012, and 2013). Rainfall was especially low in 2012 (1.92") and 2013 (1.48"). Based on this data annual plant production during these years was likely below that expected for an average year, even with cooler temperatures. Plant growth was likely enhanced in 2005 and 2011 due to higher amounts of rainfall (2" or more above the average). Except for 2004, temperatures during the growing season were cooler than the thirty-year average (Figure 2).

**Figure 1: Annual Precipitation (inches) from 2004 – 2013 at the Horse Butte RAWS Station**



**Figure 2: Annual Spring Temperatures (Fahrenheit) from 2004 – 2013 at the Horse Butte RAWs Station**



### **Grazing Management**

Authorized AUMs in the Grassy Hills AMP Allotment consists of 2,279 permitted active AUMs and 801 exchange-of-use AUMs. The exchange-of-use AUMs are attached to private and state lands fenced into the allotment. Permitted season-of-use is April 1 to January 31. Cattle primarily graze the allotment during the spring, summer, and fall seasons.

In addition to the permitted active use, BLM authorizes other permittees to trail livestock through the Grassy Hills AMP allotment. Trailing occurs in the spring and fall. Devil Creek Ranch, Inc. can trail 545 cattle during the spring through the East 71, Black Butte Seeding, and Black Butte Pastures. They can also trail 545 cattle in the Salls Field Pasture during the summer. Three Creek Ranch Company can trail 375 cattle during the spring and 750 cattle in the fall through the Salls Field Pasture. Additional details about trailing are found in the Livestock Trailing Environmental Assessment DOI-BLM-ID-T010-2012-0004-EA.

Up until 2004, when a Federal District Court order disallowed Temporary Non-Renewable (TNR) authorizations in the Jarbidge Field Office, BLM authorized TNR annually. Since 2005, Congressional Appropriations language has allowed the Jarbidge Field Office to annually authorize TNR up to the allotment's highest TNR authorization (587 AUMs) between 1997 and 2003 when forage is available. Actual use values that exceed the active permitted use are TNR AUMs. The Jarbidge Field Office authorized TNR AUMs in the fall of 2010 and 2011.

A formal grazing system has not been implemented on the allotment. Generally, cattle start in the northern pastures in the spring, they move south through the allotment during the summer, and then moved back to the northern pastures in the fall. Winter use has also occurred intermittently in the allotment.

Range improvements in the Grassy Hills AMP Allotment include the House Creek Pipeline and troughs, allotment and pasture boundary fences, a wildlife enclosure, and gap fences along Clover Creek (Map 2). There are roughly 38 miles of allotment boundary fences and 31 miles of pasture fences. About 23 miles of the House Creek Pipeline lies within the allotment, providing livestock water, via fifteen troughs, to all pastures except for the Salls Field and Catlou Field Pastures. In addition to the troughs, six ponds provide water in the spring. The 71 Draw Pond is within the wildlife enclosure. The pond feeds a pipeline that provides water to a trough about 200 feet down gradient from the enclosure. The pond is in the South 71 Pasture. In the Salls Pasture cattle can water out of Clover Creek on private land, when the gate is left open. In the Catlou Field Pasture livestock water out of a pond on BLM land as well as along 0.8 miles of Deadwood Creek on private land.

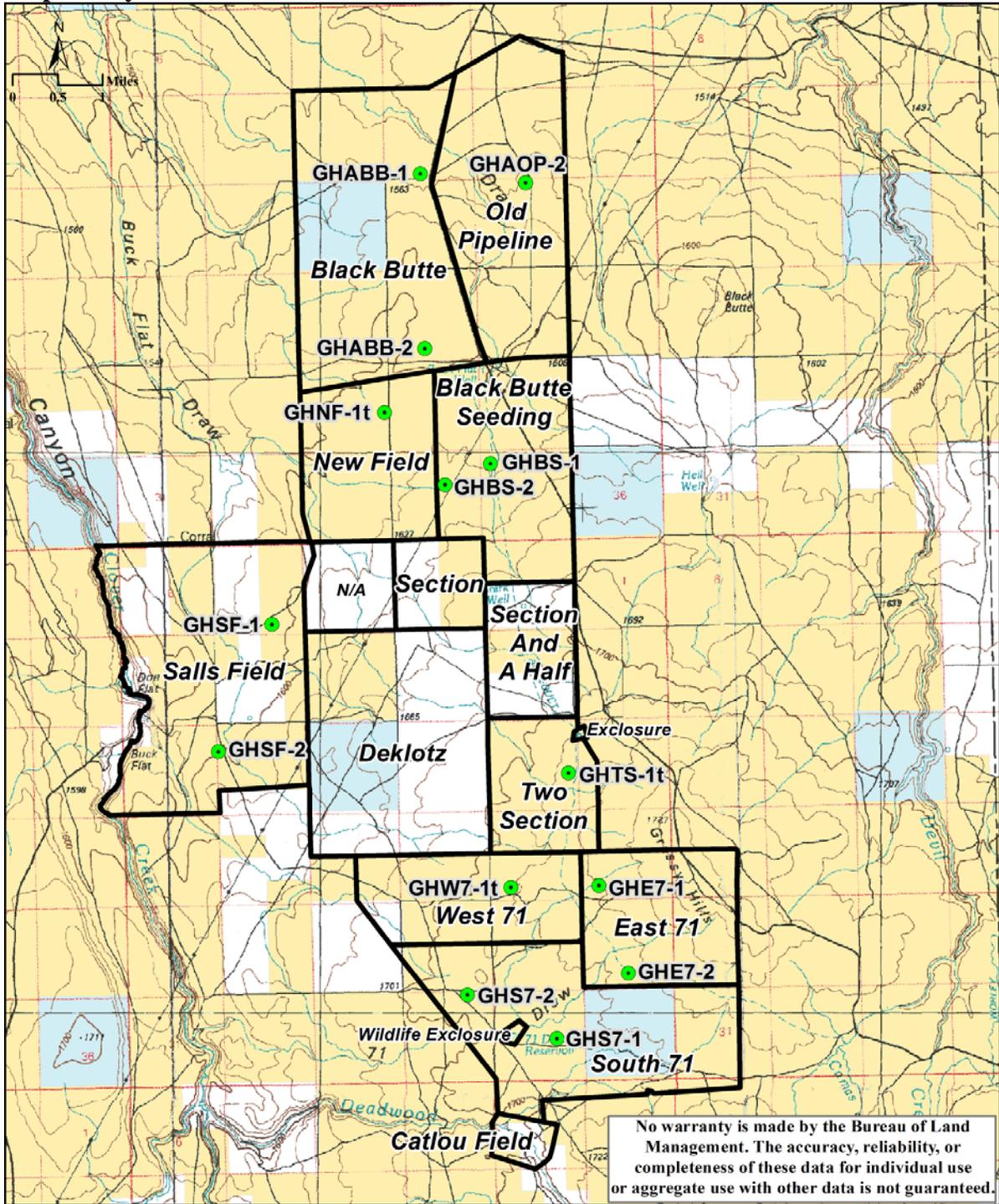
### **Livestock Actual Use and Utilization**

Prior to 2012, the grazing permit was held by Brackett Ranches LTD. In 2012, the permit transferred to Grassy Hill LLC, who then immediately transferred it to Camas Creek Cattle Association. The entire allotment burned in the 2007 Murphy Complex Fire. As a result, most of the allotment was not grazed in 2007. The only pasture grazed in 2007 was the Two Section Pasture. Grazing in this pasture occurred before the fire. In 2008, grazing use in most pastures was deferred until the fall while others were not grazed until 2009. Pastures grazed in the fall of 2008 were stocked to allow for 20 percent use levels. Deferment and rest allowed vegetation and other resources to recover from the effects of the fire.

Actual use is described by season-of-use rather than actual dates. Season-of-use designations are defined as: Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30. Early summer was designated separate from summer because some vegetation is still actively growing at this time. Further, sage-grouse nesting and early brood rearing may still be occurring during this time period.

Utilization was measured on crested wheatgrass (*Agropyron cristatum*), Thurber's needlegrass (*Achnatherum thurberianum*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and Sandberg bluegrass (*Poa secunda*). Utilization data was collected using the Height-Weight Method (Cooperative Extension Service et al., 1999). Map 3 shows the locations of key utilization sites in the Grassy Hills AMP Allotment. Key utilization sites are in representative areas based on the presence of key forage species, distance from livestock water, and accessibility of the area to livestock grazing. The following discussion describes actual use and utilization by pasture since no formal grazing system exists. A table consolidating actual use by pasture as well as including the specific dates livestock grazed the pastures is in Appendix A.

**Map 3: Key Utilization Sites**



### **Black Butte Pasture**

Actual use and utilization data for the Black Butte Pasture is in Table 3. Livestock grazed the pasture three years in the spring and four years in the early summer during the 10 year study period. Three of the four years of spring grazing occurred during consecutive years. Two of the four years that early summer grazing occurred, spring grazing also occurred. The amount of AUMs used over the ten-year period fluctuated from 129 to 550. Utilization data collected showed grazing use in 2009 and 2011 was slight (0 to 20 percent) on Thurber's needlegrass and bluebunch wheatgrass and light (21 to 40 percent) on bluebunch wheatgrass in 2013. Low use levels in 2011 are likely due to above average spring precipitation resulting in more grass production as compared to 2013 when precipitation was below average.

**Table 3: Actual Use and Utilization in the Black Butte Pasture (2004–2013)**

| Year | Season-of-Use *      | Actual AUMs | Percent Utilization <sup>^</sup> |                      |
|------|----------------------|-------------|----------------------------------|----------------------|
|      |                      |             | Thurber's Needlegrass            | Bluebunch Wheatgrass |
| 2004 | Fall/Winter          | 204         | -                                | -                    |
| 2005 | Early Summer         | 25          | -                                | -                    |
|      | Summer               | 126         | -                                | -                    |
| 2006 | Early Summer         | 129         | -                                | -                    |
| 2007 | Fire Related Non-Use | 0           | 0                                | 0                    |
| 2008 | Fire Related Non-Use | 0           | 0                                | 0                    |
| 2009 | Winter               | 165         | 19                               | 11                   |
| 2010 | Spring/Early Summer  | 555         | -                                | -                    |
| 2011 | Spring/Early Summer  | 550         | 6                                | 6                    |
| 2012 | Spring               | 243         | -                                | -                    |
| 2013 | Summer               | 475         | -                                | 24                   |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

<sup>^</sup> A dash denotes utilization data was not collected.

### **Old Pipeline Pasture**

Actual use and utilization data for the Old Pipeline Pasture is in Table 4. Livestock grazed the Old Pipeline Pasture five years in the spring during the ten-year study period. Early summer grazing also occurred for four of those five years of spring grazing. AUMs used annually in the Old Pipeline Pasture ranged from 190 to 489. Five years of utilization data is available for bluebunch wheatgrass. Bluebunch wheatgrass was moderately (41 to 60 percent) used in 2010. A note in the allotment file states that use in 2010 was higher in the area being measured than in the rest of the pasture. Utilization on bluebunch wheatgrass ranged from slight to light use (0 to 40 percent) in the other four years it was measured.

**Table 4: Actual Use and Utilization in the Old Pipeline Pasture (2004-2013)**

| Year | Season-of-Use *      | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|----------------------|-------------|----------------------------------|
|      |                      |             | Bluebunch Wheatgrass             |
| 2004 | Spring/Early Summer  | 489         | 38                               |
| 2005 | Fall                 | 25          | -                                |
|      | Winter               | 175         | -                                |
| 2006 | Spring               | 186         | -                                |
|      | Fall                 | 138         | -                                |
| 2007 | Fire Related Non-Use | 0           | 0                                |
| 2008 | Fire Related Non-Use | 0           | 0                                |
| 2009 | Winter               | 212         | 24                               |
| 2010 | Spring/Early Summer  | 41          | 42                               |
|      | Fall                 | 226         |                                  |
| 2011 | Spring/Early Summer  | 41          | 12                               |
|      | Fall                 | 149         |                                  |
| 2012 | Spring/Early Summer  | 251         | -                                |
| 2013 | Summer               | 134         | 13                               |
|      | Fall                 | 61          |                                  |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

<sup>^</sup> A dash denotes utilization data was not collected.

### **Black Butte Seeding Pasture**

Actual use and utilization data for the Black Butte Seeding Pasture is in Table 5. Livestock used the Black Butte Seeding Pasture four years in the spring during the ten-year study period. Except for one year of the four, early summer grazing also occurred. The pasture was grazed in the summer during two of the years that both spring and early summer grazing occurred. Actual use was not reported in 2012; therefore, the assumption is the pasture was not grazed that year. The number of AUMs used in the Black Butte Seeding Pasture over the ten-year study period ranged from 66 to 316. Very little utilization data was collected in the Black Butte Seeding. Light use occurred on crested wheatgrass in 2004 and on Thurber’s needlegrass in 2013. Livestock slightly used bluebunch wheatgrass in 2004, 2009, and 2013.

**Table 5: Actual Use and Utilization in the Black Butte Seeding Pasture (2004-2013)**

| Year | Season-of-Use *     | Actual AUMs | Percent Utilization <sup>^</sup> |                       |                      |
|------|---------------------|-------------|----------------------------------|-----------------------|----------------------|
|      |                     |             | Crested Wheatgrass               | Thurber’s Needlegrass | Bluebunch Wheatgrass |
| 2004 | Spring/Early Summer | 316         | 39                               | -                     | 13                   |
| 2005 | Spring              | 80          | -                                | -                     | -                    |
|      | Summer              | 142         | -                                | -                     | -                    |
| 2006 | Early Summer        | 55          | -                                | -                     | -                    |
|      | Summer              | 16          | -                                | -                     | -                    |
| 2007 | Post-fire Closure   | 0           | -                                | -                     | -                    |
| 2008 | Post-fire Closure   | 0           | -                                | -                     | -                    |
| 2009 | Fall                | 268         | -                                | -                     | 16                   |
| 2010 | Spring/Early Summer | 74          | -                                | -                     | -                    |
|      | Summer              | 229         | -                                | -                     | -                    |
| 2011 | Spring/Early Summer | 69          | -                                | -                     | -                    |

| Year | Season-of-Use * | Actual AUMs | Percent Utilization <sup>^</sup> |                       |                      |
|------|-----------------|-------------|----------------------------------|-----------------------|----------------------|
|      |                 |             | Crested Wheatgrass               | Thurber's Needlegrass | Bluebunch Wheatgrass |
|      | Summer          | 219         | -                                | -                     | -                    |
| 2012 | None            | 0           | -                                | -                     | -                    |
| 2013 | Summer          | 256         | -                                | 21                    | 14                   |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

<sup>^</sup> A dash denotes utilization data was not collected.

### ***New Field Pasture***

Actual use and utilization for the New Field Pasture is in Table 6. The New Field Pasture was carved out of the Section Pasture in 2009. Since then, spring and early summer use in the New Field Pasture occurred during two years. Early summer and summer use happened in 2012 and only summer grazing occurred in 2013. AUMs used in the pasture ranged from 134 to 272. Utilization on bluebunch wheatgrass was 6 percent in 2013.

**Table 6: Actual Use and Utilization in the New Field Pasture (2004-2013)**

| Year | Season-of-Use *     | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|---------------------|-------------|----------------------------------|
|      |                     |             | Bluebunch Wheatgrass             |
| 2010 | Spring/Early Summer | 272         | -                                |
| 2011 | Spring/Early Summer | 273         | -                                |
| 2012 | Early Summer        | 170         | -                                |
|      | Summer              | 203         | -                                |
| 2013 | Summer              | 134         | 6                                |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

<sup>^</sup> A dash denotes utilization data was not collected.

### ***East 71 Pasture***

Actual use and utilization data for the East 71 Pasture is in Table 7. Actual use was not reported in the East 71 Pasture in 2005 and 2012. Therefore, the assumption is the pasture was not grazed by livestock during these two years. Spring, early summer, and summer use occurred in 2009. Livestock grazed the pasture during the early summer and summer in the remaining years. Fall grazing also occurred in the pasture in 2006 and 2008. AUMs used annually ranged from 90 to 395. Grazing use was slight on bluebunch wheatgrass in 2011 and 2013 and light in 2004 and 2009.

**Table 7: Actual Use and Utilization in the East 71 Pasture (2004-2013)**

| Year | Season-of-Use *   | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|-------------------|-------------|----------------------------------|
|      |                   |             | Bluebunch Wheatgrass             |
| 2004 | Summer            | 135         | 21                               |
| 2005 | None              | 0           | -                                |
| 2006 | Early Summer      | 140         | -                                |
|      | Fall              | 255         | -                                |
| 2007 | Post-fire Closure | 0           | -                                |
| 2008 | Fall              | 269         | -                                |

| Year | Season-of-Use *     | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|---------------------|-------------|----------------------------------|
|      |                     |             | Bluebunch Wheatgrass             |
| 2009 | Spring/Early Summer | 128         | 23                               |
|      | Summer              | 97          |                                  |
| 2010 | Early Summer        | 50          | -                                |
|      | Summer              | 40          | -                                |
| 2011 | Early Summer        | 57          | 20                               |
|      | Summer              | 44          |                                  |
| 2012 | None                | 0           | -                                |
| 2013 | Summer              | 136         | 10                               |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

<sup>^</sup> A dash denotes utilization data was not collected.

### **West 71 Pasture**

Actual use and utilization data for the West 71 Pasture is in Table 8. Actual use was not reported in 2012 and 2013 so the assumption is the West 71 Pasture was not grazed these years. Livestock grazed the pasture primarily in the summer with fall use occurring in three years. AUMs used in the pasture over the ten-year study period ranged from 111 to 258. Slight use on bluebunch wheatgrass occurred in 2011; utilization data was not collected in any other year.

**Table 8: Actual Use and Utilization in the West 71 Pasture (2004-2013)**

| Year | Season-of-Use *   | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|-------------------|-------------|----------------------------------|
|      |                   |             | Bluebunch Wheatgrass             |
| 2004 | Summer            | 202         | -                                |
| 2005 | Summer            | 190         | -                                |
| 2006 | Summer            | 159         | -                                |
| 2007 | Post-fire Closure | 0           | -                                |
| 2008 | Post-fire Closure | 0           | -                                |
| 2009 | Summer            | 79          | -                                |
|      | Fall              | 179         | -                                |
| 2010 | Summer            | 55          | -                                |
|      | Fall              | 56          | -                                |
| 2011 | Summer            | 67          | 9                                |
|      | Fall              | 56          |                                  |
| 2012 | None              | 0           | -                                |
| 2013 | None              | 0           | -                                |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

<sup>^</sup> A dash denotes utilization data was not collected.

### **South 71 Pasture**

Actual use and utilization data for the South 71 Pasture is in Table 9. Spring, early summer, and summer use occurred in 2010 and 2011. The pasture was primarily grazed in the summer; however, fall use occurred in 2009. AUMs ranged from 57 to 248 over the ten-year study period.

Only one year of utilization data is available for the pasture. Grazing use on bluebunch wheatgrass was slight in 2013.

**Table 9: Actual Use and Utilization in the South 71 Pasture (2004-2013)**

| Year | Season-of-Use *     | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|---------------------|-------------|----------------------------------|
|      |                     |             | Bluebunch Wheatgrass             |
| 2004 | Summer              | 233         | -                                |
| 2005 | Summer              | 88          | -                                |
| 2006 | Summer              | 186         | -                                |
| 2007 | Post-fire Closure   | 0           | -                                |
| 2008 | Post-fire Closure   | 0           | -                                |
| 2009 | Summer              | 23          | -                                |
|      | Fall                | 225         |                                  |
| 2010 | Spring/Early Summer | 96          | -                                |
|      | Summer              | 76          | -                                |
| 2011 | Spring/Early Summer | 140         | -                                |
|      | Summer              | 42          | -                                |
| 2012 | Summer              | 57          | -                                |
| 2013 | Summer              | 75          | 7                                |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

<sup>^</sup> A dash denotes utilization data was not collected.

### **Section Pasture**

Actual use data for the Section Pasture is in Table 10. Utilization data was not collected in this pasture during the ten-year study period. Actual use was not reported in 2012 and 2013; therefore, the assumption is livestock use was not made those years. Spring and early summer grazing occurred in 2009. The pasture was mostly grazed in the summer and fall. In 2008 livestock used the pasture in the winter. AUMs used in the Section Pasture ranged from 15 to 371.

**Table 10: Actual Use and Utilization in the Section Pasture (2004-2013)**

| Year | Season-of-Use *     | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|---------------------|-------------|----------------------------------|
|      |                     |             | Bluebunch Wheatgrass             |
| 2004 | Early Summer        | 40          | -                                |
| 2005 | Early Summer        | 15          | -                                |
| 2006 | Early Summer        | 79          | -                                |
| 2007 | Post-fire Closure   | 0           | -                                |
| 2008 | Winter              | 64          | -                                |
| 2009 | Spring/Early Summer | 93          | -                                |
|      | Summer              | 17          | -                                |
| 2010 | Fall                | 371         | -                                |
| 2011 | Fall                | 179         | -                                |
| 2012 | None                | 0           | -                                |
| 2013 | None                | 0           | -                                |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

<sup>^</sup> A dash denotes utilization data was not collected.

### **Section And A Half Pasture**

Actual use data for the Section And A Half Pasture is in Table 11. Utilization was not measured during the study period in the Section And A Half Pasture. Spring and early summer grazing occurred concurrently during three years of the ten-year study period. In addition, early summer grazing happened in three other years with summer grazing also happening during two of these three years. Livestock grazed either in the summer or the fall in the remaining years. AUMs used annually during the ten years ranged from 52 to 275.

**Table 11: Actual Use and Utilization in the Section And A Half Pasture (2004-2013)**

| Year | Season-of-Use *     | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|---------------------|-------------|----------------------------------|
|      |                     |             | Bluebunch Wheatgrass             |
| 2004 | Early Summer        | 52          | -                                |
| 2005 | Early Summer        | 93          | -                                |
|      | Summer              | 52          | -                                |
| 2006 | Early Summer        | 67          | -                                |
|      | Summer              | 76          | -                                |
| 2007 | Post-fire Closure   | 0           | -                                |
| 2008 | Fall                | 275         | -                                |
| 2009 | Spring/Early Summer | 270         | -                                |
|      | Summer (Trailing)   | 2           | -                                |
|      | Fall                | 59          | -                                |
| 2010 | Spring/Early Summer | 133         | -                                |
| 2011 | Spring/Early Summer | 135         | -                                |
| 2012 | Fall                | 165         | -                                |
| 2013 | Summer              | 61          | -                                |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

<sup>^</sup> A dash denotes utilization data was not collected.

### **Two Sections Pasture**

Actual use and utilization data for the Two Sections Pasture is in Table 12. Actual use was not reported in 2006 and 2012 so the assumption is the pasture was not used during those years. Spring, early summer, and summer use happened during three consecutive years (2009-2011). Early summer grazing also occurred in 2004 and 2007. The pasture was either grazed in the summer, fall, or winter in the remaining years. AUMs used annually in the Two Sections Pasture ranged from 48 to 424. Utilization collected in 2004 showed grazing use on bluebunch wheatgrass was slight.

**Table 12: Actual Use and Utilization in the Two Sections Pasture (2004-2013)**

| Year | Season-of-Use * | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|-----------------|-------------|----------------------------------|
|      |                 |             | Bluebunch Wheatgrass             |
| 2004 | Early Summer    | 81          | 19                               |
| 2005 | Summer          | 85          | -                                |
| 2006 | None            | 0           | -                                |
| 2007 | Early Summer    | 79          | -                                |
| 2008 | Fall            | 303         | -                                |
|      | Winter          | 121         | -                                |

|      |                     |     |   |
|------|---------------------|-----|---|
| 2009 | Spring/Early Summer | 167 | - |
|      | Summer              | 129 | - |
| 2010 | Spring/Early Summer | 107 | - |
|      | Summer              | 94  | - |
| 2011 | Spring/Early Summer | 98  | - |
|      | Summer              | 94  | - |
| 2012 | None                | 0   | - |
| 2013 | Summer              | 48  | - |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

^ A dash denotes utilization data was not collected.

### **Deklotz Pasture**

Actual use data for the Deklotz Pasture is in Table 13. After the 2007 Murphy Fire the permittee constructed a fence splitting the fence into two fields; separating most of the private land from public land. Utilization data in the Deklotz Pasture was not collected during the ten-year study period. Spring grazing occurred in three years during the ten-year study period. Early summer grazing also occurred during one of those years and by itself in 2004. Livestock grazed the pasture in the summer or fall in the remaining years. AUMs used over the ten-year study period ranged from 53 to 281.

**Table 13: Actual Use and Utilization in the Deklotz Pasture (2004-2013)**

| Year | Season-of-Use *     | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|---------------------|-------------|----------------------------------|
|      |                     |             | Bluebunch Wheatgrass             |
| 2004 | Early Summer        | 192         | -                                |
| 2005 | Summer              | 199         | -                                |
| 2006 | Spring/Early Summer | 281         | -                                |
| 2007 | Post-fire Closure   | 0           | -                                |
| 2008 | Post-fire Closure   | 0           | -                                |
| 2009 | Fall                | 190         | -                                |
| 2010 | Spring              | 156         | -                                |
| 2011 | Spring              | 160         | -                                |
| 2012 | Fall                | 137         | -                                |
| 2013 | Fall                | 53          | -                                |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

^ A dash denotes utilization data was not collected.

### **Salls Field Pasture**

Actual use data for the Salls Field Pasture is in Table 14. Utilization data was not collected in the Salls Field Pasture during the ten-year study period. Spring grazing occurred in three years of the ten years and early summer grazing occurred in two years. Livestock used the pasture either in the fall, winter, or both during the remaining years. AUMs used annually ranged from 44 to 421.

**Table 14: Actual Use and Utilization in the Salls Field Pasture (2004-2013)**

| Year | Season-of-Use *   | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|-------------------|-------------|----------------------------------|
|      |                   |             | Bluebunch Wheatgrass             |
| 2004 | Spring            | 326         | -                                |
| 2005 | Early Summer      | 59          | -                                |
| 2006 | Early Summer      | 65          | -                                |
| 2007 | Post-fire Closure | 0           | -                                |
| 2008 | Post-fire Closure | 0           | -                                |
| 2009 | Fall              | 352         | -                                |
| 2010 | Spring            | 156         | -                                |
| 2011 | Spring            | 153         | -                                |
|      | Fall              | 268         | -                                |
| 2012 | Fall              | 272         | -                                |
|      | Winter            | 71          | -                                |
| 2013 | Winter            | 44          | -                                |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

<sup>^</sup> A dash denotes utilization data was not collected.

### **Catlou Field Pasture**

Actual use data for the Catlou Field Pasture is in Table 15. The Catlou Field Pasture is 60 percent private land. The Grassy Hills AMP livestock permittee mostly used the Catlou Field Pasture as a holding field. It held cattle during the summer and fall for short periods of time. Grazing use outside of using this pasture as a holding field occurred in 2005, 2006, and 2010. Utilization data was not collected during the ten-year study period.

**Table 15: Actual Use and Utilization in the Catlou Field Pasture (2004-2013)**

| Year | Season-of-Use *   | Actual AUMs | Percent Utilization <sup>^</sup> |
|------|-------------------|-------------|----------------------------------|
|      |                   |             | Bluebunch Wheatgrass             |
| 2004 | Summer            | 16 Trailing | -                                |
| 2005 | Early Summer      | 16          | -                                |
|      | Summer            | 7 Trailing  | -                                |
| 2006 | Summer            | 27          | -                                |
|      | Fall              | 7 Trailing  | -                                |
| 2007 | Post-fire Closure | 0           | -                                |
| 2008 | Post-fire Closure | 0           | -                                |
| 2009 | Summer            | 19 Trailing | -                                |
| 2010 | Summer            | 42          | -                                |
| 2011 | Summer            | 47 Trailing | -                                |
| 2012 | None              | 0           | -                                |
| 2013 | None              | 0           | -                                |

\* Spring 04/01–05/31; Early Summer 06/01–06/30; Summer 07/01–09/30; Fall 10/01–11/30; Winter 12/01–01/30

<sup>^</sup> A dash means that utilization data was not collected.

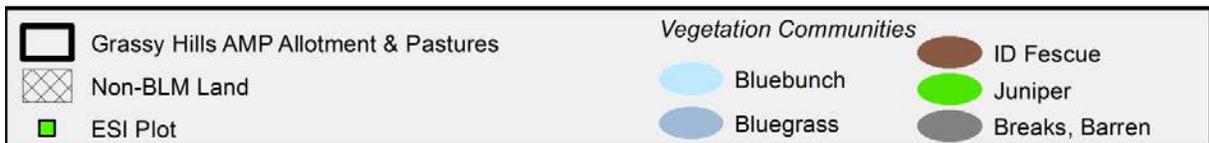
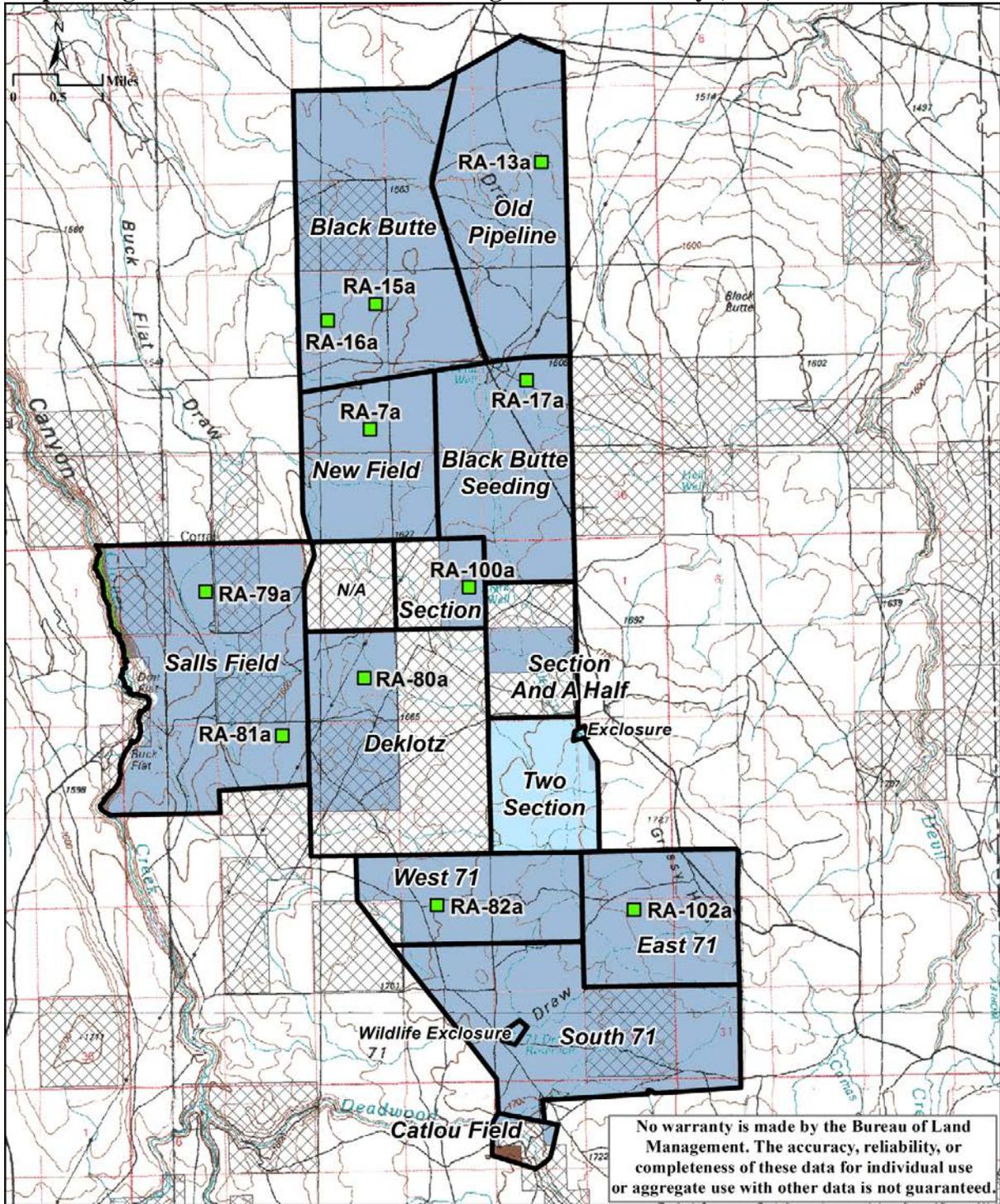
### **Vegetation**

Plant communities within the planning area were initially mapped in 2006 using field observation, field cover data, and National Agriculture Imagery Program (NAIP). Updates to the

map occurred in 2013 using more recent field observations and NAIP imagery. The Field Office classified and mapped vegetation communities based on dominant plant cover using a minimum mapping unit of 20-acres. Communities with 10 percent or more shrub cover were mapped as shrublands. The criteria of 10 percent or more shrub cover provide consistency with defined habitat needs for greater sage-grouse (Wisdom et al., 2000).

Although, much of the plant communities in the Grassy Hills AMP Allotment have been modified by fire (Map 4) and seedings, Sandberg bluegrass provides most of the herbaceous cover. Except for the Two Sections Pasture and the Catlou Field Pasture, the rest of the pastures are mapped as a Sandberg bluegrass vegetation community. The map shows the Two Sections Pasture as a bluebunch wheatgrass plant community and the Catlou Field Pasture as an Idaho fescue (*Festuca idahoensis*) plant community. Juniper (*Juniperus* spp.) occurs in small patches or as sparsely scattered individuals on canyon slopes in the Salls Field Pasture; however, it is not displayed on the vegetation map. The juniper vegetation community is found along the Clover Creek drainage.

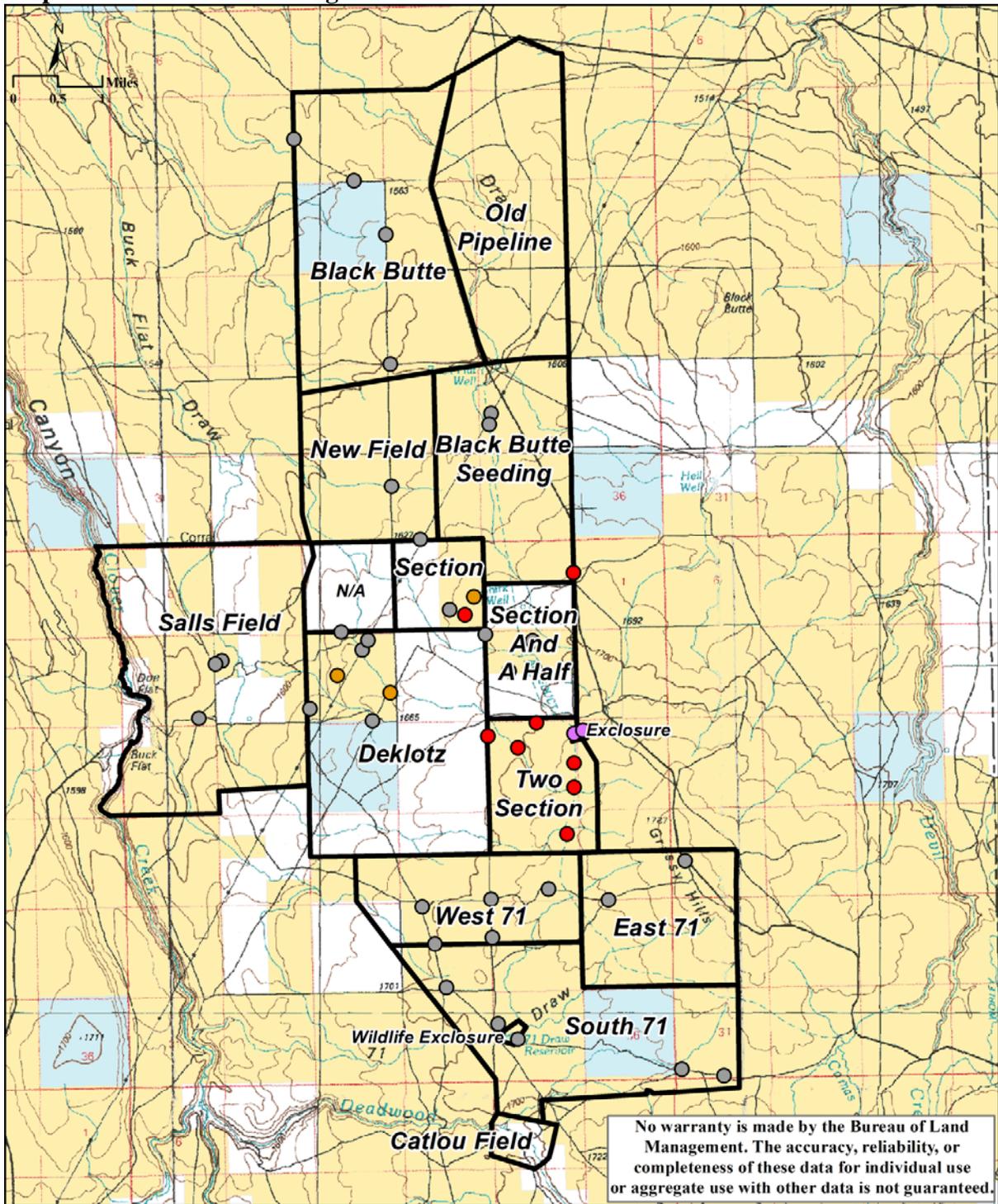
**Map 4: Vegetation Communities and Ecological Site Inventory (ESI) Plots**



### **Noxious Weeds**

The State of Idaho has 65 plant species listed as noxious weeds (<http://www.agri.state.id.us/Categories/PlantsInsects/NoxiousWeeds/watchlist.php>). Three are known to occur in the Grassy Hills AMP Allotment: diffuse knapweed, rush skeleton weed, scotch thistle (Map 5). There are thirty-nine known diffuse knapweed occurrences in the allotment. Diffuse knapweed occurs in all the pastures except for the Old Pipeline, Two Sections, and Catlou Field Pastures. It is most prevalent in the Deklotz Pasture with 12 occurrences. There are four occurrences of rush skeletonweed in the allotment: three occur in the Deklotz Pasture and one is found in the Section Pasture. Scotch thistle has only been found in the Two Section Pasture with six known occurrences. BLM treated these occurrences in 2008. Treatment goals are to reduce noxious weeds to where they will not have a significant economic or environmental impact and/or to eradicate them completely. The BLM also works to prevent the establishment of new species and occurrences in areas where they presently do not occur. Noxious weeds were not documented at any of the monitoring/study sites evaluated in this analysis.

**Map 5: Noxious Weed Management**



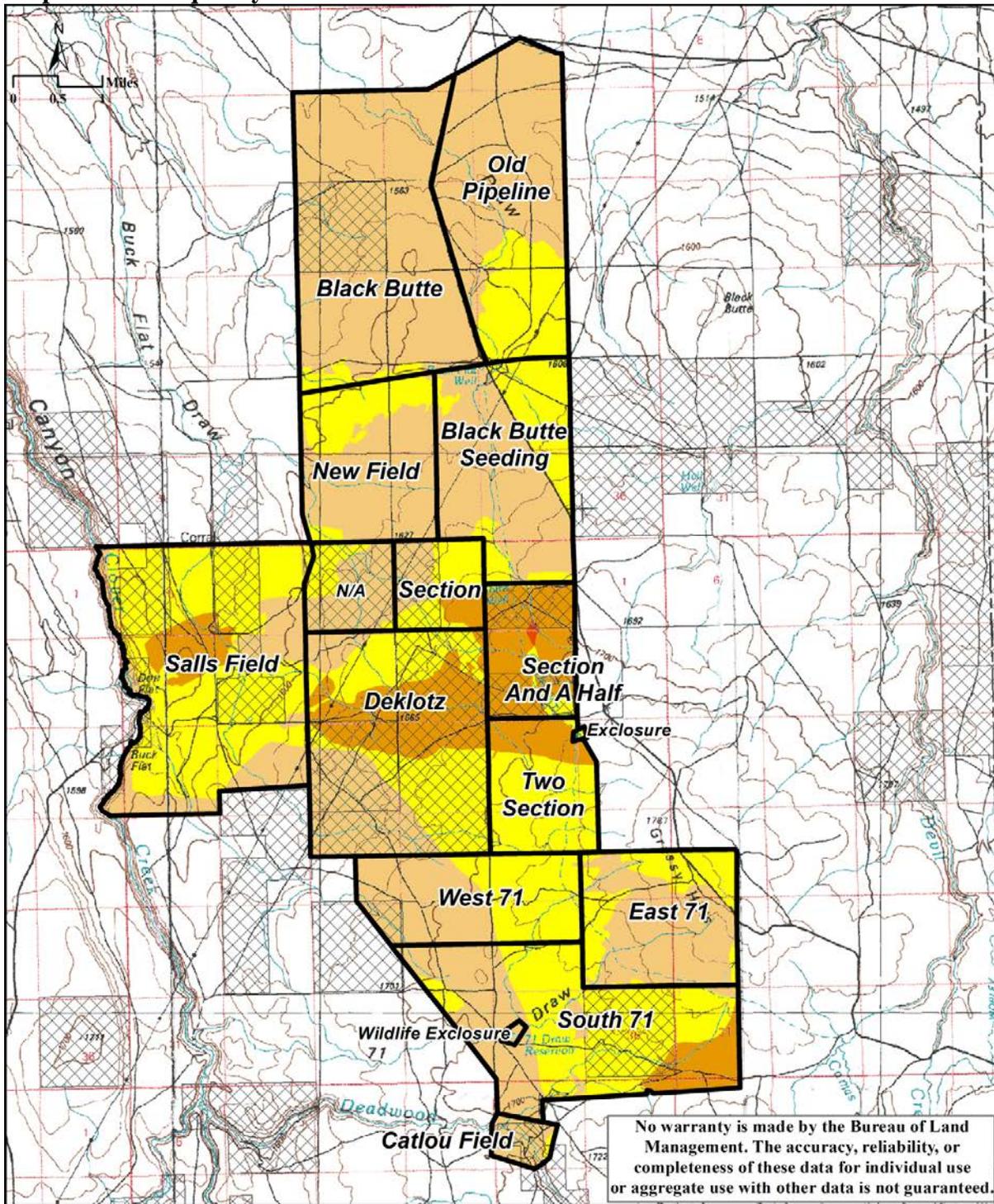
## **Wildfire History**

Wildfires have affected the allotment over the past 53 years. The entire allotment has burned at least once since 1960. Eleven wildfires have occurred in the allotment. Eight of those fires burned in the past twenty years. Fifty-seven percent (11,571 acres) of the allotment has burned once, 37 percent (7,547 acres) has burned twice, and six percent (1,128 acres) has burned three times (Map 6). The largest fire to occur in the allotment was the 2007 Murphy Complex Fire, burning almost the entire allotment. Sixty-eight acres in the Salls Field Pasture did not burn in 2007. Other wildfires that have burned in the allotment include: 1960 Grassy Hills Fire, 1973 Horse Butte Fire, 1980 House Creek Fire, 1981 Windmill Fire, 1995 Signal Butte Fire, 1998 Roseworth #1 Fire, 2000 Grass Fire, and the Five N. Three Creek Fire, 2001 Doe Flat Fire, and the 2006 Old Wind Fire.

Portions of the Black Butte, Old Pipeline, Black Butte Seeding, Section, Salls Field, Deklotz, West 71, South 71, and Catlou Field Pastures were drilled seeded with the native cultivar Secar Snake River Wheatgrass after the Murphy Complex Fire. In all, 7,234 acres were drilled seeded with two seed mixes used: Bluebunch and Thurbers. The bluebunch mix had Secar Snake River wheatgrass (*Elymus wawawaiensis*), Sandberg bluegrass, Sherman big bluegrass (*Poa ampla*), squirreltail (*Elymus elymoides*), alfalfa (*Medicago sativa*), western yarrow (*Achillea millefolium*), and fourwing saltbush (*Atriplex canescens*). This mix was seeded on 5,776 acres. The Thurber's mix contained all the same species except for the saltbush and yarrow. Lewis flax (*Linum lewisii*) and Munro's globemallow (*Sphaeralcea munroana*) were also part of the Thurbers mix. It was seeded on 1,458 acres. Sagebrush seed was flown on 14,065 acres in the winter of 2008. In 2008 and 2012 sagebrush seedlings were hand planted in the allotment affecting 4,455 acres.

Three years after the Murphy Complex Fire the Jarbidge Field Office completed a monitoring summary describing seeding success for the Murphy Complex ESR treatments (BLM, 2010). The monitoring plan described the drill seedings as being successful. Native perennial seeded grasses successfully established, stabilizing the soil and reducing competition from non-native invasive species. Limited success was found with aerial seeded sagebrush. By the third year monitoring was showing that sagebrush seedlings were establishing; however, the report concluded more time was needed to evaluate sagebrush establishment in treated areas. In areas where establishment is occurring strips of sagebrush are quite obvious indicating seeding success. Hand planting of sagebrush has had mixed results throughout the Murphy Complex rehabilitation areas. More information is needed to evaluate success of hand planted sagebrush in the Grassy Hills AMP Allotment.

**Map 6: Fire Frequency**



### **Monitoring/Study Data Summaries**

Study data used in this evaluation includes 2006 Ecological Site Inventory (ESI) cover data, 2013 Habitat Assessment Framework cover data, 2013 Step Point Method cover data, nested plot frequency data, 3x3 photo plot data, Idaho Indicators of Rangeland Health field assessments, and soil stability tests.

Due to differences in sampling locations and methodology (e.g. number of transects per site and number of points per transect) used to collect cover data, statistical tests cannot be used to analyze vegetative cover across years. However, the data can be used to describe general similarities or differences in vegetation between years or locations within the allotment.

#### **ESI Data**

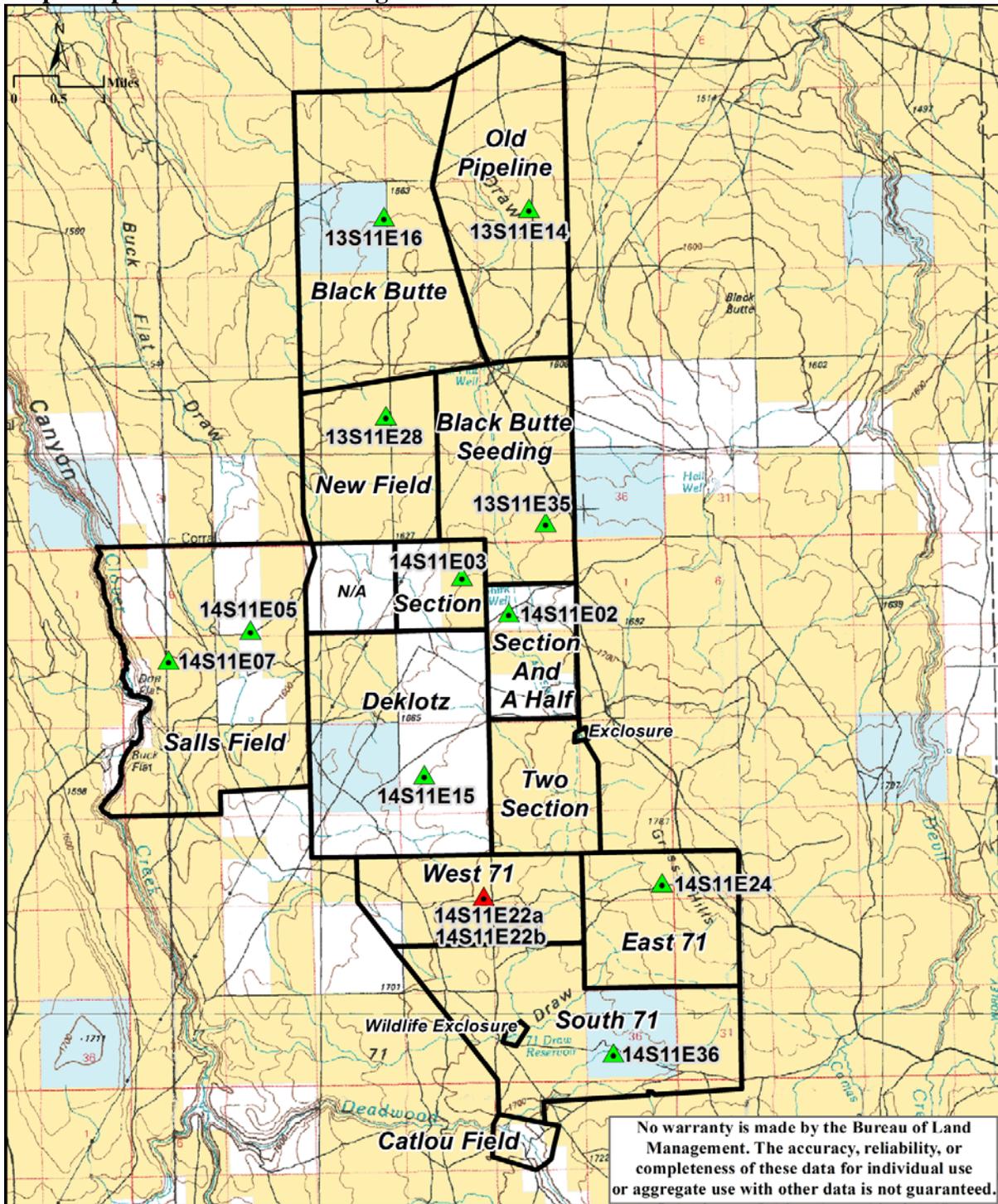
In 2006, BLM collected Ecological Site Inventory (ESI) data at ten sites in the Grassy Hills AMP Allotment (Map 4). All ten sites burned in the Murphy Complex Fire (2007). Three ESI sites were seeded as part of the Murphy Complex Fire Emergency Stabilization and Rehabilitation (ESR) plan. The other seven sites were left alone to recover naturally from the fire. Shrubs were present in all pastures where crews collected ESI data. ESI composition and production data are not used in this assessment since three of the sites were seeded after the fire altering the plant community composition. Data from the other seven sites are not used because comparing the 2006 data (significant sagebrush composition) to ESD reference condition is irrelevant to current post-fire plant composition (zero to little sagebrush composition).

#### **Upland Trend Data**

Upland trend plots are in eleven of the fourteen pastures in the Grassy Hills AMP Allotment (Map 7). All of the plots burned in the 2007 Murphy Complex Fire. Both nested plot frequency and 3x3 photo plots were read, except for one; two 3x3 photo plots were read at one site. Nested plot frequency records the frequency of plant species while plant cover is recorded at the 3x3 photo plots. All changes in plant frequency described below are statistically significant unless otherwise noted.

Factors limiting the comparison of trend data over time include: 1) data was not always collected at the same time of the year; 2) not all forbs were recorded by genus and species; 3) Annual forbs were not always noted; 4) microbiotic crusts were not always noted when the plots were established; 5) inconsistencies between persons reading the 3x3 photo plots over the years. Four sites are on state and private lands and are not discussed below. Trend data information can be reviewed at the Jarbidge Field Office.

**Map 7: Upland Trend Monitoring Sites**



### **Old Pipeline Pasture**

The Old Pipeline Pasture has one upland trend site (13S11E14) on a loamy 10-13” Wyoming big sagebrush (*Artemisia tridentata wyomingensis*)/bluebunch wheatgrass ecological site. The trend site was established in 1989. Both nested plot frequency and a 3x3 photo plot are at the site. The area is currently mapped as a Sandberg bluegrass plant community. Bluebunch wheatgrass and Thurber’s needlegrass also occur at the site.

### **Trend Site 13S11E14:**

The trend site burned in the 2007 Murphy Complex Fire. The area was seeded in 2007 with a Secar bluebunch wheatgrass seed mix. Sagebrush was also aerial seeded in strips in 2008 and sagebrush seedlings were hand planted in the general area in 2012. The area was mapped as a Wyoming big sagebrush/Sandberg bluegrass plant community prior to burning in 2007.

Nested plot frequency was initially read at Site 13S11E14 in 1989, with the 3x3 photo plot read for the first time in 1993. Data was collected in 1989, 1993, and 2013 (Table 16). Key species are Thurber’s needlegrass and bluebunch wheatgrass. The frequency of Thurber’s needlegrass declined substantially (46 percent to 14 percent) from 1989 to 2013. Sandberg bluegrass frequency also declined from 34 percent to 26 percent during this same time period. Western wheatgrass (*Pascopyrum smithii*) increased from 54 percent to 73 percent. Although not statistically measurable, bluebunch wheatgrass increased (19 to 24 percent) and squirreltail decreased (20 percent to 15 percent). Total forb frequency is static. Cheatgrass (*Bromus tectorum*) was noted in the plot in 2013 and was first documented as sparse during ESR monitoring in 2009. Changes in vegetation from 1989 to 2013 are displayed Photos 1 and 2.

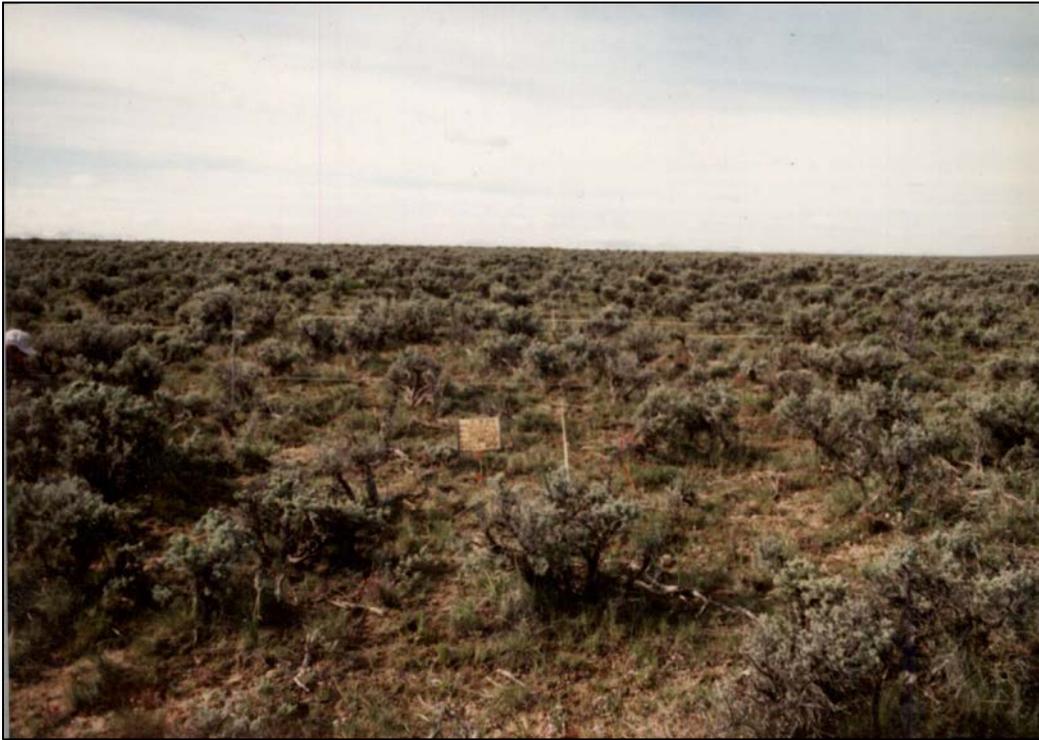
**Table 16: Frequency data from trend site 13S11E14 for Old Pipeline Pasture (1989, 1993 and 2013)**

| Species *             | Plot | Frequency |      |      |
|-----------------------|------|-----------|------|------|
|                       |      | 1989      | 1993 | 2013 |
| Thurber’s needlegrass | 2    | 46        | 51   | 14   |
| Bluebunch wheatgrass  | 4    | 19        | 20   | 24   |
| Sandberg bluegrass    | 1    | 34        | 23   | 26   |
| Western Wheatgrass    | 3    | 54        | 44   | 73   |
| Squirreltail          | 4    | 20        | 29   | 15   |
| Cheatgrass            | 4    | 0         | 0    | 21   |

\*Frequency for individual forb species not shown due to variability in plant identification among crews and timing of data collection.

The number of mature Thurber’s needlegrass rooted in the 3x3 photo plot declined substantially from 12 plants to 1 with its cover declining from 3.8 percent to 0.53 percent. Bluebunch wheatgrass cover increased from 0.7 percent to 3.5 percent. Western wheatgrass and Sandberg bluegrass increased slightly. Yellow rabbitbrush (*Chrysothamnus viscidiflorus*) was present in the plot in 2012 and photos show it as scattered throughout the site. Sagebrush was present in 1994 but is now absent with the site burning in the 2007 wildfire. Sagebrush was not noted in the ESR monitoring data in 2009; however, one sagebrush plant is present in the photo.

**Photo 1: 1989 Nested Plot Frequency Site 13S11E14, Old Pipeline Pasture**



**Photo 2: 2013 Nested Plot Frequency Site 13S11E14, Old Pipeline Pasture**



***Black Butte Seeding Pasture***

Upland trend site 13S11E35 is in the southern part of the Black Butte Seeding Pasture on a loamy 10-13” Wyoming big sagebrush/bluebunch wheatgrass ecological site. Prior to it burning, the vegetation at the site was mapped as crested wheatgrass/fourwing saltbush plant community. The trend site was established in 1989. Nested plot frequency and a 3x3 photo plot are at the site.

***Trend Site 13S11E35:***

The site has burned once (Murphy Complex Fire) since it was established. The area was seeded after the 2007 Murphy Complex Fire with a Secar bluebunch wheatgrass seed mix.

Nested plot frequency was read in 1989, 1993, and 2013 (Table 17). The 3x3 photo plot was read in 1993 and 2013. Crested wheatgrass and bluebunch wheatgrass are the key species. The frequency of crested wheatgrass remained similar throughout the study period. Bluebunch wheatgrass and Sandberg bluegrass have increased. An increase in the frequency of both species is likely the result of both plants being seeded in the area after the Murphy Complex Fire. Neither sagebrush nor cheatgrass was recorded at the site. The amount of bare ground has declined since 1989 while litter has increased. Further, microbiotic crusts were not reported in 1989, but were reported in 2013. Changes in vegetation from 1989 to 2013 are displayed in Photos 3 and 4.

**Table 17: Frequency data from trend site 13S11E35 for Black Butte Seeding Pasture (1989, 1993 and 2013)**

| Species *            | Plot | Frequency |      |      |
|----------------------|------|-----------|------|------|
|                      |      | 1989      | 1993 | 2013 |
| Crested wheatgrass   | 2    | 75        | 98   | 83   |
| Bluebunch wheatgrass | 4    | 6         | 0    | 18   |
| Sandberg bluegrass   | 1    | 32        | 27   | 66   |

\*Frequency for individual forb species not shown due to variability in plant identification among crews and timing of data collection.

The number of mature crested wheatgrass plants rooted in the 3x3 photo plot declined. However, bluebunch wheatgrass and Sandberg bluegrass plant numbers, as well as their percent cover, has increased. Perennial grass cover also increased in the 3x3 plot. Native vegetation is reestablishing in the area and at the site. This is most likely due to the success of the ESR drill seeding treatment. The herbaceous plant community is becoming more diverse and is no longer dominated by crested wheatgrass. Sagebrush was not measured at the site.

**Photo 3: 1989 Nested Plot Frequency Site 13S11E35, Black Butte Pasture**



**Photo 4: 2013 Nested Plot Frequency Site 13S11E35, Black Butte Pasture**



**New Field Pasture**

One upland trend site (13S11E28) is on a loamy 10-13”Wyoming big sagebrush/bluebunch wheatgrass ecological site in the New Field Pasture. The site was established in 1989. Both nested plot frequency and 3x3 photo plots are at the site.

***Trend Site 13S11E28:***

The trend site has burned once since 1989. It burned in the 2007 Murphy Complex Fire. Prior to burning the immediate area was mapped as a bluebunch wheatgrass plant community. The area was aerial seeded to sagebrush after the fire. A portion of the pasture immediately next to the trend site burned in 2000 and “concernable” amounts of cheatgrass was observed throughout the adjacent burn area in 2001 to 2003 (BLM ESR Closeout Summary, 2003).

Nested plot frequency was initially read in 1989. Data was collected in the 3x3 photo plot for the first time in 1994. The key species is bluebunch wheatgrass. Nested plot frequency was also collected in 1994, 2001, and 2012 (Table 18). Bluebunch wheatgrass frequency declined (37 percent to 25 percent) from 1989 to 2012. Squirreland also declined (20 percent to 6 percent) while Western wheatgrass (43 percent to 55 percent) and Sandberg bluegrass (24 percent to 55 percent) increased. Based on the data collected in 2001, bluebunch wheatgrass may have been mistakenly identified for Western wheatgrass. Cheatgrass was first recorded in the plots in 2001 and more than doubled by 2012 (23 percent to 51 percent). Sagebrush occurred on the site until it burned in 2007. Sagebrush was aerielly seeded in strips in 2008. A field visit to an ESR study site in 2009 noted that sagebrush seedlings were many. The total frequency of all forbs in 2012 did not change much from 1989. Vegetation changes from 1989 to 2012 are displayed in Photos 5 and 6.

**Table 18: Frequency data from trend site 13S11E28 for Black Butte Seeding Pasture (1989, 1994, 2001 and 2012)**

| Species *            | Plot | Frequency |      |      |      |
|----------------------|------|-----------|------|------|------|
|                      |      | 1989      | 1994 | 2001 | 2012 |
| Bluebunch wheatgrass | 4    | 37        | 30   | 76   | 25   |
| Squirreland          | 4    | 20        | 33   | 17   | 6    |
| Western Wheatgrass   | 2    | 43        | 50   | 1    | 55   |
| Sandberg bluegrass   | 1    | 24        | 15   | 32   | 55   |
| Cheatgrass           | 4    | 0         | 0    | 23   | 51   |
| Wyoming Sagebrush    | 4    | 54        | 62   | 44   | 0    |

\*Frequency for individual forb species not shown due to variability in plant identification among crews and timing of data collection.

The number of mature bluebunch wheatgrass rooted in the 3x3 photo plot increased from one to two plants with a corresponding increase in cover. Squirreland cover increased slightly while Sandberg bluegrass cover increased substantially from 1.5 percent to 16.1 percent. Following the 2007 wildfire, sagebrush cover declined to zero. Both plant cover and litter increased while bare ground decreased at the site. The increase in litter is likely a result of more cheatgrass present at

the site as well as increases in perennial grasses such as Sandberg bluegrass and Western wheatgrass.

**Photo 5: 1989 Nested Plot Frequency Site 13S11E28, New Field Pasture**



**Photo 6: 2012 Nested Plot Frequency Site 13 S11E28, New Field Pasture**



### East 71 Pasture

The East 71 Pasture has one upland trend site (14S11E24) on a little sagebrush (*Artemisia arbuscula*)/Idaho fescue 12-16" ecological site. The site is mapped as a Sandberg bluegrass plant community. Bluebunch wheatgrass and Idaho fescue are present at the site. The trend site was established 1989. Nested plot frequency and a 3x3 photo plot are set up at the site.

### **Trend Site 14S11E24:**

Since being established, the trend site burned once in the 2007 Murphy Complex Fire. Prior to it burning, the site was mapped as a bluebunch wheatgrass community. Other than sagebrush being aerial seeded in 2008, the area was left to recover naturally following the Murphy Complex Fire.

Nested plot frequency was initially read in 1989, and the 3x3 plot was read for the first time in 1992. Since 1989 nested plot frequency been read twice: 1994 and 2012 (Table 19). Key species are Idaho fescue and bluebunch wheatgrass. Over the years, the frequency of bluebunch wheatgrass plants has remained static while the frequency of Idaho fescue plants has increased (45 to 66 percent). The total frequency of all forbs in 2012 did not change much from 1989. Cheatgrass was first recorded at the site in 2012. However, it was recorded elsewhere in the pasture in 2008 during post-fire ESR monitoring. Several areas of the Grassy Hills AMP Allotment have burned since 2000, which has likely promoted the establishment of cheatgrass. Trend photos are not available for 1989; therefore, before and after pictures are not shown.

**Table 19: Frequency data from trend site 14S11E24 for East 71 Pasture (1989, 1994 and 2012)**

| Species *            | Plot | Frequency |      |      |
|----------------------|------|-----------|------|------|
|                      |      | 1989      | 1994 | 2012 |
| Idaho Fescue         | 3    | 45        | 60   | 66   |
| Bluebunch wheatgrass | 3    | 58        | 47   | 49   |
| Sandberg's bluegrass | 1    | 32        | 22   | 40   |
| Cheatgrass           | 4    | 0         | 0    | 34   |

\*Frequency for individual forb species not shown due to variability in plant identification among crews and timing of data collection.

Sagebrush was not recorded during any of the trend readings. The fire cycle expected for a little sagebrush/ Idaho fescue site is 80 to 100 years. Little sagebrush sites seldom burn (Tisdale and Hironaka, 1981) and when they do burn, little sagebrush is easily killed (Wright et al. 1979). It is not clear why sagebrush did not reestablish after the 1960 Grassy Hills Fire, but it does not appear that an available seed source was nearby. Sagebrush will likely take decades before providing cover expected for the ecological site.

The number of mature Idaho fescue plants rooted in the 3x3 photo plot increased by one (10 to 11). Cover provided by Idaho fescue declined from 7 percent to 3.9 percent. Sandberg bluegrass cover increased from 2.7 percent to 7.9 percent. Bluebunch wheatgrass, which was not recorded in the 3x3 photo plot in 1992, was recorded in 1994 and 2012. Twelve mature bluebunch wheatgrass were rooted in the plot in 2012 and provided 7.1 percent cover. Perennial grass cover doubled in the 3x3 plot (9.7 percent to 18 percent) from 1992 to 2012. In general, bare ground

has decreased as litter and perennial vegetation cover has increased. The increase in litter is likely due to increased perennial grass cover and to a lesser degree cheatgrass.

### **West 71 Pasture**

The West 71 Pasture has one upland trend site on a loamy 10–13” Wyoming big sagebrush/bluebunch wheatgrass ecological site. The site was established in 1970. Two 3x3 photo plots are at the site (14S11E22a and 14S11E22b). The 3x3 photo plots are next to each other. Data was collected at

the site on many occasions, with the last collection occurring in 2013. The area is mapped as a Sandberg bluegrass plant community. Bluebunch wheatgrass is also present on the site.

The trend site has burned once since it was established in 1970. It burned in the 2007 Murphy Complex Fire. It was drill seeded in 2007 to a Secar bluebunch wheatgrass seed mix. Sagebrush was also aerial seeded in strips in 2008. Prior to the fire, the area was mapped as a Wyoming big sagebrush/bluebunch wheatgrass plant community.

### ***3x3 Photo Plot 14S11E22a:***

The 3x3 photo plots were initially read in 1970. The key species is bluebunch wheatgrass. Mature bluebunch wheatgrass plants increased from six plants in 1970 to eight plants in 2013 in plot 14S11E22a. The number of Sandberg bluegrass plants also increased. Cheatgrass was first recorded in the plot in 2013. Sagebrush was scattered throughout the area in 1970. The site burned in the 1960 Grassy Hills Fire and sagebrush was reestablishing on the site in 1970. By 1993 three sagebrush plants were recorded in the plot. Sagebrush burned in the 2007 Murphy Complex Fire. As a result, sagebrush seed was flown on the area in 2008. Trace levels of sagebrush occur at the site. However, decades will likely be needed before sagebrush provides the amount of cover identified for the ecological site reference condition. Pictures displaying changes in vegetation between 1970 and 2013 are shown in Photos 7 and 8.

Photo 7: 1970 3x3 Photo Plot Site 14S11E22a, West 71 Pasture



Photo 8: 2013 3x3 Photo Plot Site 14S11E22a, West 71 Pasture



**3x3 Photo Plot 14S11E22b:**

Mature bluebunch wheatgrass plants increased from three plants in 1970 to seven plants in 2013 in plot 14S11E22b. Squirreltail was originally identified in the plot in 1970, but was not recorded in 1975 or afterwards. The number of Sandberg bluegrass has increased since 1970. In 1992, one sagebrush plant was recorded in the plot. Similarly, sagebrush burned in the 2007 Murphy Complex Fire and was aerial seeded in the area after the fire. Litter amounts are much higher in 2013 than any other year the plots were read. The amount of live vegetation cover has also increased due to the increased number of grass plants. Pictures displaying changes in vegetation between 1970 and 2013 are shown in Photos 9 and 10.

**Photo 9: 1970 3x3 Photo Plot Site 14S11E22b, West 71 Pasture**



**Photo 10: 2013 3x3 Photo Plot Site 14S11E22b, West 71 Pasture**



### **Section Pasture**

One upland trend plot (14S11E03) is on a loamy 10-13" Wyoming big sagebrush/bluebunch wheatgrass ecological site in the Section Pasture. The trend site was established in 1989. Both nested plot frequency and a 3x3 photo plot are at the site. Data was collected in 1989, 1993, and 2013. Current vegetation mapping shows the area as a Sandberg bluegrass plant community. Bluebunch wheatgrass is also found at the site.

### **Trend Site 14S11E03:**

The trend site has burned twice since being established in 1989. It burned in the 2000 Grass Fire and again in the 2007 Murphy Complex Fire. The area was aerial seeded after the 2000 Grass Fire with Wyoming big sagebrush, Western yarrow, Ladak alfalfa, small burnett (*Sanguisorba minor*), Eski sainfoin (*Onobrychis viciifolia*), and Lewis flax. ESR monitoring done from 2001 to 2003 showed that the aerial seeded forbs did not establish on the treated sites. Some success from the aerial seeding was noted with established sagebrush seedlings. However, these plants burned in the 2007 Murphy Complex Fire. After the 2007 fire, sagebrush seedlings were hand planted in the general area in 2008.

Nested plot frequency was initially read in 1989, and the 3x3 plot was read for the first time in 1993 (Table 20). Bluebunch wheatgrass is the key species at the site. The frequency of bluebunch wheatgrass increased from 1989 to 2013 (49 percent to 67 percent). However, Sandberg bluegrass and squirreltail declined. Total forb frequency remained static from 1989 to 2013. Cheatgrass was first noted in the plot in 2013. ESR monitoring during 2001 through 2003

noted that cheatgrass was found throughout the burn. Sagebrush was not recorded at the site in 1989 nor 2013. Vegetation changes between 1989 and 2013 are shown in Photos 11 and 12.

**Table 20: Frequency data from trend site 14S11E03 for the Section Pasture (1989, 1993, and 2013)**

| Species *            | Plot | Frequency |      |      |
|----------------------|------|-----------|------|------|
|                      |      | 1989      | 1993 | 2013 |
| Bluebunch Wheatgrass | 3    | 49        | 43   | 66   |
| Squirreltail         | 4    | 34        | 41   | 22   |
| Sandberg Bluegrass   | 1    | 57        | 56   | 35   |
| Cheatgrass           | 4    | 0         | 0    | 7    |
| Wyoming Sagebrush    | 4    | 0         | 16   | 0    |

\*Frequency for individual forb species not shown due to variability in plant identification among crews and timing of data collection.

The number of bluebunch wheatgrass rooted in the 3x3 photo plot declined from 18 to 14 plants from 1993 to 2013; however, the amount of bluebunch wheatgrass cover increased from 7.4 percent to 36.4 percent. Sandberg bluegrass cover slightly increased. Ground cover remained static during this timeframe. Overall bluebunch wheatgrass frequency and cover has increased over time at the site, while sagebrush cover is lacking due to recent fire activity in the allotment.

**Photo 11: 1989 Nested Plot Frequency Site 14S11E03, Section Pasture**



**Photo 12: 2013 Nested Plot Frequency Site 14S11E03, Section Pasture**



**Salls Field Pasture**

The Salls Field Pasture has one upland trend site (14S11E07) located on BLM lands. Another site was established on private land within the pasture. Data collected at this site is not analyzed in this assessment. Trend Site 14S11E07 is on a loamy 10-13" Wyoming big sagebrush/bluebunch wheatgrass ecological site. The site was established in 1989. Nested plot frequency and a 3x3 photo plot are at the site. Data was collected in 1989, 1995, and 2013. The area is mapped as a Sandberg bluegrass plant community. Bluebunch wheatgrass is also present at the site.

**Trend Site 14S11E07:**

The trend site burned in the 1999 Doe Flat Fire, the 2001 Doe Flat Fire, and the 2007 Murphy Complex Fire since being established in 1989. Following the 1999 Doe Flat Fire the area was drilled seeded with Secar bluebunch wheatgrass, thickspike wheatgrass (*Elymus lanceolatus*), and Eski sainfoin. It was also aerial seeded with Wyoming big sagebrush, small burnett, Western yarrow, and Lewis flax. The area was aerial seeded after the 2001 Doe Flat Fire with Spreader II alfalfa, Western yarrow, and Wyoming big sagebrush. Sagebrush seed was aerial seeded in 2008 after the Murphy Complex Fire. Pre-burn vegetation consisted of Wyoming big sagebrush and bluebunch wheatgrass plant community. ESR monitoring done to determine treatment success after the 2001 aerial seeding concluded that the forbs planted failed to establish and sagebrush establishment was spotty throughout the treated area. Cheatgrass was observed in minimal amounts. Sagebrush plants establishing after 2001 were burned in the 2007 Murphy Complex Fire.

Nested plot frequency was first read in 1989 and the 3x3 photo plot was initially read in 1995. Data was again collected in 1995 and 2013 (Table 21). The key species is bluebunch wheatgrass. The frequency of bluebunch wheatgrass in 2013 was the same as measured in 1989. Sandberg bluegrass remained static from 1989 to 2013. Thurber's needlegrass increased in frequency in 2013 as it was not recorded in 1989 and in 1995. Squirreltail frequency declined over time (51 to 10 percent). Grasses may have been misidentified explaining the sudden appearance of Thurber's needlegrass and dramatic decline of squirreltail. Cheatgrass was first recorded in the plot in 2013. Sagebrush was present, albeit at low frequencies, in 1989 and 1995, but was burned in the 2007 Murphy Complex Fire. Yellow rabbitbrush was also on record until 2013. Although it burned in 2007 and was not recorded in 2013 photos show it has re-sprouted and established after the Murphy Complex Fire. Changes in vegetation between 1989 and 2013 are shown in Photos 13 and 14.

**Table 21: Frequency data from trend site 14S11E07 for the Salls Field Pasture (1989, 1995, and 2013)**

| Species *             | Plot | Frequency |      |      |
|-----------------------|------|-----------|------|------|
|                       |      | 1989      | 1995 | 2013 |
| Bluebunch Wheatgrass  | 4    | 29        | 37   | 29   |
| Thurber's Needlegrass | 4    | 0         | 0    | 34   |
| Squirreltail          | 2    | 51        | 36   | 10   |
| Sandberg's Bluegrass  | 1    | 28        | 40   | 22   |
| Cheatgrass            | 4    | 0         | 0    | 27   |

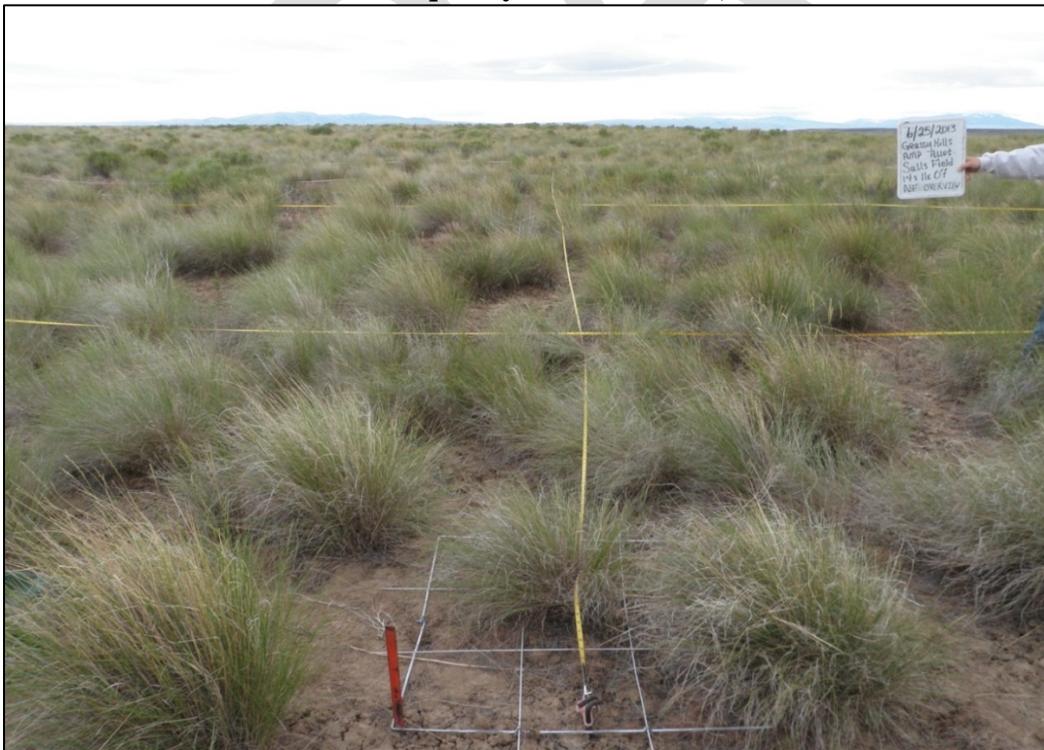
\*Frequency for individual forb species not shown due to variability in plant identification among crews and timing of data collection.

Four mature bluebunch wheatgrass plants were recorded in the 3x3 photo plot in 1995. In 2013 five Thurber's needlegrass were recorded, while bluebunch wheatgrass was not recorded. Based on the photographs it appears that bluebunch wheatgrass were likely misidentified as Thurber's needlegrass in 2013. Overall the number of perennial grass plants remained similar between 1995 and 2013. Live vegetation cover increased while bare ground decreased. Another reason contributing to a decline in bare ground is that microbiotic crusts were recorded in 2013 but not in 1995.

**Photo 13: 1989 Nested Plot Frequency Site 14S11E07, Salls Field Pasture**



**Photo 14: 2013 Nested Plot Frequency Site 14S11E07, Salls Field Pasture**



### **Trend Data Summary**

Recent fire activity, minimal utilization data, and a change in livestock permittees does not allow for an informed review of current management and its effects on plant communities, particularly trend, in the allotment. However some information regarding changes in plant communities can be extrapolated from the data. Since 2000, wildfires have eliminated sagebrush and its desired canopy cover from the allotment. Cheatgrass occurred in the upland trend sites after the 2000 and 2007 wildfires. However, despite wildfire the frequency and abundance of key species is static or has increased at most of the trend sites. Increases in bluebunch wheatgrass occurred at sites that were seeded after wildfire. The frequency of key species declined in the New Field and Old Pipeline Pastures. Upland trend data and summaries are available for review at the Jarbidge Field Office.

### **IDAHO RANGELAND HEALTH STANDARDS ASSESSMENT**

There are eight Rangeland Health Standards for BLM lands in Idaho. However, not all eight standards apply to the Grassy Hills AMP Allotment. This is due to variances in the allotment's land type, dominant vegetation types, and geographical area. Of the eight Idaho Standards for Rangeland Health, seven are applicable to the Grassy Hills AMP Allotment. Those that apply to the allotment are:

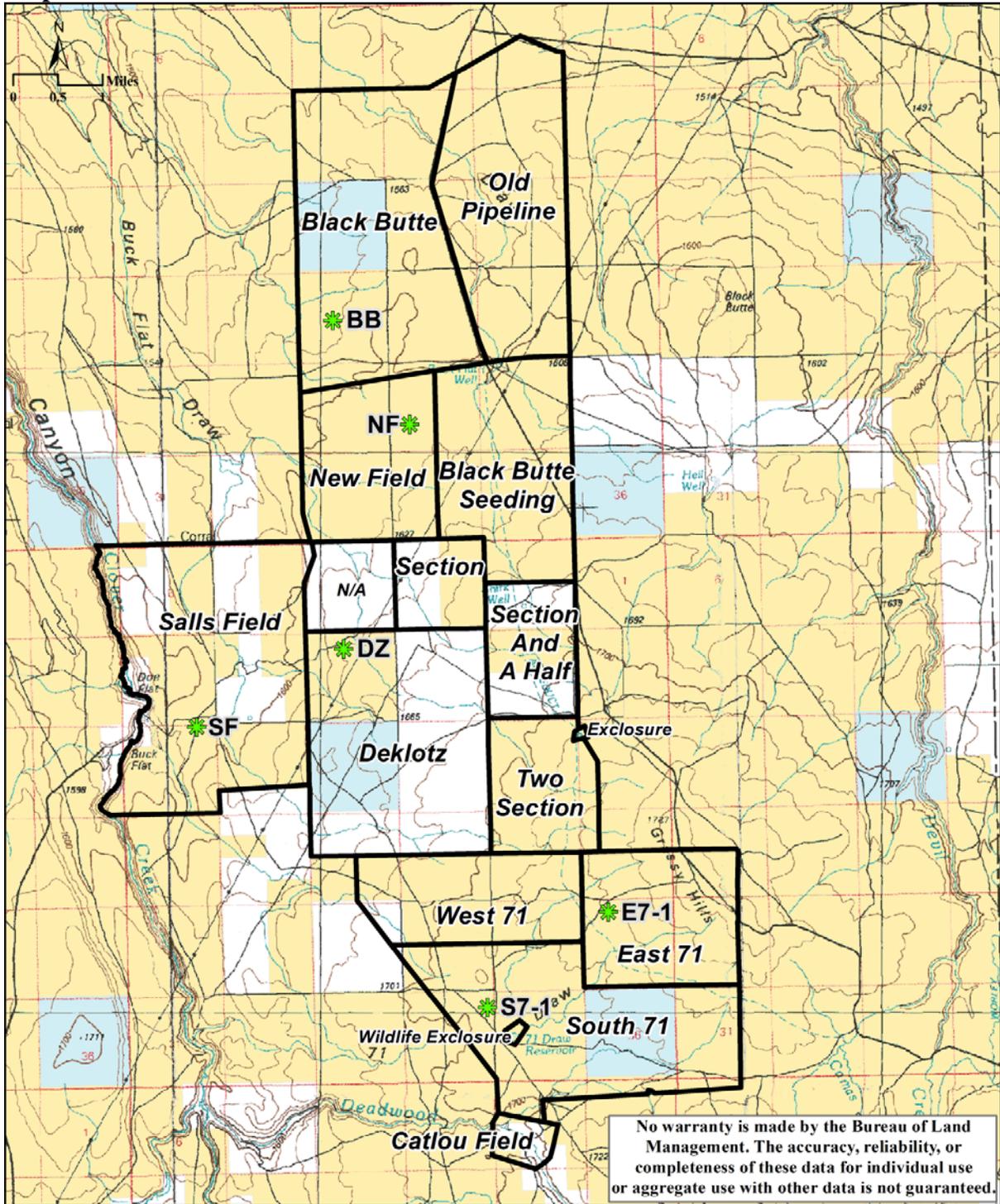
- **Standard 1** – Watersheds provide for the proper infiltration, retention, and release of water appropriate to soil type, hydrologic cycling, and energy flow.
- **Standard 2** – Riparian-wetland areas are in properly functioning condition appropriate to soil type, climate, geology, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.
- **Standard 3** – Stream channels and floodplains are properly functioning relative to the geomorphology (e.g. gradient, size, shape, roughness, confinement, and sinuosity) and climate to provide for proper nutrient cycling, hydrologic cycling, and energy flow.
- **Standard 4** - Healthy, productive, and diverse native animal habitat and populations of native plants are maintained or promoted as appropriate to soil type, climate, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.
- **Standard 5** – Rangelands seeded with mixtures, including predominately non-native plants, are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.
- **Standard 7** – Surface and ground water on public lands comply with the Idaho Water Quality Standards.
- **Standard 8** – Habitats are suitable to maintain viable populations of threatened and endangered, sensitive, and other special status species.

In 2004 an interdisciplinary (ID) team conducted Interpreting Indicators of Rangeland Health (IIRH) field evaluations of the Grassy Hills AMP Allotment. However, an evaluation to decide if the allotment was meeting the Idaho Standards for Rangeland Health was not finalized.

An ID team conducted IIRH field evaluations at six sites that are representative of the soil and vegetation resources in the Grassy Hills AMP Allotment in July, 2013. IIRH sites are in the Black Butte, Deklotz, East 71, New Field, Salls Field, and South 71 Pastures. The sites are in seeded native plant communities in the Black Butte, Deklotz, Salls Field, and South 71 Pastures and in native range in the New Field and East 71 Pastures. All six IIRH field evaluation sites are in the same area where HAF data (measures sage-grouse habitat quality) was collected (Map 8). HAF sites were randomly generated through a GIS process using criteria specific to sage-grouse habitat requirements (Appendix C). These sites are representative of the dominant plant communities found throughout the allotment.

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**Map 8: IIRH Sites**



Indicators of rangeland health were used to evaluate three rangeland health attributes: Soil and Site Stability, Hydrologic Function, and Biotic Integrity (Pellant et al., 2005). An IIRH sheet was completed at each site, photographs were taken, and plant species seen at the site were recorded. Field notes recorded at the site give more details helping to better describe the indicators and any resulting departures from the ecological site reference condition.

Vegetation cover data collected when the HAF was completed is used in the IIRH evaluation. Cover data was collected at the HAF sites using the line point intercept method (BLM, 2010). Because forbs are important to sage-grouse, the line point intercept method was augmented using Daubenmire frames. Forb species were recorded in a 7.9" by 19.7" (20 cm by 50 cm) Daubenmire frame placed at each point along the line intercept. This resulted in more comprehensive data on forb species diversity present than could be obtained by the line point intercept alone.

Natural Resource Conservation Service ecological site description (ESD) reference sheets are used to compare reference conditions to current plant and soil characteristics of the IIRH site and decide if ecological processes are functioning. The ESD describes the characteristics of the ecological site in its reference state as well as the transitional reference states that can occur on the site.

IIRH sites in the Black Butte, Deklotz, New Field, Salls Field, and South 71 Pastures are in the Loamy 10-13", Wyoming big sagebrush/bluebunch wheatgrass ecological site #R025XY019ID (NRCS, 2013a). The ESD describes the reference plant community for this ecological site as Wyoming big sagebrush in the overstory with bluebunch wheatgrass dominating the understory. Thurber's needlegrass, Sandberg bluegrass, squirreltail, and arrowleaf balsamroot (*Balsamorhiza sagittata*) are sub-dominant species. Other species in the plant community can include Indian ricegrass (*Achnatherum hymenoides*), foxtail wheatgrass (*Pseudelymus saxicola*) - a cross between squirreltail and bluebunch wheatgrass, Idaho fescue, longleaf phlox (*Phlox longifolia*), spiny phlox (*Phlox hoodii*), and yellow rabbitbrush (*C. viscidiflorus* var. *latifolius*). Natural fire frequency on the site is 50-70 years.

The site in the East 71 Pasture is in the shallow claypan 12-16", little sagebrush/Idaho fescue ecological site #R025XY010ID (NRCS, 2013b). The ESD describes the reference plant community for this ecological site being dominated by little sagebrush, Idaho fescue, and bluebunch wheatgrass. Other species in the plant community include Sandberg bluegrass, squirreltail, thickspike wheatgrass, arrowleaf balsamroot, and longleaf phlox. The natural fire frequency cycle on this site is 80-100 years.

Table 22 shows the indicator ratings for each IIRH site in the Grassy Hills AMP Allotment.

**Table 22: Summary of 17 Rangeland Health Indicators**

| Indicators  | Attributes   | Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s) |                     |                 |                    |                          |
|---|--|--|---------------------|-----------------|--------------------|--------------------------|
|   | S = Soil & Site Stability<br>H=Hydrologic Function<br>B = Biotic Integrity | Extreme  | Moderate to Extreme | Moderate        | Slight to Moderate | None to Slight           |
| 1. Rills  | S, H   |  |                     |                 |                    | BB, DZ, E71, NF, SF, S71 |
| 2. Water-flow Patterns  | S, H   |  |                     |                 |                    | BB, DZ, E71, NF, SF, S71 |
| 3. Pedestals and/or terracettes   | S, H   |  |                     |                 | NF                 | BB, DZ, E71, SF, S71     |
| 4. Bare ground  | S, H   |  |                     |                 |                    | BB, DZ, E71, NF, SF, S71 |
| 5. Gullies  | S, H   |  |                     |                 |                    | BB, DZ, E71, NF, SF, S71 |
| 6. Wind-scoured, blowouts, and/or deposition areas                        | S  |  |                     |                 |                    | BB, DZ, E71, NF, SF, S71 |
| 7. Litter movement  | S  |  |                     |                 |                    | BB, DZ, E71, NF, SF, S71 |
| 8. Soil surface resistance to erosion                                     | S, H, B  |  |                     |                 |                    | BB, DZ, E71, NF, SF, S71 |
| 9. Soil surface loss or degradation                                       | S, H, B  |  |                     |                 | NF                 | BB, DZ, E71, SF, S71     |
| 10. Plant community composition and distribution relative to infiltration | H  |  |                     |                 | DZ, NF             | BB, E71, SF, S71         |
| 11. Compaction layer  | S, H, B  |  |                     |                 |                    | BB, DZ, E71, NF, SF, S71 |
| 12. Functional/structural groups  | B  |  |                     |                 | DZ, NF             | BB, E71, SF, S71         |
| 13. Plant mortality/decadence   | B  |  |                     |                 |                    | BB, DZ, E71, NF, SF, S71 |
| 14. Litter amount   | H, B   |  | BB                  | DZ, NF, SF, S71 | E71                |                          |

| Indicators                                      | Attributes   | Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s) |                     |          |                    |                          |
|---|--|--|---------------------|----------|--------------------|--------------------------|
|   | S = Soil & Site Stability<br>H=Hydrologic Function<br>B = Biotic Integrity | Extreme  | Moderate to Extreme | Moderate | Slight to Moderate | None to Slight           |
| 15. Annual production                           | B  |  |                     |          |                    | BB, DZ, E71, NF, SF, S71 |
| 16. Invasive plants                             | B  |  |                     | E71,     | BB, DZ, NF, SF     | S71                      |
| 17. Reproductive capability of perennial plants | B  |  |                     |          |                    | BB, DZ, E71, NF, SF, S71 |

BB-Black Butte Pasture; DZ-Deklotz Pasture; E71-East 71 Pasture; NF-New Field Pasture; SF-Salls Field Pasture; S71-South 71 Pasture

Attribute departure ratings were determined by considering the preponderance of evidence of departure for the group of indicators related to each attribute (Pellant et al., 2005). Indicators showing departure from the ESD reference sheet can be more important or less important than those not departing based upon the effect of the departure on the ecological function of the site being evaluated. The ratings showing the degree of departure for the three attributes of rangeland health are in Table 23.

**Table 23: Rangeland Health Attribute Rating by Site**

| Rangeland Health Attribute | Degree of Departure |                     |          |                    |                          |
|----------------------------|---------------------|---------------------|----------|--------------------|--------------------------|
|                            | Extreme to Total    | Moderate to Extreme | Moderate | Slight to Moderate | None to Slight           |
| Soil and Site Stability    |                     |                     |          |                    | BB, DZ, NF, E71, SF, S71 |
| Hydrologic Function        |                     |                     |          | NF                 | BB, DZ, E71, SF, S71     |
| Biotic Integrity           |                     |                     |          | DZ, NF             | BB, E71, SF, S71         |

BB-Black Butte Pasture; DZ-Deklotz Pasture; E71-East 71 Pasture; NF-New Field Pasture; SF-Salls Field Pasture; S71-South 71 Pasture

### **Standard 1 (Watersheds)**

*Watersheds provide for the proper infiltration, retention, and release of water appropriate to soil type, vegetation, climate, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.*

### **Rangeland Health Assessment (All Pastures)**

Twelve indicators relating to the soil and site stability and hydrologic function attributes were rated for Standard 1 using the ESD reference sheet #R025XY019ID (loamy 10-13”) at five IIRH sites (BB, DZ, NF, SF, and S71). Site E71 was assessed using the ESD reference sheet

#R025XY010ID (shallow clay pan 12-16”). A range of values described in the ESD reference sheets were used to rate indicators #4, #8, and #14. The values for ESD #R025XY019ID are: 30 to 40 percent bare ground, 5 to 10 percent litter cover, and 4 to 6 soil stability test values (scale of 1 to 6; Pellant et al., 2005). Values for ESD #R025XY010ID are: 40 to 50 percent bare ground and 3 to 5 soil stability test values. More data is needed to determine litter cover, but it should be low and at shallow depths. Ground cover collected during HAF monitoring is used (uppermost canopy cover data) to rate watershed attributes. Except for IIRH Site DZ, ground cover at each site is shown in Table 24. Cover data was not collected at IIRH Site DZ (Deklotz Pasture).

**Table 24: Percent Ground Cover at IIRH Sites**

| Cover Types       | Percent Cover                       |                                   |                                     |                                  |                                  |
|-------------------|-------------------------------------|-----------------------------------|-------------------------------------|----------------------------------|----------------------------------|
|                   | Site BB<br>(Black Butte<br>Pasture) | Site NF<br>(New Field<br>Pasture) | Site SF<br>(Salls Field<br>Pasture) | Site E71<br>(East 71<br>Pasture) | Site S71<br>(South71<br>Pasture) |
| Perennial Grasses | 29.0                                | 36.5                              | 44.0                                | 33.0                             | 36.0                             |
| Annual Grasses    | 2.5                                 | 0.5                               | 3.0                                 | 6.0                              | 0.0                              |
| Perennial Forbs   | 6.0                                 | 1.5                               | 2.0                                 | 7.5                              | 7.0                              |
| Annual Forbs      | 0.5                                 | 0.0                               | 5.0                                 | 0.5                              | 5.0                              |
| Shrubs            | 0.0                                 | 0.0                               | 1.0                                 | 1.5                              | 4.0                              |
| Biological Crusts | 2.5                                 | 1.0                               | 17.0                                | 5.5                              | 4.0                              |
| Litter            | 35.0                                | 36.0                              | 8.0                                 | 23.0                             | 21.0                             |
| Rock              | 0.0                                 | 0.0                               | 1.0                                 | 4.5                              | 4.0                              |
| Bare Ground       | 24.5                                | 24.5                              | 19.0                                | 18.5                             | 19.0                             |
| <b>Total</b>      | <b>100</b>                          | <b>100</b>                        | <b>100</b>                          | <b>100</b>                       | <b>100</b>                       |

The amount of bare ground recorded in the cover transect at Site E71 was 18.5 percent, well below the ESD range of 40 to 50 percent. The amount of bare ground recorded at the remaining sites ranged from 19 to 24.5 percent; again well below the ESD range of 30 to 40 percent.

Litter amounts for rating indicator 14 included both detached and standing litter. Cover data collected in the allotment show that litter values ranged from 8 to 36 percent. Except for Site SF, litter amounts were greater than identified for reference conditions (5 to 10 percent). However, litter doesn't seem to affect watershed health as shown by vigorous plant growth and production.

Multiple soil series exist in the Grassy Hills AMP Allotment. Soils are typically silt loams. The Soil Survey Geographic Database, also known as SSURGO (NRCS, 2012), shows that 87 percent of the allotment has a moderate wind erosion hazard and 13 percent has a non-erosional wind erosion factor. In addition, the soil survey shows that 75 percent of the allotment has a high water erosion factor and 25 percent has a medium water erosion factor. Although the soil survey shows potential for both wind and water erosion, no indications of soil loss or active erosion were observed at five of the six sites during the 2013 IIRH field visits.

Two indicators relating to the soil and site stability attribute departed from the ESD reference condition. At IIRH Site NF (New Field Pasture), plant pedestals were present resulting in a “slight to moderate” deviation from indicators #3 (pedestals and/or terracettes) and #9 (soil loss or degradation). Although present, pedestals do not seem active at this time. Pedestalling was

also observed in the New Field Pasture during the 2004 IIRH field assessments. The ID team noted in 2004 that pedestals appeared historic. Pedestals had microbiotic crusts on them indicating they had been inactive for some time. A soil stability test was completed at IIRH Sites NF (New Field Pasture) and S71 (South 71 Pasture). The average soil stability value for both sites is 4.6, indicating adequate soil surface resistance to erosion (Photos 15 and 16).

**Photo 15: Soil Profile in the New Field Pasture**



**Photo 16: Soil Profile in the South 71 Pasture showing high soil integrity**



Four indicators relating to the hydrologic function attribute departed from the ESD reference condition. The indicator for plant community composition and distribution relative to infiltration (#10) rated as a “slight to moderate” departure at sites DZ (Deklotz Pasture) and NF (New Field Pasture). The departure was primarily due to the lack of shrubs at these sites. Both shallow and deep rooted grasses were present at both sites and appeared to provide for infiltration and nutrient cycling at these sites based on plant growth, seed stalks, and overall production expected at the site. In 2004, the ID team also rated this indicator as a “slight to moderate” deviation in the New Field Pasture, partly due to the lack of shrubs, reduced bunchgrasses, and annual grasses and forbs present. It should be noted that the evaluations completed in the New Field Pasture in 2004 and 2013 were not done at the same site.

Litter amounts deviated from the ESD at all the IIRH sites. Departures ranged from ‘slight to moderate’ to ‘moderate to extreme’. Although litter amounts were high, it is not inhibiting plant growth or production.

Considering the preponderance of information described above, the rangeland health attributes related to Standard 1 (soil and site stability and hydrologic function) rated a “none to slight” departure at all the IIRH sites except for IIRH Site NF. The “none to slight” rating is due to the fact that most of the departures are a result of natural disturbance (Murphy Complex Fire). The departures are also within the natural variance described in Reference State 1 of the ESD Reference Sheets. ESD Reference State 1.4 (#R025XY010ID) for the 10-13” Wyoming big sagebrush/bluebunch wheatgrass site is a post fire–grass dominated site. Bluebunch wheatgrass

dominates the plant community in the post fire reference state. Sandberg bluegrass and other perennial grasses and forbs are subdominant.

ESD Reference State 1.3 (R025XY019ID) for the little sagebrush/Idaho fescue site is a bluebunch wheatgrass/Sandberg bluegrass dominated site. Some cheatgrass is described as invading both sites following wildfires. In time, shrubs, specifically Wyoming big and little sagebrush, are expected to reestablish in the allotment.

The Hydrologic Function attribute rated a “slight to moderate” departure at Site NF. The reason for this rating is largely due to historic pedestals that resulted from past soil surface loss. As stated above, pedestals did not appear to be active at this time.

### **Evaluation of Standard 1**

The rangeland health assessment in 2013 determined most of the indicators related to Standard 1 were rated as a “none to slight” departure from ESD reference condition. The plant community composition and distribution relative to the infiltration and runoff indicator rated “slight to moderate” at two IIRH sites due to lack of shrub regeneration. Except for 68 acres, almost the entire Grassy Hills AMP Allotment was burned in the 2007 Murphy Complex Fire. This fire removed most shrubs in the allotment. Shrubs are important to range sites as they trap snow which can increase infiltration. While sagebrush was reduced because of wildfire, some rabbitbrush is present. Although total shrub cover has been reduced across the allotment, perennial grass species appeared vigorous and are producing seedheads suggesting that reduced shrub cover is not negatively affecting water infiltration nor nutrient cycling to the point of reducing perennial grass vigor or its reproductive capability.

Litter cover (ranged from 23 to 36 percent) ratings ranged from “slight to moderate” to “moderate to extreme”. While the litter amount indicator ratings deviated from reference condition, increased litter amounts are not negatively affecting the area based on plant vigor at the site. The litter amount was also not the result of invasive annual grass, as very little cheatgrass was observed at most of the sites.

Pedestals were at Site NF and appeared inactive. Pedestals were also present at the 2004 IIRH site in the New Field Pasture and were also noted as not active, hence, most pedestals seen at the site is likely historic. There were some signs of past soil surface loss or degradation due to the pedestals around perennial plants. Soil loss to wind erosion after the 2007 fires likely contributed to the pedestalling. Although pedestals were inactive, the extent of past pedestals and resulting soil loss resulted in indicators #3 and #9 being rated as a departure from the ESD reference condition.

Most of the sagebrush in the Grassy Hills AMP Allotment burned in the 2007 Murphy Complex Fire. During the IIRH site visits sagebrush seedlings were observed at most the sites. However, there was very little sign of shrubs reestablishing in the Deklotz and New Field Pastures. As a result, the plant community composition and distribution relative to the infiltration indicator at sites DZ and NF were rated a slight to moderate departure. While sagebrush cover has been reduced throughout these pastures, perennial grass species appeared vigorous and were

producing seed heads, suggesting that reduced shrub cover is not negatively affecting plant growth or plant reproduction.

***Evaluation Finding – Grassy Hills AMP Allotment is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

Data collected during the RHA field assessments show ground cover in the Grassy Hills AMP Allotment is sufficient for soil stability and hydrologic function. Evidence of accelerated erosion, such as active rills, gullies, flow patterns, etc., was not present. Pedestals were in one pasture, but pedestals appear to be inactive and are a result of past influences (2004 RHA data). Topography is relatively flat, reducing risk for accelerated soil erosion. Infiltration, retention and release or water processes relative to soil, vegetation, climate and landform appear to be providing for appropriate nutrient and hydrologic cycling and energy flow.

**Standard 2 (Riparian Areas & Wetlands)**

*Riparian-wetland areas are in properly functioning condition appropriate to soil type, climate, geology, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.*

**Rangeland Health Assessment**

Two streams and several reservoirs and ponds occur in the Grassy Hills AMP Allotment. The two streams are Clover Creek which flows through the Salls Field Pasture and Deadwood Creek which flows through the Catlou Field Pasture. These streams are discussed separately by pasture. Other streams in the allotment are ephemeral. Ephemeral streams only flow in direct response to precipitation and are above the water table throughout the year (BLM, 1998).

Aikers, 71 Draw, Grassy Hills, and Shirk Reservoirs, as well as several unnamed reservoirs also occur in the allotment. The 71 Draw Reservoir was fenced in the late 1980's and managed as an enclosure to enhance wetland and wildlife values. Some cattle use has occurred in the past due to fencing issues. However, a recent inspection of the fence found it adequate to prevent cattle from accessing the pond. An evaluation (BLM, 2003) was conducted on this lentic area in 2007, and the wetland associated with the reservoir was functioning as designed. As the reservoirs are of artificial origin, they along with the ephemeral streams were not assessed in this evaluation.

**Salls Field Pasture**

Clover Creek flows along a portion of the western boundary of the allotment. North of the private land at Salls Crossing, gap fences and cliffs associated with Clover Creek Canyon prevent livestock access on BLM lands. However, livestock can access Clover Creek on private land, if the gate is left open. Standard 2 was not assessed for Clover Creek.

**Catlou Field Pasture**

A short reach (< 400 feet) of Deadwood Creek flows through BLM land in the Catlou Field Pasture. The creek feeds a man-made pond dug in the stream channel at the western edge of the pasture. Proper Functioning Condition (PFC) assessments (BLM 1998) were done on this section of Deadwood Creek in 1999, 2006, and 2014. The stream reach (3.0 to 4.2) evaluated also included 1.1 mile of Deadwood Creek in an adjoining allotment. The PFC assessment is a broad-scale assessment that uses hydrology, vegetation, and erosion/deposition (soil) attributes and processes to qualitatively assess riparian health. The PFC assessments include one of the following ratings: properly functioning condition (PFC), functioning at risk with an upward trend (FAR-UP), functioning at risk with no apparent trend (FAR-NA), functioning at risk with a downward trend (FAR-DN), and non-functioning (NF).

The most recent PFC assessment rated Deadwood Creek (approx. 400 feet of Reach 3.0-4.2) at PFC. In 1999 several of the vegetation indicators used to assess the riparian area were underrepresented along the stream (Table 25). However, in 2006 and 2014 a diverse composition and age class distribution of riparian vegetation was present within the stream reach changing the ratings from "not appropriate" to "appropriate". Riparian vegetation was vigorous and able to protect streambanks during high water flow events.

**Table 25: PFC Assessment Vegetation Indicators for Deadwood Creek, reach 3.0-4.2 by year.**

| Vegetation Indicators   | Assessment Response |      |      |
|---|---------------------|------|------|
|   | 1999                | 2006 | 2014 |
| There is a diverse age class distribution of riparian-wetland vegetation (recruitment for maintenance and recovery) (6)                           | No                  | Yes  | Yes  |
| There is a diverse composition of riparian-wetland vegetation (for maintenance/recovery) (7)  | Yes                 | Yes  | Yes  |
| Species present indicate maintenance of riparian-wetland soil moisture characteristics (8)  | Yes                 | Yes  | Yes  |
| Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-stream flow events (9) | No                  | Yes  | Yes  |
| Riparian plants exhibit high vigor (10)   | No                  | Yes  | Yes  |
| Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows (11)                                | No                  | Yes  | Yes  |
| Plant communities in the riparian area are an adequate source of coarse and/or large woody material (for maintenance/recovery) (12)               | N/A                 | N/A  | Yes  |

**Evaluation of Standard 2**

Deadwood Creek has intermittent flow and is highly influenced by a water diversion and water withdrawal upstream of the allotment on private property. During the growing season, Deadwood Creek is diverted for private land irrigation. Most of the water is diverted into a canal to Cedar Creek Reservoir. The remainder of the water is diverted to irrigate private meadows below the canal and upstream of the allotment. As a result, the portion of Deadwood Creek flowing through the allotment has water for a limited time in the winter and for a short period during spring run-off. Despite the water diversion, riparian vegetation along this portion of the

stream reach has improved. Willows are vigorous and are fifteen to twenty feet tall. However, the width of the riparian zone is narrow due to limited water flows. As a result upland plants species have encroached into the channel and herbaceous riparian species such as sedges are in localized areas. In addition, Canada thistle was found throughout the reach.

In 1999 four of the vegetation indicators were not functioning as expected. However, in 2006 and 2014 all the vegetation indicators were appropriate for Deadwood Creek given the water withdrawals upstream.

The Catlou Field Pasture is primarily used as a holding field by the Grassy Hills AMP permittee. The field is mostly used during the summer and fall. Grazing in this pasture occurred in 2005, 2006, and 2010, other than being used as a holding field. Utilization data was not collected during the ten-year study period.

***Evaluation Finding – Catlou Field Pasture is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

The most recent evaluation (2014) determined the stream reach of Deadwood Creek in the Catlou Field Pasture is in properly functioning condition. Willows are numerous and vigorous. Riparian species are diverse and there are multiple age classes of riparian vegetation. However, herbaceous riparian vegetation such as sedges is limited due to water withdrawals upstream. Overall, riparian vegetation has improved and is adequate to stabilize banks during high stream flows; therefore, the portion of Deadwood Creek in the Catlou Field Pasture is meeting Standard 2.

**Standard 3 (Stream Channel & Floodplain)**

*Stream channels and floodplains are properly functioning relative to the geomorphology (e.g. gradient, size, shape, roughness, confinement, and sinuosity) and climate to provide for proper nutrient cycling, hydrologic cycling, and energy flow.*

**Rangeland Health Assessment**

Standard 3 was not evaluated for Clover Creek (Salls Field Pasture), ephemeral streams, or reservoirs for the same reasons as discussed under Standard 2.

**Catlou Field Pasture**

PFC assessments were done in 1999, 2006, and 2014. The most recent PFC assessment (2014) rated the stream reach (400 feet) of Deadwood Creek at PFC. There were attributes that were not functioning appropriate each year an assessment was done (Table 26).

In 1999, five of the hydrology and erosion/deposition components were not functioning appropriately for the entire stream reach (1.2 miles). Four of the components were not functioning properly in 2006 and 2014. There was evidence of a few inactive beaver dams where the dam failed. Multiple channels were present, which would be expected for a stream with

beaver activity. There was also excessive amounts of sediment present in the stream channel. The amount of sediment is likely a result of historic beaver dams and stream bank disturbance. More woody vegetation, primarily willows species, has established since 1999. Woody vegetation combined with the improved floodplain development and pre-existing large angular substrate has enabled the stream to dissipate stream energy during high water flows. Considering the water diversions occurring upstream from the allotment, the 400 feet of Deadwood Creek that flows through the Catlou Field Pasture is functioning appropriately.

**Table 26: PFC Assessment Hydrology and Erosion/Deposition Indicators for Deadwood Creek, reach 3.0-4.2 by year.**

| Hydrology and Erosion/Deposition Indicators  | Assessment Response |      |      |
|--|---------------------|------|------|
|  | 1999                | 2006 | 2014 |
| Floodplain above bank-full inundated in "relatively frequently" events (1-3 years) (1)   | Yes                 | Yes  | Yes  |
| Active/stable beaver dams, where present (2)   | N/A                 | No   | No   |
| Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region) (3)     | No                  | No   | Yes  |
| Riparian zone is widening or has achieved potential extent (4)   | Yes                 | Yes  | No   |
| Upland watershed is not contributing to riparian-wetland degradation (5)   | No                  | Yes  | No   |
| Floodplain and channel characteristics (i.e. rocks, overflow channels, coarse and/or large woody debris) are adequate to dissipate energy (13) | No                  | Yes  | Yes  |
| Point bars are revegetating with riparian-wetland vegetation (14)  | Yes                 | Yes  | N/A  |
| Lateral stream movement is associated with natural sinuosity (15)  | No                  | No   | Yes  |
| System is vertically stable (16)   | Unknown             | Yes  | Yes  |
| Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion and deposition) (17)              | No                  | No   | No   |

### Evaluation of Standard 3

Deadwood Creek has intermittent flow because of the water diversion and water withdrawals upstream of the allotment. Stream characteristics and potential are highly influenced by the reduced water flows. All or most of the water is diverted to irrigate meadows or into a canal transporting water to Cedar Creek Reservoir for irrigation. Streamflow occurs in the winter and for a short period during spring run-off. Overall the floodplain and channel functions are adequate along this portion of the stream, considering the water diversions occurring upstream of the allotment. The portion of Deadwood Creek in the Catlou Field Pasture can adequately dissipate stream energy, capture sediment, and maintain stable banks with deep rooted hydric vegetation.

#### *Evaluation Finding – Catlou Field Pasture is:*

- Meeting the Standard  
 Not meeting the Standard, but making significant progress towards meeting  
 Not meeting the Standard

#### *Rationale for Evaluation Finding*

The stream reach supports riparian vegetation in the floodplain and is maintaining channel characteristics consistent for a stream with beaver dams and regulated waterflows. Considering

the water diversions occurring upstream from the allotment, the 400 feet of Deadwood Creek that flows through the Catlou Field Pasture is meeting Standard 2.

**Standard 4 (Native Plant Communities)**

*Healthy, productive, and diverse native animal habitat and populations of native plants are maintained or promoted as appropriate to soil type, climate, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.*

Pastures assessed under Standard 4 are the New Field, East 71, Black Butte Seeding, Section, and Catlou Field Pasture. HAF cover data (2012 and 2013) as well as 2006 ESI production cover data is used to evaluate Standard 4. Each IIRH site and its representative pastures is discussed separately.

**Rangeland Health Assessment**

**New Field Pasture**

**IIRH Site NF**

IIRH Site NF is in a native plant community in the New Field Pasture. The site has burned twice since 1960: 1973 Horse Butte Fire and 2007 Murphy Complex Fire. The IIRH site is in the same place as a 2012 HAF site. Cover data was also collected at an ESI site in the pasture in 2006. The 2012 HAF cover data and 2006 ESI cover data (ESI Site RA-7A) are used to evaluate Standard 4 in the New Field Pasture (Table 27).

**Table 27: Vegetation Cover (IIRH/HAF Site and ESI Site RA-7A Production data)**

| Vegetation Class        | Species                | Percent Cover            |                        |
|-------------------------|------------------------|--------------------------|------------------------|
|                         |                        | 2012<br>IIRH/HAF Site NF | 2006<br>ESI Site RA-7A |
| Perennial Grasses       | Bluebunch Wheatgrass   | 1.5                      | 0.7                    |
|                         | Squirreltail           | 1.5                      | 0                      |
|                         | Sandberg Bluegrass     | 26                       | 15.3                   |
|                         | Western Wheatgrass     | 7.5                      | 0.7                    |
| Annual Grasses          | Cheatgrass             | 0.5                      | 1.3                    |
| Perennial Forbs         | Longleaf Phlox         | 1                        | 0                      |
| Annual Forbs            | Tall Annual Willowherb | 0.5                      | 0.7                    |
| Shrubs                  | None                   | 0                        | 0                      |
| <b>Vegetation Total</b> |                        | <b>38.5</b>              | <b>18.7</b>            |
| Other Cover             | Microbiotic Crust      | 1.0                      | 2.7                    |
|                         | Litter                 | 36                       | 10.7                   |

Native grasses provide the dominant plant cover at both the sites (36.5 percent, 16.7 percent). Sandberg bluegrass provides the most cover (26 percent, 15.3 percent), followed by Western wheatgrass (7.5 percent, 0.7 percent) and bluebunch wheatgrass (1.5 percent, 0.7 percent). Two perennial forbs were also recorded along the HAF transect as well as a small amount of cheatgrass cover (0.5 percent). Cheatgrass cover (1.3 percent) was also measured at the ESI site. Shrubs were not found along either transect. Noxious weed species were not observed during the IIRH field visit. Other vegetation observed at the IIRH site, but not recorded in the HAF cover transect included ten perennial forb species, rubber rabbitbrush (*Chrysothamnus nauseosus*) and

a few Wyoming big sagebrush plants (Appendix B). Annual forbs were also present outside of the cover transect. Biotic crusts were also present in both years. Lower amounts of biotic crust in 2012 are likely a result of the 2007 Murphy Complex Fire. A picture of the IIRH site is shown in Photo 17.

**Photo 17: 2013 IIRH Site NF (New Field Pasture)**



Cheatgrass was recorded at both the IIRH site and ESI site. It contributed minimal cover along both transects. Cheatgrass was more prominent outside of the HAF cover transect at the IIRH site, especially in more disturbed areas (rodent burrows and along a power line). Therefore, the indicator for invasive plants rated a “slight to moderate” deviation from the ESD reference condition.

The functional/structural group indicator was also rated as a “slight to moderate” departure at the IIRH site mostly due to the lack of shrubs in the area, as well as reduced amounts of deep-rooted bunchgrasses. Cover data at the ESI site also shows a reduced amount of deep-rooted bunchgrasses. Sandberg bluegrass provides most of the vegetation cover at both sites.

Pedestals were present at the IIRH site indicating a loss of soil likely occurred at some point in the past. Pedestals appeared inactive and there are no other signs of accelerated erosion occurring at the site. Litter amounts exceeded that shown in the ESD reference sheet. All the other indicators of biotic integrity rated as “none to slight” departure.

Based on the preponderance of information, the Biotic Integrity attribute rated “slight to moderate” departure from the ESD reference condition. This rating was given due to evidence of

past erosion, reduced amounts of shrubs and deep-rooted grasses, an increased amount of litter, and invasive and noxious species present.

***East 71, Black Butte Seeding, Section, and Catlou Field Pastures  
IIRH Site E71. Shallow Claypan 12-16”***

IIRH Site E71 is in the East 71 Pasture in a Sandberg bluegrass vegetation community. The IIRH site is also representative of the plant communities in the Black Butte Seeding, Section, and Catlou Field Pastures. An ESI Site (RA-102a) is also in the East 71 Pasture in native range. The IIRH site has burned three times since 1960: 1960 Grassy Hills Fire, 2000 Grass Fire, and 2007 Murphy Complex Fire. The ESI site burned twice: Grassy Hills and Murphy Complex Fires. Neither areas are seeded due to a large amount of rock in the soil; however, the IIRH site is surrounded by a Secar bluebunch wheatgrass seeding. Vegetation cover (2012 HAF and 2006 Production Data) is in Table 28.

**Table 28: Vegetation Cover (IIRH Site E71 HAF data and ESI Site RA-102a Cover Data)**

| Vegetation Class        | Species                | Percent Cover         |                          |
|-------------------------|------------------------|-----------------------|--------------------------|
|                         |                        | 2012<br>IIRH Site E71 | 2006<br>ESI Site RA-102a |
| Perennial Grasses       | Sandberg Bluegrass     | 20.5                  | 12                       |
|                         | Bluebunch Wheatgrass   | 8                     | 13.3                     |
|                         | Idaho Fescue           | 4                     | 5.3                      |
|                         | Squirreltail           | 0                     | 1.3                      |
|                         | Basin Wildrye          | 0.5                   | 0                        |
| Annual Grasses          | Six-weeks Fescue       | 3.5                   | 0                        |
|                         | Cheatgrass             | 2.5                   | 2                        |
| Perennial Forbs         | Longleaf Phlox         | 3                     | 0.7                      |
|                         | Shaggy Fleabane        | 2                     | 0.7                      |
|                         | Lupine                 | 1                     | 0.7                      |
|                         | Desert Parsley         | 0.5                   | 0                        |
|                         | Pale Agoseris          | 0.5                   | 0.7                      |
|                         | Hooker’s Balsamroot    | 0.5                   | 0                        |
| Annual Forbs            | Western Tansymustard   | 0.5                   | 0                        |
|                         | Tall Annual Willowherb | 0                     | 2                        |
| Shrubs                  | Yellow Rabbitbrush     | 1.5                   | 1.3                      |
|                         | Little Sagebrush       | 0                     | 1.3                      |
|                         | Wyoming Big Sagebrush  | 0                     | 0.7                      |
| <b>Vegetation Total</b> |                        | <b>48.5</b>           | <b>42.0</b>              |
| Other Cover             | Biotic Crusts          | 5.5                   | 4.7                      |
|                         | Total Litter           | 23                    | 31.4                     |

Sandberg bluegrass provides the most plant cover (21 percent) followed by bluebunch wheatgrass (8 percent) at the IIRH site. Yellow rabbitbrush was recorded at 1.5 percent cover. Six perennial forb species were recorded and provided 7.5 percent of the cover. Cheatgrass was also present at 2.5 percent cover. Other plant species observed at the IIRH site, outside of the cover transect includes 8 perennial grasses, 1 annual grass, 19 perennial forbs, 13 annual forbs,

and 2 shrubs (Appendix B). The two shrubs noted at the site are Wyoming big sagebrush and yellow rabbitbrush. Photo 18 shows IIRH Site E71.

**Photo 18: 2013 IIRH Site E71 (East 71 Pasture)**



Bluebunch wheatgrass provided the most cover (13.3 percent) at the ESI site followed by Sandberg bluegrass (12 percent). Shrubs recorded along the cover transect included little sagebrush, yellow rabbitbrush, and Wyoming big sagebrush. Several forbs were recorded at both sites as well as microbiotic crusts.

Two indicators of rangeland health were identified as deviating from the ESD reference condition at the IIRH site: litter amounts and invasive plants. The indicator for litter amount rated a “slight to moderate” departure. Litter amounts were higher than described for the ESD reference condition. Litter amounts were also high at the ESI site.

The invasive plants indicator rated a “moderate” departure. Scattered amounts of invasive plants (cheatgrass, curvseed butterwort, tall tumbled mustard) were observed and noted in the IIRH field notes. Field notes describe these plants as being found in small areas and their presence was largely associated with disturbed areas. Cheatgrass was also recorded in both the HAF and ESI cover transects. Noxious weeds were not noted at either site. All other indicators related to the Biotic Integrity attribute rated “none to slight”.

The biotic integrity attribute rated a “none to slight” departure from reference condition. Invasive plants, such as cheatgrass, are present; however, they occupy small niches in the landscape, with most plants being at disturbed sites (i.e. rodent burrows). Ground cover appears sufficient

(plants, biotic crusts, and rocks) to keep invasive plants from expanding at the site. Although litter and functional/structural groups rated “slight to moderate”, their departure is not influencing the biotic integrity of the site (e.g. plant vigor and reproduction are not impaired).

#### **Evaluation of Standard 4**

##### ***New Field Pasture***

IIRH Site NF and ESI Site RA-7a have burned twice in the past 60 years (1973 and 2007). Wyoming big sagebrush had reestablished in some areas of the New Field Pasture after the 1973 Horse Butte Fire and before the 2007 Murphy Complex Fire (2006 ESI and IIRH data and photos). The Murphy Complex fire eliminated most of this sagebrush and other shrubs. A 2004 IIRH site, located just northwest of IIRH Site NF, showed a substantial amount of cheatgrass cover (22 percent). Wildfire combined with site disturbance likely provided an enhanced opportunity for cheatgrass to establish and spread. Two diffuse knapweed occurrences were recorded and treated in the New Field Pasture in 2008. However, considering the current lack of deep-rooted grasses combined with signs of past soil erosion, it could be assumed that with future disturbance, such as wildfires, there is an increased risk of cheatgrass and diffuse knapweed increasing in the New Field Pasture. Such possibilities could also result in poor habitat condition for native wildlife currently inhabiting the area.

Nested plot frequency data collected in the New Field Pasture showed a decline in deep-rooted and medium-rooted bunchgrasses. Specifically bluebunch wheatgrass and squirreltail declined, while the frequency of Sandberg bluegrass and Western wheatgrass increased. Line transect cover data shows Sandberg bluegrass dominates vegetation cover at both the IIRH and ESI sites. The data also shows Western wheatgrass is more common than bluebunch wheatgrass and other deep-rooted grasses.

The New Field Pasture was formed in 2010. Prior to that, it was included as part of the Section Pasture. Since 2010, the New Field Pasture was grazed during the spring/early summer for two years and during the summer for two years. Precipitation in 2012 was well below the thirty year average, but actual use shows that livestock used more AUMs in 2012 than in the other three years. However, utilization was not collected in 2012 so no conclusions regarding use levels can be made. Utilization was collected once in 2013 for bluebunch wheatgrass and measured as slight (6 percent). Prior to 2010, the Section Pasture was primarily grazed in June (four of seven years). Utilization data was not collected before 2010.

##### ***Evaluation Finding – New Field Pasture is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

##### ***Rationale for Evaluation Finding***

Shrubs were mostly removed in the pasture by the 2007 Murphy Complex Fire. Reduced bluebunch wheatgrass with a corresponding increase in Sandberg bluegrass, and the loss of shrubs are indicative of a shift in the relative dominance of vegetation functional/structural groups. Declines in deep-rooted perennial bunchgrasses and shrubs can result in a change of nutrient cycling and energy flow due to changes in above and below ground structure. Shallow-

rooted perennial grasses, such as Sandberg bluegrass, generally have a shorter active growth period, smaller root systems, and relatively lower potential to capture and store carbon below ground. However, perennial species that are present appear productive and are capable of reproduction and recruitment of new seedlings indicating that the site is still producing at a functional level.

Cheatgrass is present at both the IIRH and ESI sites. Noxious weeds are also present in the pasture. These invasive species can become a threat to biotic integrity following large-scale disturbances such as wildfire.

Shrubs and deep to medium rooted perennial grasses are limited at the IIRH and ESI site. Trend data shows a decline of bluebunch wheatgrass and squirreltail with an increase in Sandberg bluegrass. Cheatgrass has also established in some areas of the native plant communities. Noxious weeds were documented in the pasture. Shrub regeneration following the 2007 wildfire is not occurring as expected and could reduce habitat quality for wildlife as well as impair nutrient cycling, energy flow, and the hydrologic cycle in the future. The presence of invasive species throughout the allotment puts the native plant communities at risk of declining, especially after a large scale disturbance such as wildfire.

#### **East 71 Pasture**

IIRH Site E71 has burned twice in the past thirteen years (2000 and 2007) and ESI Site RA-102a has burned once (2007). Both sites burned in the 1960 Grassy Hills Fire. Wyoming big sagebrush and little sagebrush had reestablished in portions of the East 71 Pasture after the 1960 fire (2006 ESI and 2004 IIRH data and photos). The recent fires have eliminated most of the sagebrush and other shrubs that had reestablished. Seven years after the Murphy Complex Fire shrubs are starting to reestablish. Deep-rooted grasses present at the site are enabling water infiltration and nutrient uptake; grasses do not appear stressed, are producing seed and reproducing. Forbs diversity at the IIRH site was high with 19 perennial and 13 annual forb species present.

A 2004 IIRH site evaluation in the southeast part of the pasture stated there was a trace amount of cheatgrass in the area. The 2013 IIRH site evaluation field notes described cheatgrass as scattered and mostly associated with disturbance (i.e. rodent burrows). Cheatgrass cover in 2006 and 2012 cover transects measured about 2%. Except for the 2012 cover data and 2013 IIRH site evaluation, the other measurements/observations were taken in different areas within the pasture, so comparisons over time cannot be made. The data shows cheatgrass cover is a small percent of the vegetation cover.

Ground cover from perennial grasses, forbs, microbiotic crusts as well as rock appears to be keeping cheatgrass cover from expanding in the plant community. As microbiotic crusts and shrubs increase post-fire, cheatgrass cover should continue to be minimal. Noxious weeds were not observed at the IIRH site. However, two diffuse knapweed occurrences are documented in the East 71, Black Butte Seeding, and Section Pastures. Rush skeleton was also present in the Section Pasture. Both knapweed and rush skeleton occurrences were treated in 2008.

Nested plot frequency data collected in the East 71 Pasture showed the frequency of deep and medium-rooted bunchgrass plants to either be static (bluebunch wheatgrass) or have increased (Idaho fescue). Perennial grass cover (bluebunch wheatgrass and Sandberg bluegrass) doubled in the 3x3 photo plot (9 to 18 percent). Total forb frequency is static. Cheatgrass was not reported at the trend site until 2012, after the Murphy Complex Fire.

The East 71 Pasture was mostly grazed during the summer. In 2009, it was grazed during the spring and summer. In addition to the summer use, fall grazing also occurred in the pasture in 2006 and 2008. Utilization data was collected on bluebunch wheatgrass in 2004, 2009, 2011, and 2013. Use on bluebunch wheatgrass was slight in 2011 and 2013 and light in 2004 and 2009. Actual use ranged from 90 AUMs to 395 AUMs.

### **Black Butte Seeding Pasture**

Recent cover data is not available for the Black Butte Seeding Pasture. Nested plot frequency data is available and shows increases in the frequency of both bluebunch wheatgrass and Sandberg bluegrass occurrences. Cheatgrass was not recorded at the trend site. The amount of bare ground declined while litter increased. Further, bluebunch wheatgrass and Sandberg bluegrass plant numbers, as well as their percent cover, increased in the 3x3 photo plot. Total perennial grass cover also increased in the 3x3 plot. The herbaceous plant community at the trend site appears more diverse than in the past. However, sagebrush was not measured at the site.

The Black Butte Seeding Pasture was grazed four years in the spring during the ten-year study period. Early summer grazing also occurred during three of the four years. The pasture was grazed in the summer during two of the years that both spring and early summer grazing occurred. The number of AUMs used in the Black Butte Seeding Pasture ranged from 71 to 316 AUMs. Light use on crested wheatgrass occurred in 2004 and on Thurber's needlegrass in 2013. Slight use was measured on bluebunch wheatgrass in 2004, 2009, and 2013.

### **Section Pasture**

Recent cover data is not available for the Section Pasture; however, trend data was collected. The data shows bluebunch wheatgrass frequency increased from 49 to 67 percent over the long term while Sandberg bluegrass and squirreltail declined. Total forb frequency remained static. Cheatgrass was first noted in the plot in 2013. Sagebrush was not recorded at the site.

The number of bluebunch wheatgrass rooted in the 3x3 photo plot declined from 18 to 14 plants; however, the amount of bluebunch wheatgrass cover increased from 7.4 to 36.4 percent. Sandberg bluegrass cover slightly increased. Ground cover remained fairly static during this timeframe. Overall bluebunch wheatgrass frequency and cover has increased at the site, while sagebrush cover is lacking due to recent fire activity in the allotment.

The Section Pasture has been mostly grazed in the summer and fall. One year of spring and early summer grazing occurred in 2009 and in 2008 the pasture was grazed in the winter. AUMs used in the Section Pasture ranged from 15 to 371. Utilization data was not collected in this pasture during the ten-year study period.

### **Catlou Field Pasture**

Data regarding upland vegetation has not been collected in the Catlou Field Pasture. However, the JFO interdisciplinary team determined that the Catlou Field Pasture was similar in vegetation conditions to the East 71 Pasture. Therefore, it meets Standard 4 based on the IRRH assessment in the East 71 Pasture. The pasture is primarily used as a holding pasture. Most of the field is in private ownership.

### ***Evaluation Finding – East 71, Black Butte Seeding, Section, and Catlou Field Pastures are:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

### ***Rationale for Evaluation Finding***

IIRH Site E71 is on a little sagebrush/Idaho fescue site (Shallow Claypan 12-16”). The site has burned three times since 1960. Two of the fires have occurred in the past thirteen years. The ESD describes a burned plant community in Reference State 1, Community Phase 1.4: Post Fire-Grass Dominated State. In this state the site is dominated by perennial grasses, both shallow and deep rooted. Rabbitbrush is also expected to establish on the site. Cheatgrass may invade the site as well.

The IIRH site is similar to the ESD Reference State 1 burned plant community. Although Sandberg bluegrass cover was high (20 percent) at the IIRH site, there were enough deep-rooted grasses in the overall plant composition to effectively perform nutrient cycling and water infiltration processes at the site. This is evidence by the vigor of the plants present at the site. Perennial species are productive and capable of reproduction and recruitment of new seedlings. Further, trend data in three pastures show that bluebunch wheatgrass has increased either in frequency or cover.

Noxious weeds were not noted at the IIRH, ESI, or trend sites. Noxious weeds known to occur in the pastures were treated in 2008. Cheatgrass is found in minimal amounts in all pastures. Although present, it is not expected to expand due to sufficient ground cover provided by perennial vegetation, microbiotic crusts, and rock.

More litter is present at the sites than expected; however, it is providing cover for site protection and the replenishment of nutrients appears to be occurring; therefore, not negatively affecting ecological processes. The native vegetation communities in the East 71, Black Butte Seeding, Section, and Catlou Field Pastures are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle

The native plant community lacks vertical structure due to a wildfire burning through it and removing shrubs present prior to the fire. Use by native wildlife dependent on sagebrush for their habitat (i.e. sage thrasher (*Oreoscoptes montanus*), sagebrush vole (*Lemmiscus curtatus*), sagebrush lizard (*Sceloporus graciosus*), least chipmunk (*Neotamius minimus*), and Vesper sparrow (*Pooecetes gramineus*) is limited at this time. As shrubs re-establish and mature these animals should return to the area. In the meantime, the bluebunch wheatgrass plant community provides habitat for grassland [Savannah sparrow (*Passerculus sandwichensis*), grasshopper

sparrow (*Ammodramus savannarum*), and montane vole (*Microtus montanus*)] and generalist wildlife species [horned lark (*Eremophila alpestris*), Western meadowlark (*Sternella neglecta*), deer mouse (*Peromyscus maniculatus*), and coyote (*Canis latrans*)]. It also can provide seasonal forage for mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), and elk (*Cervus elaphus*).

#### **Allotment Summary for Standard 4 (Native Plant Communities)**

Standard 4 is not met in the New Field Pasture. Shrubs and deep to medium rooted perennial grasses are limited at the IIRH and ESI site. Trend data shows a decline of bluebunch wheatgrass and squirreltail with an increase in Sandberg bluegrass. Shrub regeneration after the 2007 wildfire is not occurring as expected and could reduce habitat quality for wildlife as well as impair nutrient cycling, energy flow, and the hydrologic cycle in the future. Declines in deep and medium rooted grass species and limited shrub regeneration combined with invasive species puts the native plant communities in this pasture at further risk of declining, especially after a major disturbance such as wildfire.

Standard 4 is met in the East 71, Black Butte Seeding, Section, and Catlou Field Pastures. Native vegetation in the East 71 Pasture is similar to the ESD Reference 1 burned plant community. Deep-rooted grasses in the plant composition are effectively performing nutrient cycling, energy flow, and water infiltration processes at the site. This is evidence by the vigor of the plants present in the area. Perennial species are productive and capable of reproduction and recruitment of new seedlings. The native vegetation communities in the East 71, Black Butte Seeding, Section, and Catlou Field Pastures are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

#### **Standard 5 (Seedings)**

*Rangelands seeded with mixtures, including predominately non-native plants, are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.*

The remaining pastures of the Grassy Hills AMP Allotment are assessed under Standard 5: Black Butte, Old Pipeline, South 71, West 71, Section And A Half, and Two Section. IIRH sites in these pastures are in seedings put in after wildfires. A Secar bluebunch wheatgrass mix was planted at all of the sites. Noxious weed species were not documented at any of the IIRH sites. HAF vegetative cover data collected in 2012 and 2013, as well as 2006 ESI production cover data is used to evaluate Standard 5. (Cover data is not available for IIRH Site DZ.) Each IIRH site and its representative pastures are discussed separately.

### **Rangeland Health Assessment**

#### **Black Butte and Old Pipeline Pastures**

##### **IIRH Site BB. Loamy 10-13”;**

IIRH site BB is in a Wyoming big sagebrush/bluebunch wheatgrass in the Black Butte Pasture and is also representative of the Old Pipeline Pasture. IIRH Site BB is shown in Photo 19. The IIRH site burned twice since 1960: 1973 Horse Butte Fire and the 2007 Murphy Complex Fire. The site was seeded to Secar bluebunch wheatgrass following the Murphy Complex Fire. HAF cover data was also collected in the Old Pipeline Pasture in 2012. A 2006 ESI site (RA-16a) is in

the same area as the IIRH site. Two other ESI sites are also in the Black Butte Pasture. However, these sites were seeded in 2007 changing the vegetation composition at the two ESI sites. Data has not been collected since the seeding was done; therefore, data is not available to describe current conditions.

**Photo 19: 2013 IIRH Site BB (Black Butte Pasture)**



Vegetation cover data (2013 HAF, 2006 ESI production data) for Site BB is in Table 29. Prior to the 2007 wildfire, vegetation cover at the ESI site was dominated by Sandberg bluegrass and Wyoming big sagebrush. Bluebunch wheatgrass was present, but at very low amounts (4 percent). No other plant species were recorded at the site in 2006.

**Table 29: Vegetation Cover at IIRH Site BB and ESI Site RA-15a in the Black Butte Pasture and HAF Site 1 in the Old Pipeline Pasture**

| Vegetation Class  | Species               | Percent Cover                           |  |  |
|-------------------|-----------------------|---|--|--|
|                   |                       | 2013 IIRH Site BB (Black Butte Pasture) | 2006 ESI Site RA-15a (Black Butte Pasture) | 2012 HAF Site 1 (Old Pipeline Pasture) |
| Perennial Grasses | Bluebunch Wheatgrass  | 47                                      | 4  | 2                                      |
|                   | Thurber's Needlegrass | 7                                       | 0  | 9                                      |
|                   | Sandberg Bluegrass    | 6                                       | 30   | 6                                      |
|                   | Western Wheatgrass    | 0                                       | 0  | 14                                     |
|                   | Squirreltail          | 0                                       | 0  | 3                                      |
| Annual            | Cheatgrass            | 2                                       | 0  | 2                                      |

| Vegetation Class        | Species  | Percent Cover                                    |   |   |
|-------------------------|--|--|---|---|
|                         |  | 2013<br>IIRH Site BB<br>(Black Butte<br>Pasture) | 2006<br>ESI Site RA-15a<br>(Black Butte<br>Pasture) | 2012<br>HAF Site 1<br>(Old Pipeline<br>Pasture) |
| Grasses                 |  |  |   |   |
| Perennial<br>Forbs      | Alfalfa  | 3  | 0   | 0   |
|                         | Longleaf Phlox   | 1  | 0   | 2   |
|                         | Slender Phlox  | 0  | 0   | 1   |
|                         | Milkvetch<br>( <i>Astragalus spp.</i> )                    | 0  | 0   | 2   |
|                         | Lewis Flax   | 0  | 0   | 1   |
| Annual<br>Forbs         | Clasping pepperweed<br>( <i>Lepidium<br/>perfoliatum</i> ) | 0  | 0   | 2   |
| Shrubs                  | Fourwing Saltbush  | 1  | 0   | 0   |
|                         | Wyoming Big<br>Sagebrush                                   | 0  | 25  | 0   |
|                         | Yellow Rabbitbrush   | 0  | 0   | 1   |
| <b>Vegetation Total</b> |  | <b>67</b>  | <b>39</b>   | <b>45</b>                                       |
| Other Cover             | Microbiotic Crusts   | 2.5  | 1   | 2   |
|                         | Total Litter   | 35   | 23  | 36  |

The wildfire and subsequent seeding has resulted in a very different plant community composition. The 2012 HAF data shows the site dominated by bluebunch wheatgrass (47 percent) with Thurber's needlegrass (7 percent) and Sandberg bluegrass (6 percent) present at lower amounts. Alfalfa and long-leaf phlox were recorded along the cover transect. Cheatgrass was also recorded (2 percent) in 2012. Alfalfa and Western yarrow were seeded in 2007. Alfalfa was documented in the cover transect, while yarrow was not. Microbiotic crusts contributed 2.5 percent of the total cover.

Fourwing saltbush was planted in 2007 and is the dominant shrub species at 1 percent. Sagebrush seed was flown on in strips in the area in 2007 but it was not documented in the line-point intercept transect in 2012. Noxious weeds were not observed at the site. Plant species noted in the area but not recorded along the cover transect included 8 perennial grasses, 3 annual grasses, 20 perennial forbs, 10 annual forbs, and 3 shrubs (Appendix B). The three shrubs included fourwing saltbush, Wyoming big sagebrush, and yellow rabbitbrush.

HAF data collected in the Old Pipeline Pasture indicates Western Wheatgrass is the dominant grass species with Thurber's needlegrass and Sandberg bluegrass being codominant grass species. Some perennial forbs were recorded providing 6 percent of the total cover.

Two indicators of rangeland health deviated from the ESD reference condition at IIRH Site BB: litter amounts and invasive plants. Cheatgrass was recorded at 1 percent cover. The IIRH field notes cheatgrass as being in "low abundance with trace amounts found only in disturbed areas".

Cheatgrass was not recorded at the 2006 ESI site. The indicator for invasive plants rated as a “slight to moderate” departure with some cheatgrass being present in 2013.

The indicator for litter amount rated as a “moderate to extreme” departure from reference condition due to larger amounts being present than described in the ESD. Litter amounts were high at both the IIRH and ESI sites. All other indicators related to the Biotic Integrity attribute rated “none to slight”.

**South 71, West 71, Section And A Half, and Two Section Pastures**  
**IIRH Site S71. Loamy 10-13”**

IIRH Site S71 is in the South 71 Pasture in a Secar bluebunch wheatgrass seeding. The site is also representative of the Secar bluebunch seedings in the West 71, Section And A Half, and Two Section Pastures. Photo 20 shows IIRH Site S71. The South 71 pasture has burned twice since 1960: 1960 Grassy Hills Fire, 2007 Murphy Complex Fire. Secar bluebunch wheatgrass was seeded after the Murphy Complex Fire.

**Photo 20: 2013 IIRH Site S71 (South 71 Pasture)**



Vegetation cover (2013 HAF) for IIRH Site S71 is in Table 30. HAF cover data was also collected in the Two Section and Section And A Half Pastures in 2012. This data is also shown in Table 30. Bluebunch wheatgrass provides the most cover (12 percent, 24 percent, 29.5 percent), followed by Sandberg bluegrass (8 percent, 9.5 percent, 16 percent), and Western Wheatgrass (6 percent, 1.5 percent, 6.5 percent). Thurber’s needlegrass (6 percent) was recorded at the IIRH site but not at either of the HAF sites. Annual grasses were not noted on the cover

transect at the IIRH site. Cheatgrass was present at the HAF sites providing 1 percent to 1.5 percent of the cover. Perennial forbs provide 7 percent, 3 percent, and 2.5 percent of the plant cover at the IIRH and HAF sites. Rabbitbrush (4 percent, 4.5 percent, and 3 percent) was the only shrub species recorded along all three cover transects.

**Table 30: Vegetation Cover at IIRH Site S71 (South 71 Pasture), HAF Site TS (Two Section Pasture), and HAF Site SH (Section And A Half Pasture)**

| Vegetation Class        | Species                       | Percent Cover                               |   |  |
|-------------------------|-------------------------------|---|---|--|
|                         |                               | 2013<br>IIRH Site S71<br>(South 71 Pasture) | 2012<br>HAF Site TS<br>(Two Section<br>Pasture) | 2012<br>HAF Site SH<br>(Section And A<br>Half Pasture) |
| Perennial<br>Grasses    | Secar Bluebunch<br>Wheatgrass | 12  | 24  | 29.5   |
|                         | Sandberg Bluegrass            | 8   | 9.5   | 16   |
|                         | Thurber's<br>Needlegrass      | 6   | 0   | 0  |
|                         | Western Wheatgrass            | 6   | 1.5   | 6.5  |
|                         | Squirreltail                  | 3   | 0   | 0.5  |
|                         | Idaho Fescue                  | 1   | 0   | 0  |
|                         | Basin Wildrye                 | 0   | 6   | 1.5  |
| Annual<br>Grasses       | Cheatgrass                    | 0   | 1.5   | 1  |
| Perennial<br>Forbs      | Desert Parsley                | 4   | 0   | 0  |
|                         | Longleaf Phlox                | 2   | 2.5   | 2  |
|                         | Pale Agoseris                 | 1   |   | 0  |
|                         | Lupine                        | 0   | 0.5   | 0.5  |
| Annual Forbs            | Clasping<br>Pepperweed        | 2   | 0   | 0  |
|                         | Blue-eyed Mary                | 1   | 0   | 0  |
|                         | Pink Microsteris              | 1   | 0   | 0  |
|                         | Small Blue-eyed<br>Mary       | 1   | 0   | 0  |
|                         | Groundsmoke                   | 0   | 0.5   | 0  |
| Shrubs                  | Yellow Rabbitbrush            | 4   | 4.5   | 3  |
|                         | Rubber Rabbitbrush            | 0   | 0.5   | 0  |
| <b>Vegetation Total</b> |                               | <b>52</b>                                   | <b>45</b>                                       | <b>60.5</b>  |
| Other Cover             | Microbiotic Crusts            | 4   | 0   | 1.5  |
|                         | Litter                        | 21  | 23.5  | 17.5   |

Noxious weeds were not observed at any of the sites. Plant species recorded outside of the cover transect at IIRH Site S71 included 10 perennial grasses, 1 annual grass, 25 perennial forbs, 11 annual forbs, and 3 shrubs (Appendix B). Shrubs included Wyoming big sagebrush, yellow rabbitbrush, and fourwing saltbush.

Only one indicator of rangeland health deviated from the ESD reference condition at IIRH Site S71. The litter indicator rated as a “moderate” departure due to the increased amounts found at

the site. All other indicators related to the Biotic Integrity attribute rated “none to slight”. Field notes indicate that the Secar bluebunch wheatgrass seeding is very productive with a diverse forb component. Individual plants are vigorous and healthy, producing seed and reproducing. Rabbitbrush and Wyoming big sagebrush are reestablishing in the plant community following the 2007 Murphy Complex Fire.

**Deklotz Pasture**

***IIRH Site DZ. Loamy 10-13”***

IIRH Site DZ is in a productive Secar bluebunch wheatgrass and Sandberg bluegrass seeding (Photo 21). The site has burned twice since 1960: 1973 Horse Butte Fire and the 2007 Murphy Complex Fire. The area was seeded to Secar bluebunch wheatgrass after the 2007 Murphy Complex Fire. HAF cover data was not collected at this site. ESI production cover data collected in 2006 was not used in the evaluation of Standard 5 since the site has not been seeded. More recent data has not been collected at the ESI site. Prior to the 2007 wildfire Wyoming big sagebrush and Sandberg bluegrass dominated the plant composition at the ESI site.

**Photo 21: 2013 IIRH Site DZ (Deklotz Pasture)**



Field notes taken during the IIRH assessment describe the seeding as productive, perennial plants are reproducing, and a diverse forb component (17 perennial and 8 annual forb species) is present. Noxious weeds were not recorded at the site. Microbiotic crusts were also recorded at the site.

Three indicators of rangeland health deviated from the ESD reference condition: functional/structural groups; litter amounts; and invasive plants. The 2007 Murphy Complex Fire

eliminated most of the shrubs in the Deklotz Pasture. In other pastures in the Grassy Hills AMP Allotment, shrubs are reestablishing in the seeded areas. However, there was very little evidence that shrubs, especially Wyoming big sagebrush are occupying this site. Based on this observation the indicator for functional/structural groups rated as a “slight to moderate” departure from ESD reference condition.

Cheatgrass, curvseed butterwort, tumbled mustard, and western tansymustard were noted in the IIRH field notes as being present. All of these invasive plants were primarily found in small amounts in disturbed areas (e.g. rodent burrows and powerline). Although these plants did not provide much cover in the plant community, their combined presence resulted in a “slight to moderate” departure from ESD reference condition.

The indicator for litter rated as a “moderate” departure from the reference condition due to more litter at the site than described in the ESD. All other indicators related to the Biotic Integrity attribute rated “none to slight”. The Biotic Integrity attribute rated as a “slight to moderate” departure from the ESD reference condition. The rating is a result of the number of invasive weeds present and shrubs not establishing at the site.

### **Salls Field Pasture**

#### ***IIRH Site SF. Loamy 10-13”***

IIRH Site SF is in a Secar bluebunch wheatgrass seeding (Photo 22). The IIRH site has burned twice since 1960: 2001 Doe Flat Fire and 2007 Murphy Complex Fire. The area was drill seeded to a Secar bluebunch wheatgrass after the Doe Flat Fire. The area was also aerial seeded with sagebrush in 2008 after the Murphy Complex Fire.

**Photo 22: 2013 IIRH Site SF (Salls Field Pasture)**



HAF cover data was collected in 2013 at the IIRH site (Table 31). Cover data was also collected at two ESI sites (RA-79a and RA-81a) in 2006. The ESI cover data was not used in this assessment. ESI Site RA-79a has never been seeded and therefore, cannot be assessed under Standard 5. ESI Site RA-81a was native until seeded following the Murphy Complex Fire in 2007. Recent data has not been collected at the ESI site since it was seeded. Prior to the 2007 wildfire the plant composition at ESI Site RA-79a was a bluebunch wheatgrass/Sandberg bluegrass vegetation type and a bluebunch wheatgrass/cheatgrass dominated site at RA-81a.

**Table 31: Vegetation Cover at IIRH Site SF**

| Vegetation Class        | Species               | Percent Cover     |
|-------------------------|-----------------------|-------------------|
|                         |                       | 2013 IIRH Site SF |
| Perennial Grasses       | Bluebunch Wheatgrass  | 21                |
|                         | Sandberg Bluegrass    | 11                |
|                         | Squirreltail          | 7                 |
|                         | Basin Wildrye         | 2                 |
|                         | Thurber's Needlegrass | 1                 |
|                         | Western Wheatgrass    | 1                 |
| Annual Grasses          | Cheatgrass            | 3                 |
| Perennial Forbs         | Longleaf Phlox        | 1                 |
|                         | Prickly-leaved Phlox  | 1                 |
| Annual Forbs            | Curveseed Butterwort  | 5                 |
| Shrubs                  | Wyoming Big Sagebrush | 1                 |
| <b>Vegetation Total</b> |                       | <b>54</b>         |
| Other Cover             | Microbiotic Crusts    | 17                |
|                         | Litter                | 8                 |

At IIRH Site SF Secar bluebunch provides the most cover (21percent) followed by Sandberg bluegrass (11 percent) and squirreltail (7 percent). Curveseed butterwort (5 percent) and cheatgrass (3 percent) were also present. Wyoming big sagebrush made up 1 percent of the cover and biological soil crusts comprised 17 percent of the cover. Other plant species noted at the site, but not recorded along the cover transect, are 6 perennial grasses, 1 annual grass (cheatgrass), 19 perennial forbs, 8 annual forbs, and 4 shrubs. Shrubs included Wyoming big sagebrush, fourwing saltbush, rubber rabbitbrush, and yellow rabbitbrush.

The indicator for invasive species rated as a “slight to moderate” departure from the ESD reference condition. Although limited in their amounts, three species were present in disturbed areas: cheatgrass, tumbled mustard, and curveseed butterwort. IIRH field notes describe the seeding as productive. Shrubs are reestablishing with sagebrush cover being low at this time. Western wheatgrass is dominant in some areas. All other indicators of rangeland health were within the “none to slight” departure category. Overall, the biotic integrity attribute rated as a “none to slight” departure from the ESD reference condition.

## **Evaluation of Standard 5**

### **Black Butte and Old Pipeline Pastures**

IIRH Site BB and ESI Site RA-16a have burned twice since 1960: 1973 Horse Butte Fire and the 2007 Murphy Complex Fire. Wyoming big sagebrush had reestablished in the site after the 1973 fire. However, the Murphy Complex Fire burned the entire pasture eliminating most of the shrubs in the Black Butte Pasture as well as in the Old Pipeline Pasture. Shrubs are beginning to reestablish at the IIRH site. Wyoming big sagebrush, rabbitbrush, and fourwing saltbush were all noted either along the cover transect or in the field notes as present in the immediate area.

Almost 100 percent of the Black Butte Pasture was seeded in 2007 with Secar bluebunch after the Murphy Complex Fire. About 80 percent of the Old Pipeline Pasture has also been seeded with Secar bluebunch wheatgrass: 30 percent of the pasture was seeded in 2000 after the Grass Fire and another 50 percent seeded in 2007. Secar bluebunch wheatgrass has successfully established in most the areas it was seeded. Field notes describe the seeding at IIRH Site BB as a “very productive bluebunch wheatgrass seeding with a good forb component”. There were numerous forb species (thirty-two species) at the site. In general, pre-seeding cover data (2006 ESI production data) showed very little bluebunch wheatgrass (4 percent) in the area and post-seeding cover data shows bluebunch wheatgrass is now the dominate species (47 percent). IIRH notes also state that perennial plants are producing seed and reproducing.

Noxious weeds were not observed at the IIRH site, ESI site, nor mentioned in the trend data. Four diffuse knapweed occurrences have been documented in the Black Butte Pasture. All four occurrences were treated in 2008. Noxious weeds have not been documented in the Old Pipeline Pasture.

Cheatgrass is present at IIRH Site BB but in low amounts. IIRH cover data collected in 2004, in the Black Butte Pasture did not record cheatgrass along the cover transect. However, 2004 data collected in the Old Pipeline Pasture in the 2000 Secar bluebunch wheatgrass seeding recorded a substantial amount of tumble mustard (2004 cover data and photos, BLM), as well as some cheatgrass and curvseed butterwort.

The current seeded plant community in both pastures lack vertical structure due to the 2007 Murphy Complex Fire burning through it and removing any shrubs that may have been present before the fire. Use by native wildlife dependent on sagebrush for their habitat is limited at this time. As shrubs re-establish and mature such animals should return to the area. In the meantime, the Secar bluebunch wheatgrass plant community provides habitat for grassland and generalist wildlife species. It also can provide seasonal forage for big game species.

Recent trend data was not collected in the Black Butte Pasture; however, it was collected in the Old Pipeline Pasture. The data shows a significant decline in the frequency of Thurber’s needlegrass occurrences; from 46 percent in 1989 to 14 percent in 2012. Data collected in 1993 showed a static trend in Thurber’s needlegrass occurrences. Bluebunch wheatgrass frequency was static throughout the study period. Western wheatgrass frequency increased from 54 to 73. The 3x3 photo plot also shows a substantial decline in the number of Thurber’s needlegrass plants. Mature plants rooted in the 3x3 photo plot declined from 12 plants to 1. Cover also declined from 3.8 percent to 0.53 percent.

In 2012 cover data was collected at a HAF site in the Old Pipeline Pasture. Western wheatgrass (14 percent) and Thurber's needlegrass (9 percent) provide most of the grass cover. Bluebunch wheatgrass cover was 2 percent, Sandberg bluegrass was 6 percent, and squirreltail was 3 percent. Cheatgrass cover was 2 percent.

The Black Butte Pasture was mostly grazed in spring and summer. Fall/winter use occurred in 2004 and winter use in 2009. AUMs used in the Black Butte Pasture ranged from 129 to 555. Very little utilization data was collected in the Black Butte Pasture. Light use occurred on Thurber's needlegrass in 2013. Slight use was measured on bluebunch wheatgrass and Thurber's needlegrass in 2009, and 2011. Light use was made on bluebunch wheatgrass in 2013.

The Old Pipeline Pasture was grazed five years in the spring during the ten-year study period. Early summer grazing also occurred for four of those five years of spring grazing. AUMs used annually in the Old Pipeline Pasture ranged from 190 to 489. Livestock grazing did not occur in the Old Pipeline Pasture in 2007 and 2008 to allow the Secar bluebunch wheatgrass seeding to establish, as well as existing native vegetation to recover from being burned. Grazing was reauthorized in the pasture during the winter of 2009. Spring and early summer grazing occurred consecutively for the next three years (2010–2012). Spring grazing also occurred during two dry springs (2004 and 2012). Livestock used the most AUMs during the past ten years in 2004, however; utilization levels were light averaging 38 percent.

Utilization in the Old Pipeline Pasture was collected on bluebunch wheatgrass. Bluebunch wheatgrass was moderately (41 to 60 percent) used 2010. Utilization on bluebunch wheatgrass ranged from slight to light use in the other four years it was measured.

***Evaluation Finding – Black Butte Pasture is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

IIRH Site BB is on a Wyoming big sagebrush/bluebunch wheatgrass site (Loamy 10-13"). The site has burned twice since 1960, in 1973 and 2007. The 2007 Murphy Complex Fire burned the entire pasture. The ESD for this site describes a burned plant community in Reference State 1 Community Phase 1.3: Post Fire-Grass Dominated State. In this phase the site is dominated by perennial grasses, both deep and shallow-rooted. Rabbitbrush and horsebrush is expected to resprout on the site. Some cheatgrass may have invaded the site as well.

The IIRH site is similar to the ESD Reference 1 burned plant community. Secar bluebunch wheatgrass was seeded after the Murphy Complex Fire and now dominates the site. Sandberg bluegrass and Thurber's needlegrass are subdominant species. Perennial and annual forb diversity was high and shrubs, including Wyoming big sagebrush, are colonizing the area. Adequate water infiltration and nutrient cycling are occurring as evidence by perennial species that are productive and capable of reproduction and recruitment of new seedlings. Habitat is available for native grassland wildlife species. As shrubs reestablish, shrub obligate wildlife species should to return to the area.

Noxious weeds were not seen at the IIRH site. Diffuse knapweed found in the pasture was treated in 2008. Cheatgrass is present but provides a small portion of the vegetation cover. Cheatgrass is not expected to expand due to sufficient cover provided by perennial vegetation.

More litter is present at the sites than expected; however, it is providing cover for site protection and the replenishment of nutrients appears to be occurring. The seeded vegetation communities in the Black Butte Pasture are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

***Evaluation Finding – Old Pipeline Pasture is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

An IIRH field assessment was not done in the Old Pipeline Pasture in 2013. Vegetation conditions in the Old Pipeline Pasture appeared like that found in the Black Butte Pasture. Therefore, IIRH Site BB represents both pastures. However, trend data on the 2007 Secar bluebunch wheatgrass seeding and 2004 IIRH cover data collected on a 2001 Secar bluebunch wheatgrass seeding show some portions of the seedings in this pasture might not meet Standard 5.

Secar bluebunch wheatgrass was seeded in 2007 at trend site 13S11E14, but its percent frequency in the plant community has remained similar since before being seeded. Although seeded in 2007, bluebunch wheatgrass does not seem to have increased in numbers or cover at the trend site.

Trend data show a dramatic decline in Thurber's needlegrass. Thurber's needlegrass frequency declined from 47 percent in 1986 to 14 percent in 2013. The 2007 Murphy Complex Fire may have influenced the decline in Thurber's needlegrass cover. A study done in southern Idaho resulted in either a high mortality rate for Thurber's needlegrass or extensive damage to the plants from summer wildfires (Wright and Klemmedson, 1965). Post-fire recovery of Thurber's is slow (Volland and Dell, 1981) and plant vigor may be reduced for several years after being burned (Bunting, 1985). Sandberg bluegrass frequency also declined.

In contrast, Western wheatgrass has increased significantly. Western wheatgrass, due to its rhizomatous nature can effectively compete with bunchgrasses. It recovers well from summer and fall burns and is fairly tolerant of livestock grazing. Western wheatgrass stands are typically resistant to drought. Rhizomes are typically extensive and can extend deep into the soil profile, and are effective at stabilizing soils. Cover data collected in 2012 further substantiates western wheatgrass as a dominant grass in the Old Pipeline Pasture.

Although Western wheatgrass provides for some nutrient cycling and energy flow, the structure of perennial grasses has change substantially with the declines in both deep-rooted and shallow rooted perennial bunchgrasses. These declines compounded by the loss of shrubs can result in

reduced nutrient cycling and energy flow due to changes in the above ground structure. For example less litter and reduced basal cover from grasses could influence soil movement as well as the kind and amount of nutrients available at the site.

Noxious weeds have not been observed in the Old Pipeline Pasture. However, invasive annual plants were recorded in 2004 IIRH cover data. The data showed tumble mustard as prominent in the 2000 Secar bluebunch wheatgrass seeding. Cheatgrass, clasping pepperweed, and curvedseed butterwort were also present at the site. Plant vigor, including the ability for perennial grasses to produce seed and propagate, appeared low at the 2004 IIRH site. Deep-rooted bunchgrasses were also noted as not being common at the site. The decline in deep-rooted bunchgrasses and presence of annual invasive plants in this pasture puts the pasture at increased risk for loss of diversity following a disturbance such as wildfire as well as its ability to maintain native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

### **South 71, West 71, Section And A Half, and Two Section Pastures**

IIRH Site S71 has burned twice since 1960: 1960 Grassy Hills Fire and the 2007 Murphy Complex Fire and the HAF site has burned three times: 1960 Grassy Hills Fire, Grass Fire 2000, and the 2007 Murphy Complex Fire. Other portions of the South 71 Pasture have also burned several times over this timeframe. Portions of the east half of the South 71 Pasture has burned up to four times since 1960. The Section And A Half and West 71 Pastures have also burned at least twice since 1960. All four pastures were completely burned by the Murphy Complex Fire, eliminating most shrubs in these pastures. Shrubs were observed establishing at the IIRH site in 2013. Wyoming big sagebrush, rabbitbrush, and fourwing saltbush were all noted either along the cover transect or in the field notes as present in the immediate area.

Considering the wildfire, the vegetation composition, plant distribution, and structure are appropriate at the site with bluebunch wheatgrass being the dominant grass species and Sandberg bluegrass and others being sub-dominant. Field notes describe the seeding as very productive. Several forb species (36) are present. Plant reproduction is occurring at the site.

Noxious weeds were not observed at either the IIRH site or HAF sites. A total of 13 occurrences of diffuse knapweed were in the South 71, West 71, and Section And A Half Pastures. In addition, six occurrences of Scotch thistle were found in the Two Section Pasture. All 19 noxious weed occurrences were treated in 2008. Very little cheatgrass was found at the IIRH Site or HAF sites.

Trend data was not collected in the South 71, Section And A Half, or the Two Section Pastures; however, it was collected in the West 71 Pasture. Two 3x3 photos are at the trend site (14S11E22a and 14S11E22b) in the West 71 Pasture. Mature bluebunch wheatgrass plants increased from six plants in 1970 to eight plants in 2013 in plot 14S11E22a. The number of Sandberg bluegrass plants also increased. Cheatgrass was first recorded in the plot in 2013. Mature bluebunch wheatgrass plants increased from three plants in 1970 to seven plants in 2013 in plot 14S11E22b. The number of Sandberg bluegrass also increased.

The current seeded plant community in all four pastures lack vertical structure due to the 2007 Murphy Complex Fire burning through it and removing sagebrush that was present. The shrubs currently present are too short and too sparse for sagebrush steppe wildlife. Use by native

wildlife dependent on sagebrush for their habitat is limited at this time. As shrubs re-establish and mature such animals should return to the area. In the meantime, the Secar bluebunch wheatgrass plant community provides habitat for grassland and generalist wildlife species. It also can provide seasonal forage for big game species.

Spring, early summer, and summer use by livestock occurred in 2010 and 2011 in the South 71 Pasture. Otherwise, the pasture was grazed in the summer; however, fall use occurred once in 2009. AUMs ranged from 57 to 248 over the ten-year study period. Only one year of utilization data is available for the pasture. Grazing use on bluebunch wheatgrass was slight in 2013. Livestock grazed the West 71 Pasture primarily in the summer with fall use occurring in three years. The pasture was also rested four years. AUMs used in the pasture over the ten-year study period ranged from 111 to 258. Use was slight on bluebunch wheatgrass in 2011; data was not collected in any other years.

Spring and early summer grazing occurred concurrently during three years of the ten-year study period in the Section And A Half Pasture. In addition, early summer grazing happened in three other years with summer grazing also happening during two of these three years. In the remaining years livestock grazed either in the summer or the fall. AUMs used annually ranged from 52 to 275. Utilization was not measured during the study period in the Section And A Half Pasture.

Spring, early summer, and summer use was made during three consecutive years (2009 – 2001) in the Two Section Pasture. Early summer grazing also occurred in 2004 and 2007. The pasture was either grazed in the summer, fall, or winter in the remaining years. AUMs used annually in the Two Sections Pasture ranged from 48 to 424. Utilization was collected in 2004. Grazing use on bluebunch wheatgrass was slight.

***Evaluation Finding – South 71, West 71, Section And A Half, and Two Section Pastures are:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

IIRH Site S71 is on a Wyoming big sagebrush/bluebunch wheatgrass site (loamy 10-13”). The site has burned twice since 1960, in 1960 and 2007. The ESD for this site describes a burned plant community in Reference State 1 Community Phase 1.3: Post Fire-Grass Dominated State. In this phase the site perennial grasses, both deep and shallow-rooted, dominate the site. Rabbitbrush and horsebrush will resprout on the site. Some cheatgrass may have invaded the site as well.

The IIRH site is similar to the ESD Reference 1 burned plant community. Secar bluebunch wheatgrass was seeded after the Murphy Complex Fire and now dominates the site. Sandberg bluegrass, Thurber’s needlegrass, and Western wheatgrass are subdominant species. Perennial and annual forb diversity is high and shrubs, including Wyoming big sagebrush, are reestablishing in the area. Adequate water infiltration and nutrient cycling are occurring as evidence by perennial species that are productive and capable of reproduction and recruitment of

new seedlings. Bluebunch wheatgrass also dominates the HAF sites with similar grasses being subdominant species.

Noxious weeds were not seen at the IIRH site or the HAF sites. Diffuse knapweed and Scotch thistle were found in some of the pastures and treated in 2008. Very little cheatgrass is present and it was either not documented or occurred in low amounts along the cover transects. Although present, it is not expected to expand due to sufficient cover provided by perennial vegetation.

More litter is present at the sites than expected; however, it is providing cover for site protection and nutrient cycling appears to be occurring. Litter is not negatively affecting ecological processes at all three sites. The seeded vegetation communities in the South 71, West 71, Section And A Half, and Two Section Pastures are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

### *Deklotz Pasture*

IIRH Site DZ has burned twice since 1960: 1960 Grassy Hills Fire and the 2007 Murphy Complex Fire. However, other portions of the Deklotz Pasture have burned several times over this timeframe. For example, portions of the south half of the Deklotz Pasture has burned four times since 1960. The entire pasture was completely burned by the Murphy Complex Fire, eliminating most sagebrush. Very little sagebrush recruitment was noted at the IIRH site six years after the Murphy Complex Fire. In 2008, sagebrush seedlings were hand planted in the area. If these hand planted shrubs establish they could provide a future seed source for sagebrush expansion in the Deklotz Pasture.

Bunchgrasses, forbs, and litter seem sufficiently distributed throughout the IIRH site, allowing for adequate water infiltration, nutrient cycling, and energy flow. The plant community, although dominated by grasses, appeared vigorous displaying normal growth forms and biomass production. Reproduction appears to be occurring with different age classes present. Plant composition is such that photosynthesis is occurring throughout the growing season; grasses with shorter and longer life cycles are present (i.e. Sandberg bluegrass and Secar bluebunch wheatgrass).

Noxious weeds were not recorded at IIRH Site DZ. However, five occurrences of diffuse knapweed and two occurrences of rush skeletonweed have been documented in the Deklotz Pasture. All seven noxious weed occurrences were treated in 2008. Several invasive plants, including cheatgrass, were noted at IIRH site. However, they were present in low amounts and mostly found in disturbed areas.

Trend data is not available for the trend plot in the Deklotz Pasture. The plot is on private land and recent data has not been collected.

Spring grazing has occurred in three years since 2004. Early summer grazing also occurred during one of those years and by itself in 2004. Summer or fall use was made in the remaining years. AUMs used over the ten-year study period ranged from 53 to 281. Utilization data in the Deklotz Pasture was not collected over the ten-year period.

***Evaluation Finding – Deklotz Pasture is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

IIRH Site DZ is on a Wyoming big sagebrush/bluebunch wheatgrass site (loamy 10-13”). The site has burned twice since 1960, in 1960 and 2007. The ESD for this site describes a burned plant community in its Reference State 1 Community Phase 1.3: Post Fire-Grass Dominated State. In this phase the site is dominated by perennial grasses, both deep and shallow-rooted. Rabbitbrush and horsebrush will resprout on the site. Some cheatgrass may have invaded the site as well.

The IIRH site is similar to the ESD Reference 1 burned plant community. Secar bluebunch wheatgrass was seeded after the Murphy Complex Fire and now dominates the site. Sandberg bluegrass, Thurber’s needlegrass, and Western wheatgrass are subdominant species. Perennial and annual forb diversity is high. Shrubs including Wyoming big sagebrush are expected to reestablish in the area, although it may take decades. Adequate water infiltration, energy flow, and nutrient cycling are occurring as evidence by perennial species that are productive and capable of reproduction and recruitment of new seedlings.

Noxious weeds were not seen at the IIRH site. Diffuse knapweed and rush skeletonweed were found in the Deklotz Pasture; however, they were treated in 2008. Invasive annuals are present at the IIRH site, including cheatgrass. Most of them are found in small disturbed areas such as rodent hills. Although present, they are not expected to expand into the seeding due to sufficient cover provided by Secar bluebunch wheatgrass and other perennial vegetation.

The current plant community lacks vertical structure due to a wildfire burning through it and removing sagebrush that was present. Use by native shrub obligate wildlife is limited at this time. As shrubs reestablish these animals should return to the area. In the meantime, the Secar bluebunch wheatgrass plant community provides habitat to native grassland wildlife species as well as seasonal habitat for big game species.

More litter is present at the sites than expected; however, it does not seem to be impacting ecological processes. It is providing cover for site protection and nutrients appears to be replenishing as well. The seeded vegetation community in the Deklotz Pasture is functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

***Salls Field Pasture***

IIRH Site SF has burned twice since 1960: 2001 Doe Flat Fire and the 2007 Murphy Complex Fire. The Murphy Complex Fire essentially burned off any shrubs that may have reestablished after the Doe Flat Fire. Shrub regeneration is occurring at the site. Rabbitbrush, fourwing saltbush, and sagebrush were all noted at the IIRH site. Deep-rooted grasses appear vigorous and reproduction is occurring. Plant composition is such that energy flow, water infiltration, and nutrient cycling are occurring at the IIRH site.

Noxious weeds were not recorded at IIRH Site SF, but three occurrences of diffuse knapweed were documented in the Salls Field Pasture. These occurrences were treated in 2008. Several invasive plants, including cheatgrass, were noted at the IIRH site. However, they were present in low amounts and mostly found in disturbed areas.

Both nested plot frequency and a 3x3 photo plot in the Salls Field Pasture. The frequency of bluebunch wheatgrass in 2013 is the same as measured in 1989. Thurber's needlegrass increased in frequency in 2013 as it was not recorded in 1989 and in 1995. Sandberg bluegrass also remained static from 1989 to 2013. Squirreltail declined substantially. Grasses may have been misidentified explaining the sudden appearance of Thurber's needlegrass and dramatic decline of squirreltail. Cheatgrass was first recorded in the plot in 2013 at low levels (3%). Sagebrush was present, albeit at low frequencies, in 1989 and 1995, but burned in the 2007 Murphy Complex Fire. Yellow rabbitbrush was recorded in 2013.

Four mature bluebunch wheatgrass plants were recorded in the 3x3 plot in 1995. In 2013 five Thurber's needlegrass were recorded, while bluebunch wheatgrass was not recorded. It appears that Thurber's needlegrass was misidentified as bluebunch wheatgrass in 2013. Overall the number of perennial grass plants remained similar between 1995 and 2013. Live vegetation cover increased while bare ground decreased. Another factor contributing to a decline in bare ground is that microbiotic crusts were recorded in 2013 but not in 1995.

Spring grazing occurred in three years of the ten-year study period with fall use also occurring during one of these years. Early summer grazing occurred in two years. Livestock grazed the pasture either in the fall, winter, or both during the remaining years. AUMs used annually ranged from 44 to 421. Utilization data was not collected in the Salls Field Pasture during the ten-year study period.

***Evaluation Finding – Salls Field Pasture is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

IIRH Site SF is on a Wyoming big sagebrush/bluebunch wheatgrass site (loamy 10-13"). The site has burned twice since 1960, in 2001 and 2007. The ESD for this site describes a burned plant community in its Reference State 1 Community Phase 1.3: Post Fire-Grass Dominated State. In this phase the site is dominated by perennial grasses, both deep and shallow-rooted. Rabbitbrush and horsebrush will resprout on the site. Some cheatgrass may have invaded the site as well.

The IIRH site is similar to the ESD Reference 1 burned plant community. Secar bluebunch wheatgrass was seeded after the Murphy Complex Fire and now dominates the site. Sandberg bluegrass and squirreltail are subdominant species. Perennial and annual forb diversity is high and shrubs, including Wyoming big sagebrush, are reestablishing in the area. Adequate water

infiltration, energy flow, and nutrient cycling are occurring as evidence by perennial species that are productive and capable of recruitment of new seedlings.

Noxious weeds were not seen at the IIRH site. Diffuse knapweed occurrences were found in the Salls Field Pasture; however, they were treated in 2008. Invasive annuals are present at the IIRH site, including cheatgrass. Most of the invasive plants are found in small disturbed areas such as rodent hills. Although present, they are not expected to expand into the seeding due to sufficient cover provided by Secar bluebunch wheatgrass and other perennial vegetation. Litter amounts are appropriate for the IIRH site.

The current plant community is providing habitat primarily to grassland and generalist wildlife species. Use by native wildlife dependent on sagebrush for their habitat (i.e. Brewer's sparrow, sage sparrow, sage thrasher, sagebrush lizard) is limited at this time. As shrubs, particularly sagebrush re-establish, these animals should return to the area. The seeded vegetation community in the Salls Field Pasture is functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

**Allotment Summary for Standard 5 (Seeded Plant Communities):**

A recent IIRH assessment has not been done in the Old Pipeline Pasture. However, trend data as well as cover data from a 2004 IIRH site indicate that the pasture may not be meeting the standard throughout the pasture. In 2004, IIRH cover data showed tumble mustard as prominent in a 2000 Secar bluebunch wheatgrass seeding. Cheatgrass, clasping pepperweed, and curvseed butterwort were also present at the site. Deep-rooted bunchgrasses were also noted as not being common at the site. Plant vigor, including the ability for perennial grasses to produce seed and propagate, appeared low at the 2004 IIRH site.

Trend data collected in the Old Pipeline Pasture shows a significant decline in the frequency of Thurber's needlegrass occurrences; from 46 percent in 1989 to 14 percent in 2012. The 3x3 photo plot also shows a substantial decline in the number of Thurber's needlegrass plants rooted in the plot (twelve to one). Thurber's cover also declined from 3.8 to 0.53 percent. The decline in deep-rooted bunchgrasses and presence of annual invasive plants in this pasture puts the pasture at increased risk for loss of diversity following a disturbance such as wildfire as well as its ability to maintain native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

Standard 5 met in the remaining seeded pastures. The current condition of the seeded pastures is similar to the ESD Reference 1 burned plant community. The seedings consist of Secar bluebunch wheatgrass with Sandberg bluegrass being a subdominant species. Other grasses occurring in the seedings include squirreltail, Thurber's needlegrass, Western wheatgrass, and wildrye. Shrub cover, particularly sagebrush, is low due to losses incurred during the 2007 Murphy Complex Fire. During the past six years sagebrush has begun to reestablish in most of the pastures to a limited degree. Sagebrush establishment in the Deklotz Pasture is slower than expected. However, sagebrush seed and seedlings have been planted in the pasture; therefore, some shrub regeneration is anticipated. Perennial and annual forb diversity is high. Adequate water infiltration, energy flow, and nutrient cycling are occurring as evidence by perennial species that are productive and capable of reproduction and recruitment of new seedlings.

**Standard 6 (Exotic Plant Communities, Other than Seedings)**

*Exotic plant communities, other than seedings, will meet minimum requirements of soil stability and maintenance of existing native and seeded plants. These communities will be rehabilitated to perennial communities when feasible cost effective methods are developed.*

Standard Doesn't Apply

The plant communities with the Grassy Hills AMP Allotment are dominated by native species as well as native-like seedings. Standard 6 does not apply to the allotment.

**Standard 7 (Water Quality)**

*Surface and ground water on public lands comply with the Idaho Water Quality Standards.*

**Rangeland Health Assessment**

See Standard 2 for a description of the water resources in the Grassy Hills AMP Allotment. Standard 7 was not evaluated for Clover Creek, intermittent streams, and reservoirs for the same reasons as discussed under Standard 2.

**Evaluation of Standard 7**

The short segment of Deadwood Creek in the Catlou Field Pasture is within IDEQ assessment unit (AU) ID17050102SW034\_03. This AU is identified in the IDEQ 2012 Integrated Report (IDEQ, 2014) as fully supporting the designated beneficial uses of cold water aquatic life and secondary contact recreation. The IDEQ 2012 Integrated Report identifies the lower 4.1 miles of Deadwood Creek, which includes Deadwood Creek within the Catlou Field Pasture, as a Category 2 stream. Category 2 streams include streams for which waters are fully supporting the beneficial uses assessed (IDEQ 2014, Attachment E).

***Evaluation Finding – Catlou Field Pasture is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

Deadwood Creek that flows through the Catlou Field Pasture is listed by IDEQ as a Category 2 stream that is supporting designated beneficial uses (IDEQ 2014). Standard 7 is met for the Grassy Hills AMP Allotment.

**Standard 8 (Threatened, Endangered and BLM Sensitive Plants and Animals)**

*Habitats are suitable to maintain viable populations of threatened and endangered, sensitive, and other special status species.*

**Rangeland Health Assessment**

**Plants**

There are no known BLM sensitive plant species within the allotment. In the Jarbidge Field Office special status plants are generally associated with distinct soil types that occur on the periphery of the field office. None of these soil types occur within the allotment based on

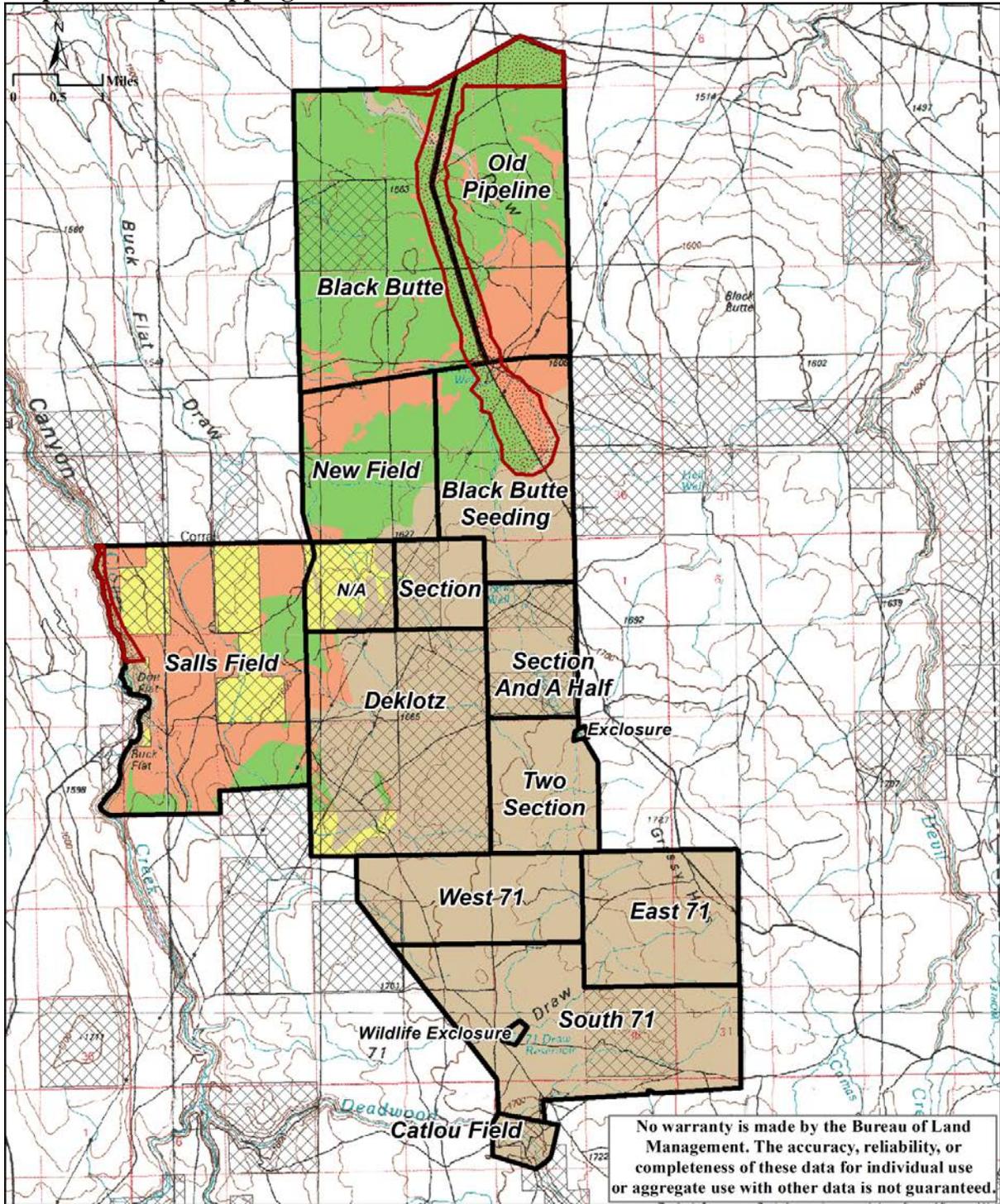
SSURGO soil data (NRCS, 2012). Potential habitat occurs for one sensitive plant species, slickspot peppergrass (*Lepidium papilliferum*; Proposed Endangered, BLM sensitive species). Approximately 1,535 acres have been surveyed for slickspot peppergrass; slickspots were noted but slickspot peppergrass plants have not been found in these or earlier surveys. Systematic inventories for other special status plants have not been conducted in the allotment.

Slickspot peppergrass grows in the semiarid sagebrush-steppe ecosystem of southwestern Idaho. Interspersed within this habitat type, slickspot peppergrass are found in visually distinct microsites known as slickspots (mini playas or natric sites) that act as small water basins and where the sodium and clay content is higher than adjacent, unoccupied habitat (Moseley, 1994). The Grassy Hills AMP Allotment has 11,068 acres (54 percent of allotment) of potential slickspot peppergrass habitat (Map 9). A GIS model was developed to help focus inventory and clearance efforts to areas that would have a higher chance of finding slickspot peppergrass plants (BLM, 2012). This model used updated soils data, vegetation community data, fire frequency, slope, and elevation to further refine potential habitat and to categorize the habitat into groups (high, medium, and low) that identify the potential for finding the species. The allotment has 6,835 acres of high potential, 4,225 acres of medium potential, 8 acres of low potential, habitat for slickspot peppergrass (Table 32). The nearest known occupied habitat for slickspot peppergrass is 0.1 mile from the Salls Field Pasture, on the west side of Clover Creek.

**Table 32: Slickspot Peppergrass Potential Habitat (Acres)**

| Pasture             | High  | Medium | Low | Non-habitat |
|---------------------|-------|--------|-----|-------------|
| Black Butte         | 2,645 | 223    | 0   | 103         |
| Black Butte Seeding | 712   | 371    | 0   | 1,118       |
| Catlou Field        | 0     | 0      | 0   | 87          |
| Deklotz             | 56    | 168    | 0   | 416         |
| East 71             | 0     | 0      | 0   | 1,662       |
| Exclosure           | 0     | 0      | 0   | 11          |
| New Field           | 1,040 | 505    | 1   | 142         |
| Old Pipeline        | 1,832 | 881    | 0   | 48          |
| Salls Field         | 551   | 2,076  | 6   | 138         |
| Section             | 0     | 0      | 0   | 319         |
| Section And A Half  | 0     | 0      | 0   | 319         |
| South 71            | 0     | 0      | 0   | 2,351       |
| Two Section         | 0     | 0      | 0   | 1,110       |
| West 71             | 0     | 0      | 0   | 1,438       |
| Wildlife Exclosure  | 0     | 0      | 0   | 26          |

**Map 9: Slickspot Peppergrass Potential Habitat**



## Animals

Presence of various sensitive wildlife species are based upon primarily incidental observations by BLM staff and data entered into the Idaho Natural Heritage Center database by other individuals. Species found in the Grassy Hills AMP Allotment are discussed below.

### Redband Trout (*Oncorhynchus mykiss gairdnerii*; BLM sensitive species)

No recent fisheries surveys or fish habitat surveys have occurred in the allotment. Redband trout likely occur within the Clover Creek drainage on the western edge of the Salls Field Pasture when water temperatures are suitable (October-June). Livestock do not have access to Clover Creek within the allotment on BLM land. Livestock from the allotment are blocked from Clover Creek on private land by a gap fence on the east side of the canyon.

Redband trout are known to occur within the headwaters of the Deadwood Creek drainage (outside the allotment). However, a significant portion of Deadwood Creek upstream of the Grassy Hills AMP Allotment is dewatered for most of the year making it unsuitable for redband trout. No other BLM Sensitive fish or threatened, endangered, or special status aquatic species are present in the allotment.

### Greater Sage-Grouse (*Centrocercus urophasianus*; BLM sensitive species)

Sage-grouse require sagebrush and other shrub habitat to fulfill seasonal habitat needs (Connelly et al., 2000; Holloran et al., 2005). Sage-grouse are dependent on sagebrush ecosystems and require extensive stands of sagebrush with a diverse and vigorous herbaceous understory.

Sage-grouse display and breed on leks (i.e., display grounds with sparse vegetation cover) between March and May. After breeding hens disperse into nesting areas around the leks. Sage-grouse typically return to the same lek and nest areas year after year. Hens seek out nest sites concealed from predators, especially avian predators (Conover et al., 2010) by a combination of sagebrush and grass cover. When chicks hatch the hen and her chicks feed on insects and forbs and slowly move towards wetter areas like wet meadows or streams and springs where forbs are still green and growing. A diverse forb component and an abundance of forbs are necessary to support a variety of insects which are critical to the growth of young sage-grouse (Knick and Connelly, 2011). In the fall as forbs dry up sage-grouse switch from eating forbs to sagebrush through the winter. Sage-grouse may either migrate to different seasonal habitats or may stay in a single general area throughout the year.

In 2010, the BLM developed the Sage-Grouse HAF to assess seasonal sage-grouse habitats at multiple scales (Stiver et al., 2010). Habitat suitability requirements were based on the following guidelines which were published in 2000 and describe desired conditions for sage-grouse habitats during nesting and early brood rearing, late brood rearing, and winter:

- Nesting and early brood rearing habitat should support 15-25 percent canopy cover of sagebrush, perennial herbaceous cover should average at least 7” in height with at least 10 percent canopy cover for grasses and at least 5 percent for forbs and a diversity of forb species during spring (Connelly et al., 2000).

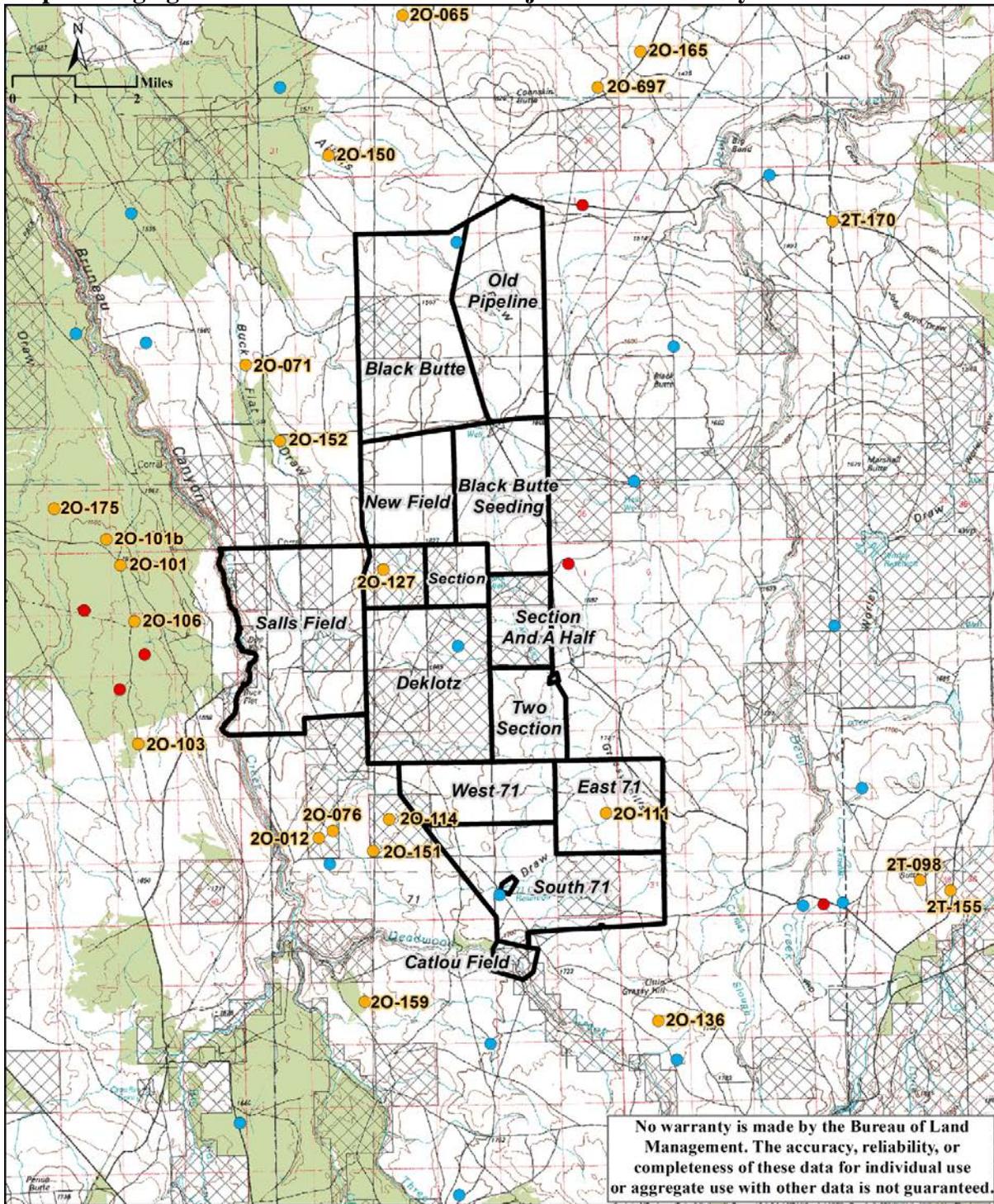
- Late brood rearing habitat should support 10-25 percent canopy cover of sagebrush. Riparian areas or wet meadows in the general area improve habitat for sage-grouse (Connelly et al., 2000).
- Winter habitat should have 10-30 percent canopy cover of sagebrush with at least 10-14' exposed above the snow (Connelly et al., 2000).

The 2007 Murphy Complex Fire essentially eliminated all sagebrush habitat in the allotment. The BLM aerial seeded sagebrush in strips after the fire. Although sagebrush has been reseeded, recovery of the sagebrush community needed for sage-grouse will take one (Wambolt and Payne, 1986) to several (Baker, 2006; Baker, 2011) decades assuming no more fires occur.

Large areas of sagebrush occur to the west of the allotment in the Buck Flat AMP, Juniper Butte, and Juniper Draw Allotments (Map 10).

DRAFT

**Map 10: Sage-grouse Leks and Shrublands Adjacent to the Grassy Hills AMP Allotment**



The Grassy Hills AMP Allotment has two occupied and three undetermined (due to a lack of recent surveys) sage-grouse leks. Within five miles there are 22 occupied, 19 undetermined, and 6 unoccupied sage-grouse leks (Map 10). Table 33 shows sage-grouse attendance at occupied leks within five miles of the allotment. Leks are occupied if there has been documented sage-grouse activity within the past five years.

**Table 33: Sage-grouse Attendance at Occupied Leks within Five Miles of the Grassy Hills AMP Allotment (2000-2014)**

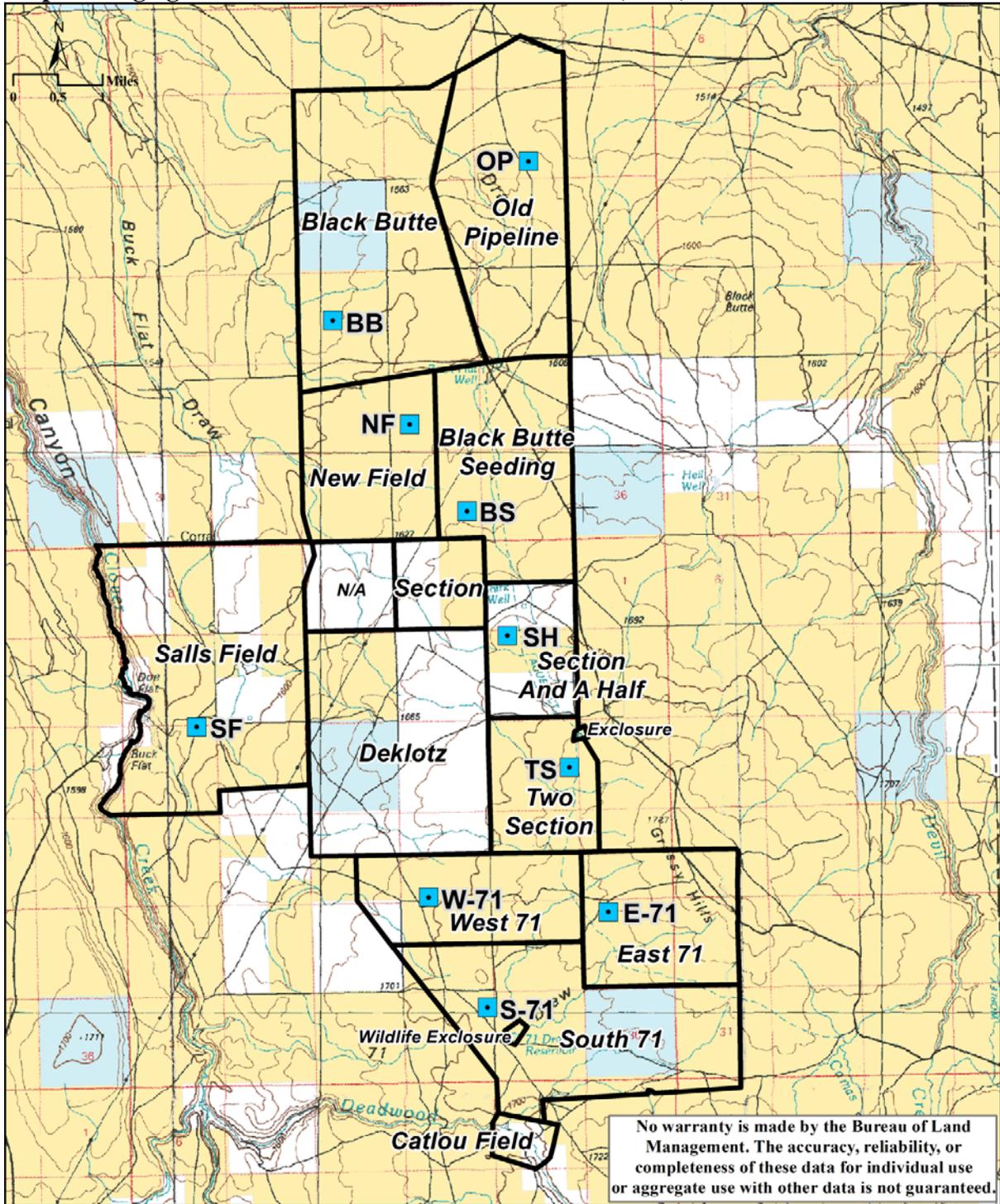
| Lek     | Location            | Survey Year <sup>1</sup> |    |    |    |    |    |    |     |    |    |    |    |    |    |    |
|---------|---------------------|--------------------------|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|
|         |                     | 00                       | 01 | 02 | 03 | 04 | 05 | 06 | 07  | 08 | 09 | 10 | 11 | 12 | 13 | 14 |
| 2O-111  | East 71 Pasture     | 20                       | -- | -- | 8  | 8  | 7  | 19 | --* | 0  | 19 | 19 | 14 | 11 | 2  | 2  |
| 2O-127  | Lek on Private Land |                          |    |    |    |    |    |    |     |    | 6  | 3  | -- | -- | -- | -- |
| 2O-114  | 0.4 mile W          |                          |    |    |    |    |    |    |     |    | 4  | 5  | -- | -- | -- | -- |
| 2O-151  | 0.9 mile W          | --                       | -- | -- | -- | -- | 13 | -- | --* | 8  | 3  | 3  | 0  | 6  | -- | 5  |
| 2O-076  | 1.2 miles W         | --                       | -- | -- | -- | -- | -- | -- | --* | -- | -- | 5  | -- | -- | -- | -- |
| 2O-150  | 1.3 miles N         |                          |    |    |    |    | 19 | -- | 7*  | 15 | 7  | 6  | 0  | -- | -- | -- |
| 2O-152  | 1.3 miles W         | --                       | -- | -- | -- | 0  | -- | -- | --* | -- | -- | 0  | 11 | 0  | -- | -- |
| 2O-012  | 1.4 miles W         |                          |    |    |    |    |    |    |     |    | 8  | -- | 12 | -- | -- | -- |
| 2O-103  | 1.4 miles W         | 6                        | 0  | 16 | -- | 15 | 24 | 18 | 15  | 8  | 4  | 9  | 5  | 1  | 5  | 9  |
| 2O-101  | 1.6 miles W         | 9                        | 0  | 0  | -- | 6  | 6  | 24 | 7   | 2  | 7  | 2  | 0  | 4  | 3  | 4  |
| 2O-106  | 1.6 miles W         | 13                       | 11 | -- | -- | 12 | 26 | 22 | 3   | 5  | 7  | 2  | 4  | 2  | 0  | 4  |
| 2O-136  | 1.6 miles S         |                          |    |    |    |    | 8  | -- | 29* | 26 | 12 | 15 | 15 | -- | -- | -- |
| 2O-071  | 1.8 miles W         |                          |    |    |    |    |    |    |     |    | 12 | 4  | -- | -- | -- | -- |
| 2O-101b | 1.8 miles W         |                          |    |    |    |    | 6  | 12 | 10  | 6  | -- | 6  | 0  | 1  | 0  | 4  |
| 2O-159  | 2.1 miles SW        |                          |    |    |    |    |    |    |     |    | 5  | 10 | -- | -- | -- | -- |
| 2O-697  | 2.1 miles NE        |                          |    |    |    |    |    |    | 2*  | 0  | 0  | 4  | 1  | 4  | 0  | 0  |
| 2O-175  | 2.7 miles W         |                          |    |    |    |    |    | 34 | 1   | 12 | 5  | 15 | 32 | 35 | 19 | 81 |
| 2O-165  | 3.0 miles NE        | 9                        | 8  | 7  | -- | 8  | -- | -- | 9*  | 9  | 4  | 2  | 4  | -- | 0  | 4  |
| 2O-065  | 3.5 miles N         |                          |    |    |    |    |    |    |     |    | 12 | 5  | -- | -- | -- | -- |
| 2T-098  | 4.2 miles E         | 11                       | 0  | 2  | 2  | 0  | 4  | 2  | 0*  | 2  | 8  | 6  | 13 | 15 | 19 | 19 |
| 2T-155  | 4.6 miles E         | 6                        | 0  | 1  | -- | -- | -- | -- | --* | 0  | 0  | -- | 2  | 0  | -- | 0  |
| 2T-170  | 4.7 miles E         | 9                        | 2  | -- | -- | -- | 16 | 17 | 24* | 16 | 6  | 4  | 0  | 0  | 0  | 0  |

<sup>1</sup>Where the table is blank the lek had not yet been identified; in years marked by dashes (--) the lek was not surveyed. An asterisk indicates area around lek burned in a wildfire that year (\*).

### *Nesting and Early Brood Rearing Habitat*

The current conditions of sage-grouse seasonal habitats were assessed following protocols outlined in the Sage-grouse HAF (Stiver et al., 2010). Sage-grouse habitat suitability assessments were done in 2012 at HAF sites BS- Black Butte Seeding Pasture, E71- East 71 Pasture, NF- New Field Pasture, SH- Section Half Pasture, TS- Two Section Pasture, and W71- West 71 Pasture. Assessments were also conducted in 2013 at HAF sites BB- Black Butte Pasture, OP- Old Pipeline Road Pasture, SF- Salls Field Pasture, and S71- South 71 Pasture. Map 11 shows the locations of HAF sites.

**Map 11: Sage-grouse Habitat Assessment Framework (HAF) Sites**



Sage-grouse droppings were observed during the assessments at the HAF site in the East 71 Pasture. Sage-grouse droppings were also seen during the IIRH field visits to the Black Butte and Salls Field Pastures. Sage-grouse habitat suitability assessments are not necessarily an indication of rangeland health; they are merely indicators of habitat suitability. However, vegetation data collected as part of the habitat suitability assessments are used to inform and interpret other rangeland health information and observations. Sage-grouse habitat suitability assessments are in Table 34.

**Table 34: Sage-grouse Habitat Assessment Worksheet for Nesting and Early Brood Rearing Habitat (Arid Site)**

| Habitat Indicator                    | Suitable Habitat  | Marginal Habitat  | Unsuitable Habitat  |
|--------------------------------------|---|---|---|
| Average Sagebrush Canopy Cover       | 15-25 percent   | 10- <15 percent or > 25 percent                         | <10 percent   |
|                                      |   |   | BB(0), BS(0), E71(0), NF(0), OP(0), SF(1 percent), SH(0), S71(0), TS(0), W71(0) |
| Average Sagebrush Height             | 12-30"  | 10-11" or >30"  | <10"  |
|                                      | SF(26")   |   | BB(0"), BS(0"), E71(0"), NF(0"), OP(0"), SH(0"), S71(0"), TS(0"), W71(0")       |
| Sagebrush Growth Form                | Spreading   | Mix of spreading and columnar                           | Columnar  |
|                                      | SF  |   | BB, BS, E71, NF, OP, SH, S71, TS, W71   |
| Average Grass Height                 | ≥7"   | 5- <7"  | <5"   |
|                                      | BB(13"), SF(10"), SH(7"), S71(12"), TS(9")  | OP (6.7"), W71(6.6")                                    | BS(4.0"), E71(4.3"), NF(3.8")   |
| Average Perennial Grass Canopy Cover | ≥10 percent   | 5- <10 percent  | <5 percent  |
|                                      | BB(66 percent), BS(33.5 percent), E71(41.5 percent), NF(41.5 percent), OP(36 percent), SF(49 percent), SH(59.5 percent), S71(38 percent), TS(45.5 percent), W71(59.5 percent) |   |   |
| Average Forb Canopy Cover            | ≥5 percent  | 3- <5 percent   | <3 percent  |
|                                      | BB(8 percent), BS(6 percent), E71(6 percent), OP(13 percent), SF(5 percent), S71(14 percent), TS(6 percent)   |   | NF(1 percent), SH(2 percent), W71(2 percent)                                    |
| Preferred Forb Abundance and         | Forbs common with at least a few preferred species common   | Forbs common, but only 1 or 2 preferred species present | Forbs rare to sparsely present  |

| Habitat Indicator              | Suitable Habitat                          | Marginal Habitat | Unsuitable Habitat  |
|--------------------------------|---|------------------|---|
| Diversity                      | BB, BS, E71, NF, OP, SF, SH, S71, TS, W71 |                  |   |
| <i>Overall Site Evaluation</i> |   |                  | BB, BS, E71, NF, OP, SF, SH, S71, TS, W71   |
| <i>Pasture Evaluation</i>      |   |                  | Black Butte, Black Butte Seeding, Catlou Field, DeKlotz, East 71, New Field, Old Pipeline, Salls Field, Section, Section And A Half, South 71, Two Section, West 71 |

One HAF site is in the Black Butte Pasture (HAF site BB). Wildfire has eliminated most the sagebrush in the pasture making it unsuitable for sage-grouse. AF site BB is in the southwestern portion of the pasture that is mapped as a Sandberg bluegrass vegetation community. Attributes at HAF site BB rated suitable for all grass and forb indicators. Seven species of forbs were observed and they occurred at moderate density (1.79 forbs per 0.1 m<sup>2</sup> plot). The most common forbs were longleaf phlox, lupine, and alfalfa (*Medicago sativa*). Cheatgrass was 3 percent cover (cover values reported are for all layers). This pasture has good potential for restoration since all grass and forb attributes were rated suitable. A few sagebrush seedlings were observed during the IIRH field visit and rabbitbrush and fourwing saltbush is scattered throughout the pasture.

The Black Butte Seeding Pasture has one HAF site (HAF site BS). Wildfire has eliminated sagebrush in the pasture making it unsuitable for sage-grouse. HAF site BS is in the southwestern portion of the pasture that is mapped as a Sandberg bluegrass vegetation community. Attributes were rated unsuitable for sagebrush indicators and average grass height. However, average grass canopy cover, average forb canopy cover, and preferred forb abundance and diversity were all rated suitable. Twelve species of forbs were seen and they occurred at high density (2.78 forbs per 0.1 m<sup>2</sup> plot). The most common forbs were longleaf phlox, western yarrow (*Achillea millefolium*), and lupine (*Lupinus* spp.). Cheatgrass was recorded at 2.5 percent cover (all layers).

The Catlou Field, DeKlotz, Section, and Section And A Half Pastures were not assessed during the HAF. These pastures have all burned in wildfires, which essentially eliminated all the sagebrush. Without sagebrush, these pastures are unsuitable as nesting and early brood rearing habitat for sage-grouse. During the IIRH field visit to the DeKlotz Pasture very little brush was observed and the field notes also indicate that there was very little cheatgrass.

One HAF site is in the East 71 Pasture (HAF site E71). Wildfire has eliminated sagebrush in the pasture making it unsuitable for sage-grouse. HAF site E71 is in the western portion of the pasture that is mapped as a Sandberg bluegrass vegetation community. Attributes were rated unsuitable for sagebrush indicators and average grass height. However, average grass canopy cover, average forb canopy cover, and preferred forb abundance and diversity were all rated suitable. Sixteen species of forbs were observed and they occurred at high density (4.53 forbs per 0.1 m<sup>2</sup> plot). The most common forbs were longleaf phlox, shaggy fleabane (*Erigeron pumilus*),

lupine, barestem biscuitroot (*Lomatium nudicaule*), pale agoseris, and lambstongue ragwort (*Senecio integerrimus*). Cheatgrass was recorded at 2.5 percent cover (all layers). The IIRH field notes indicate that there is very little sagebrush and that rabbitbrush is increasing at the site.

The New Field Pasture has one HAF site (HAF site NF). This entire pasture also has burned in wildfires and is mapped as a Sandberg bluegrass vegetation community. Attributes at the site were rated unsuitable for all habitat indicators except for average perennial grass canopy cover (suitable) and preferred forb abundance and diversity (suitable). Although average forb canopy cover was unsuitable, the site rated suitable for preferred forb abundance and diversity with 10 species of forbs observed. Forb density was moderate (0.72 forbs per 0.1m<sup>2</sup> plot). The most common forbs were longleaf phlox and spiny phlox. Cheatgrass was recorded at 0.5 percent cover (all layers). The IIRH field notes indicate that shrubs are generally lacking.

One HAF site is in the Old Pipeline Pasture (HAF site OP). The entire pasture has burned and is mapped as a Sandberg bluegrass vegetation community. At the site, all grass and forb indicators rated suitable except for grass height which was slightly lower than the recommended seven inches. Fifteen species of forbs were observed and they occurred at high density (3.69 forbs per 0.1 m<sup>2</sup> plot). The most common forb species were longleaf phlox, pale agoseris, sagebrush phlox (*Phlox aculeata*), Lewis flax (*Linum lewisii*), and mourning milkvetch (*Astragalus atratus*). Cheatgrass was recorded at 2 percent cover (all layers). This pasture has good potential for restoration since all grass and forb attributes rated suitable.

The Salls Field Pasture has one HAF site (HAF site SF). Wildfire has eliminated most of the sagebrush in the pasture making it unsuitable for sage-grouse. The entire pasture is mapped as a Sandberg bluegrass vegetation community. Attributes at the site rated suitable for all habitat indicators except for sagebrush canopy cover (unsuitable). Ten species of forbs were observed and they occurred at high density (5.94 forbs per 0.1 m<sup>2</sup> plot). The most common forbs were sagebrush phlox, longleaf phlox, pale agoseris, and mourning milkvetch. Cheatgrass was recorded at 3 percent cover (all layers). Rabbitbrush, sagebrush, and shadscale saltbush were observed at low densities during the IIRH field visit.

One HAF site is in the Section And A Half Pasture (HAF site SH). The entire pasture has burned and is mapped as a Sandberg bluegrass vegetation community. Attributes at the site were rated suitable for all grass and forb indicators except for average forb canopy cover (unsuitable). Although average forb canopy cover was unsuitable, the site rated suitable for preferred forb abundance and diversity with 13 species of forbs observed. Forb density was high (3.36 forbs per 0.1m<sup>2</sup> plot). The most common forbs were longleaf phlox, lupine, and freckled milkvetch (*Astragalus lentiginosus*). Cheatgrass was recorded at 1.5 percent cover (all layers). This pasture has good potential for restoration.

The South 71 Pasture has one HAF site (HAF site S71). Wildfire has eliminated most of the sagebrush in the pasture making it unsuitable for sage-grouse. The entire pasture is mapped as a Sandberg bluegrass vegetation community. Attributes at HAF site S71 rated suitable for all grass and forb indicators. Eighteen species of forbs were observed and they occurred at high density (5.84 forbs per 0.1 m<sup>2</sup> plot). The most common forbs were longleaf phlox, pale agoseris, desert biscuitroot (*Lomatium foeniculaceum*), mourning milkvetch, sagebrush phlox, and lava aster

(*Ionactis alpina*). Cheatgrass was not recorded along the transect and is uncommon at the site. This pasture has good potential for restoration. Sagebrush seedlings and rabbitbrush plants were observed at low densities during the IIRH field visit.

The Two Section Pasture has one HAF site (HAF site TS). The entire pasture has burned and is predominately mapped as a bluebunch wheatgrass vegetation community. Attributes at HAF site TS rated suitable for all grass and forb indicators. Nine species of forbs were observed and they occurred at high density (2.37 forbs per 0.1 m<sup>2</sup> plot). The most common forbs were longleaf phlox, lupine, Lewis flax, and pale agoseris. Cheatgrass was recorded at 3 percent cover (all layers). This pasture has good potential for restoration. Rabbitbrush was recorded at 6 percent cover at the site (all layers).

The West 71 Pasture has one HAF site (HAF site W71). The entire pasture has burned and is mapped as a Sandberg bluegrass vegetation community. Attributes at the site were suitable for grass canopy cover and preferred forb abundance, marginal for grass height, and unsuitable for the remaining habitat indicators. Seven species of forbs were observed and they occurred at moderate density (0.72 forbs per 0.1 m<sup>2</sup> plot). The most common forbs were longleaf phlox, lupine, and shaggy fleabane. Cheatgrass was recorded at 0.5 percent cover at the site (all layers). A list of plants species observed at each site, including preferred sage-grouse forbs is ed in Appendix B.

#### *Late Brood Rearing Habitat*

Aikers Draw occurs in the Black Butte, Black Butte Seeding, Old Pipeline, and Section And A Half Pastures. Buck Flat Draw occurs in the DeKlotz, New Field, Salls Field, Section, Section And a Half, and Two Sections Pastures in the allotment. Additionally, other unnamed draws occur throughout the allotment. These draws contain water intermittently and reservoirs were constructed along these draws to capture water from snowmelt. In some years these areas contain a higher abundance of preferred forbs than the surrounding uplands while in other years the drainages and reservoirs are dry. While areas that remain moist later in the summer are present in the allotment the value as late brood rearing habitat for sage-grouse is limited since sagebrush is absent near these areas.

Clover Creek along the western edge of the allotment occurs in the bottom of a steep canyon. Riparian areas associated with steep drainages or canyons are not used by sage-grouse (Stiver et al., 2010). Sage-grouse potentially use the area along Deadwood Creek as late-brood rearing habitat since this portion of the creek within the allotment does not occur in the bottom of a steep canyon. However, the creek only has water intermittently and generally does not contain water into the late summer. Deadwood Creek in the Catlou Field Pasture is a high use area for livestock.

#### *Winter Habitat*

The allotment is unsuitable for wintering sage-grouse since the majority of sagebrush burned in wildfires. Cover of grasses and forbs for wintering habitats generally is irrelevant, because of the complete reliance of sage-grouse upon sagebrush during this period (Homer et al., 1993).

Ferruginous Hawk (*Buteo regalis*; BLM sensitive species)

Ferruginous hawks typically inhabit flat and rolling terrain in grasslands and shrub steppe regions (Bechard and Schmutz, 1995). They primarily nest in trees or less frequently on cliffs, rock outcrops or on the ground at the crest of ridges. Although ferruginous hawks exhibit flexibility in nest site selection, they prefer elevated nest sites and rarely nest on level ground (Bechard and Schmutz, 1995). Ferruginous hawks may have more than one nest site within their nesting territory that they may use in different years (Bechard and Schmutz, 1995). Locally, ferruginous hawks that nest on the ground are rarely successful. Both the male and female share in the nest selection, egg incubation and young rearing, though the male does most of the hunting. One clutch of two to four eggs is laid in spring and parents care for the young until several weeks after fledging (Bechard and Schmutz, 1995).

Ferruginous hawks prey primarily on smaller mammals. Prey species include ground squirrel (*Urocitellus* spp.), black-tailed jackrabbit (*Lepus californicus*), mountain cottontail (*Sylvilagus nuttalli*), and pocket gopher (*Thomomys talpoides*). Fledgling birds, reptiles and insects constitute a small percent of the diet (Bechard and Schmutz, 1995).

Management of shrub steppe and grassland habitats that provide healthy native shrub and bunchgrass communities and a natural range of habitat variation would be expected to provide suitable habitat for ferruginous hawks.

There is one ferruginous hawk nest in the allotment (Nest F10; Table 35). The nest is in a live juniper along Aikers Draw in the Old Pipeline Pasture.

**Table 35: Ferruginous Hawk Nest Data**

| Nest | Survey Year <sup>1</sup> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------|--------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|      | 95                       | 96 | 97 | 98 | 99 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 |
| F07  | 2                        | -- | -- | -- | -- | A  | U  | 2  | -- | -- | -- | 2  | A  | -- | 2  | 2  | 2  | A  | 2  |

<sup>1</sup>Surveys were not conducted in years indicated by dashes (--). If the nest was active with young, the number of young was recorded, if the nest was active (A) with no young that was also recorded. Also if evidence of use was present but the species was unknown (U) was recorded.

Junipers that could be used for nesting by ferruginous hawks occur in the Old Pipeline, Salls Field, and South 71 Pastures. The Old Pipeline Pasture has four juniper skeletons and one live juniper along Aikers Draw. The Salls Field Pasture has about 40 junipers along the top edge of the canyon rim along Clover Creek. A side draw that extends from Clover Creek has an additional six live junipers and 30 juniper skeletons. The South 71 Pasture has six junipers along the pipeline in northeastern portion of the pasture. The remaining pastures do not contain trees suitable for nesting.

The allotment is predominately a perennial grassland that provides marginal habitat for mammalian prey (black-tailed jackrabbit, mountain cottontail, ground squirrels, etc.) favored by ferruginous hawks.

Brewer's Sparrow (*Spizella breweri*; BLM sensitive species)

Brewer's sparrows are typically associated with sagebrush steppe. Brewer's sparrow place nests primarily in shrubs, but occasionally on the ground. The nest shrub is typically taller and denser than in the surrounding habitat (Rotenberry et al., 1999). Shrubs used for nesting by Brewer's sparrows include primarily big sagebrush (81 percent), with spiny hopsage (*Grayia spinosa*) (10 percent), antelope bitterbrush (*Purshia tridentata*) (6 percent), and yellow rabbitbrush (3 percent) (Rotenberry et al., 1999). Brewer's sparrows construct their nest in the canopy of sagebrush which averaged 27 inches tall (Rotenberry et al., 1999). In Idaho, Brewer's sparrow nests ranged from 7.8 to 19.6 inches above the ground, averaged nine inches from the top of the sagebrush and averaged seven inches from the edge of the shrub canopy (Rotenberry et al., 1999). These sparrows feed on small insects and seeds (Rotenberry et al., 1999).

Wildfires have eliminated most of the sagebrush in the allotment making it unsuitable for Brewer's Sparrow nesting. Scattered rabbitbrush occurs at low density throughout the allotment. Rabbitbrush plants may provide some limited nesting habitat.

Loggerhead shrike (*Lanius ludovicianus*; BLM sensitive species)

Loggerhead shrikes are associated with open grasslands and shrub steppe habitats. In southern Idaho loggerhead shrikes place nests in big sagebrush, antelope bitterbrush and greasewood (Woods and Cade, 1996). Nest shrubs ranged from 35 to 117 inches tall (Woods and Cade, 1996). The average height of the nest was 31 inches and ranged from 13 to 63 inches above ground (Woods and Cade, 1996). Although big sagebrush was shorter than greasewood or bitterbrush nest height was similar for all shrubs (Woods and Cade, 1996). In the Jarbidge Field Office a few loggerhead shrike nests have been found in western juniper.

Loggerhead shrikes feed on arthropods, amphibians, reptiles, small mammals and birds (Yosef, 1996). They use thorny bushes or barbed wire fences to impale their prey to facilitate feeding and to store future meals.

Management of shrub steppe habitat that provides healthy native shrub and bunchgrass communities and a natural range of habitat variation would be expected to provide suitable habitat for loggerhead shrikes.

Wildfires have eliminated most of the sagebrush in the allotment making it unsuitable for Loggerhead shrike nesting. Scattered rabbitbrush throughout the allotment may provide some limited nesting habitat. Junipers in the Old Pipeline, Salls Field, and South 71 Pastures may also provide nesting habitat for a few loggerhead shrikes.

Sagebrush sparrow (*Artemisioispiza nevadensis*; BLM sensitive species)

Sagebrush sparrows are sagebrush obligates that are typically common in shrub steppe habitats (Martin and Carlson, 1998). Sagebrush sparrows nest in shrubs, in bunchgrasses or occasionally on the ground at the base of a shrub (Martin and Carlson, 1998). The nest shrub is usually taller than the surrounding vegetation (Martin and Carlson, 1998). In Idaho sagebrush sparrows nest in big sagebrush, however, in Oregon they may also use antelope bitterbrush, rabbitbrush, greasewood (*Sarcobatus vermiculatus*) and bunchgrasses (Martin and Carlson, 1998). In general sagebrush sparrow nests are placed closer to the main stem than the edge of the shrub. In shrubs

the nest can range from 9 to 11 inches above the ground. Sagebrush sparrows feed on seeds, insects, spiders, fruits, and succulent vegetation (Martin and Carlson, 1998).

Wildfires have eliminated most of the sagebrush in the allotment making it unsuitable for sagebrush sparrow nesting. Scattered rabbitbrush throughout the allotment may provide some limited nesting habitat.

Pygmy rabbit (*Brachylagus idahoensis*; BLM sensitive species)

Pygmy rabbits are sagebrush obligates that are usually found in areas with tall dense stands of big sagebrush and deep soils (Green and Flinders, 1980; Heady and Laundré, 2005). Pygmy rabbits usually excavate burrow systems with multiple entrances. Burrow entrances are often at the base of sagebrush (Green and Flinders, 1980). Pygmy rabbits spend most of their time (68 percent) in a generally small area (less than 200 feet radius [3 acres]) from the burrow within a larger (90 acres to 170 acres) home range. The primary food of pygmy rabbits is sagebrush which comprises 99 percent of its winter diet (Green and Flinders, 1980). Grasses and forbs make up more of the diet in the late spring into early summer.

Prior to 2007, approximately 540 acres of the allotment was surveyed for pygmy rabbits. Surveys have been conducted in the Black Butte Seeding (40 acres) and Old Pipeline (500 acres) Pastures. Prior to the Murphy Complex Fire of 2007, pygmy rabbits were documented in the Black Butte Seeding and Old Pipeline Pastures. Subsequent surveys have not documented pygmy rabbits in areas occupied prior to the fires. Without sagebrush the allotment is unsuitable for pygmy rabbits.

Piute ground squirrel (*Urocitellus mollis*; BLM sensitive species)

Piute ground squirrels are associated with shrub steppe habitats in southwestern Idaho. They emerge from hibernation in late February into March depending on the year and begin hibernation by late June (Yensen and Sherman, 2003). The diet of Piute ground squirrels is mostly herbaceous vegetation including grasses and forbs, seeds, and animal matter (Rickart, 1987; Yensen and Sherman, 2003). Piute ground squirrels excavate deep and shallow burrow systems (Reynolds and Wakkinen, 1987).

Piute ground squirrels are an important prey item to many predators in shrub steppe habitats including other sensitive species like ferruginous hawks and prairie falcons.

Management of shrub steppe habitat that provides healthy native shrub and bunchgrass communities and a natural range of habitat variation would be expected to provide suitable habitat for Piute ground squirrels.

Although Piute ground squirrels have been observed in the allotment, the BLM does not have distribution data on ground squirrels within the allotment. Wildfires have converted shrub steppe habitats in the allotments to perennial grass communities. Because shrub habitats provide more favorable environments for ground squirrels than grass habitats (Yensen et al., 1992; Van Horne et al., 1997) the allotment was rated marginal for Piute ground squirrels.

Spotted bat (*Euderma maculatum*; BLM sensitive species)

Spotted bats are typically found in arid portions of the western United States where it forages primarily on moths (Adams, 2003). It roosts in rock crevices in tall cliffs (Watkins, 1977). Little is known about the behavior and population size of spotted bats.

Tall cliffs that would provide suitable roosting habitat for spotted bats are present along portions of Clover Creek in the Salls Field Pasture. No cliffs are present in the remaining pastures. Spotted bats may forage over the allotment. Water is found in the Aikers, 71 Draw, Grassy Hills, and Shirk Reservoirs, as well as several unnamed reservoirs in the allotment. Water is also found along Clover (perennial) and Deadwood (intermittent) Creeks.

**Evaluation of Standard 8**

There are no known BLM Sensitive or Federally listed plants within the Grassy Hills AMP Allotment. Approximately 1,535 acres was surveyed for slickspot peppergrass. However, systematic inventories for other special status plants have not been conducted in the allotment. GIS modeling predicts that the allotment has 6,835 acres of high potential, 4,225 acres of medium potential, and 8 acres of low potential habitat for slickspot peppergrass. The nearest known occupied habitat for slickspot peppergrass is 0.1 mile from the Salls Field Pasture, on the west side of Clover Creek.

No recent fisheries surveys or fish habitat surveys have occurred in the allotment. Redband trout likely occur within the Clover Creek drainage on the western edge of the Salls Field Pasture when water temperatures are suitable (October-June). Livestock do not have access to Clover Creek on BLM land within the allotment.

Redband trout are known to occur within the headwaters of the Deadwood Creek drainage (outside the allotment). However, a significant portion of Deadwood Creek upstream of the Grassy Hills AMP Allotment is dewatered for most of the year making it unsuitable for redband trout. No other BLM Sensitive fish or threatened, endangered, or special status aquatic species are present in the allotment.

Habitat for BLM Sensitive wildlife species occurs within the allotment. Overall habitat ratings for each species by pasture are shown in Table 36.

**Table 36: Overall Habitat Suitability for BLM Sensitive Wildlife Species by Pasture**

| Species Name and Type of Habitat            | Black Butte | Black Butte | Catlow Field | East 71 | DeKlotz | New Field | Old Pipeline | Salls Field | Section | Section And | South 71 | Two Section | West71 |
|---|-------------|-------------|--------------|---------|---------|-----------|--------------|-------------|---------|-------------|----------|-------------|--------|
| Sage-grouse (nesting & early brood rearing) | U           | U           | U            | U       | U       | U         | U            | U           | U       | U           | U        | U           | U      |
| (late brood rearing)                        | U           | U           | U            | U       | U       | U         | U            | U           | U       | U           | U        | U           | U      |
| (winter)                                    | U           | U           | U            | U       | U       | U         | U            | U           | U       | U           | U        | U           | U      |
| Ferruginous hawk (nesting)                  | U           | U           | U            | U       | U       | U         | S            | S           | U       | U           | S        | U           | U      |
| (foraging)                                  | M           | M           | M            | M       | M       | M         | M            | M           | M       | M           | M        | M           | M      |

| Species Name and Type of Habitat   | Black Butte | Black Butte | Catlow Field | East 71 | DeKlotz | New Field | Old Pipeline | Salls Field | Section | Section And A Half | South 71 | Two Section | West71 |
|------------------------------------|-------------|-------------|--------------|---------|---------|-----------|--------------|-------------|---------|--------------------|----------|-------------|--------|
| Prairie falcon (nesting)           | U           | U           | U            | U       | U       | U         | U            | S           | U       | U                  | U        | U           | U      |
| (foraging)                         | S           | S           | S            | S       | S       | S         | S            | S           | S       | S                  | S        | S           | S      |
| Brewer's sparrow (nesting)         | U           | U           | U            | U       | U       | U         | U            | U           | U       | U                  | U        | U           | U      |
| Sagebrush sparrow (nesting)        | U           | U           | U            | U       | U       | U         | U            | U           | U       | U                  | U        | U           | U      |
| Loggerhead shrike (nesting)        | U           | U           | U            | U       | U       | U         | U            | U           | U       | U                  | U        | U           | U      |
| Pygmy rabbit (year round)          | U           | U           | U            | U       | U       | U         | U            | U           | U       | U                  | U        | U           | U      |
| Piute ground squirrel (year round) | M           | M           | M            | M       | M       | M         | M            | M           | M       | M                  | M        | M           | M      |
| Spotted bat (roosting)             | U           | U           | U            | U       | U       | U         | U            | S           | U       | U                  | U        | U           | U      |
| (foraging)                         | S           | S           | S            | S       | S       | S         | S            | S           | S       | S                  | S        | S           | S      |

S = Suitable (combination of components make the habitat suitable), M = Marginal (some habitat components are missing), U = Unsuitable (one or more critical habitat components are missing).

Overall, sage-grouse nesting and early brood rearing habitat is unsuitable since wildfire has eliminated most of the sagebrush in the allotment. The Black Butte, Old Pipeline, Section And A Half, South 71, and Two Section Pastures all have good potential for restoration since they contain suitable grass heights and have abundant forbs. Numerous drainages and reservoirs are present in the allotment; however, sagebrush cover is absent near these areas making them unsuitable as late brood rearing habitat. The allotment does not contain sagebrush of suitable height or density for wintering sage-grouse.

Junipers that provide suitable nesting habitat for ferruginous hawks occur in the Old Pipeline, Salls Field, and South 71 Pastures. No trees are present in the remaining pastures. The allotment contain marginal habitat for prey species such as mountain cottontail, black-tailed jackrabbit and ground squirrels usually hunted by ferruginous hawk.

Without sagebrush the allotment rated unsuitable for Brewer's sparrow, loggerhead shrike, and sagebrush sparrow nesting. Pygmy rabbit habitat was also rated unsuitable. Areas where pygmy rabbits were documented in the past have all burned.

Wildfires have converted shrub steppe habitats in the allotments to perennial grass communities. Because shrub habitats provide more favorable environments for ground squirrels than grass habitats (Yensen et al., 1992; Van Horne et al., 1997) the allotment rated marginal for Piute ground squirrels.

Suitable roosting habitat for spotted bats is present along portions of Clover Creek in the Salls Field Pasture. No cliffs that would provide roosting habitat are present in the remaining pastures. Spotted bats may forage over the allotment. Water is found in numerous reservoirs throughout the allotment and in Clover Creek and Deadwood Creek.

***Evaluation Finding – The Grassy Hill AMP Allotment is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

The Murphy Complex Fire in 2007 essentially eliminated all sagebrush in the allotment. Since 1960 there have been eleven fires in the allotment. Without sagebrush the allotment is generally unsuitable for sage-grouse and other sagebrush dependent special status species. Following the Murphy Complex Fire the BLM aerial seeded sagebrush in strips. Although sagebrush has been reseeded, recovery of the sagebrush community needed for sage-grouse will take one (Wambolt and Payne, 1986) to several (Baker, 2006; Baker, 2011) decades assuming the absence of additional fire. Therefore, the Grassy Hills Allotment is not meeting Standard 8. Pastures with the best potential for sage-grouse habitat restoration include the Black Butte, Old Pipeline, Section And A Half, South 71, and Two Section Pastures.

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**APPENDIX A: CONSOLIDATED ACTUAL USE DATA BY PASTURE**

| Pasture             | Year        | Season of Use | Actual AUMs |
|---------------------|-------------|---------------|-------------|
| Black Butte         | 2004        | 11/10 – 12/10 | 204         |
|                     | 2005        | 06/04 – 06/05 | 8           |
|                     |             | 06/22 – 06/23 | 7           |
|                     |             | 06/30 – 07/05 | 60          |
|                     |             | 07/18 – 08/01 | 76          |
|                     | 2006        | 05/26 – 06/14 | 129         |
|                     | 2007        |               | 0           |
|                     | 2008        |               | 0           |
|                     | 2009        | 12/01 – 12/17 | 165         |
|                     | 2010        | 03/18 – 05/29 | 385         |
|                     |             | 06/16 – 06/29 | 170         |
|                     | 2011        | 03/18 – 05/28 | 380         |
|                     |             | 06/16 – 06/29 | 170         |
|                     | 2012        | 04/10 – 05/09 | 243         |
|                     | 2013        | 07/01 – 07/25 | 475         |
| Old Pipeline        | 2004        | 05/18 – 06/15 | 489         |
|                     | 2005        | 11/29 – 12/14 | 200         |
|                     | 2006        | 05/03 – 05/18 | 186         |
|                     |             | 11/10 – 11/18 | 107         |
|                     |             | 11/22 – 11/30 | 31          |
|                     | 2007        |               | 0           |
|                     | 2008        |               | 0           |
|                     | 2009        | 12/01 – 12/11 | 134         |
|                     |             | 12/18 – 12/25 | 78          |
|                     | 2010        | 05/19 – 06/21 | 41          |
|                     |             | 11/03 – 11/16 | 226         |
|                     | 2011        | 05/19 – 06/21 | 41          |
|                     |             | 11/09 – 11/21 | 149         |
|                     | 2012        | 05/10 – 06/09 | 251         |
|                     | 2013        | 07/15 – 07/25 | 134         |
| 10/31 – 11/06       |             | 61            |             |
| Black Butte Seeding | 2004        | 05/04 – 06/09 | 316         |
|                     | 2005        | 04/19 – 04/26 | 80          |
|                     |             | 06/24 – 07/15 | 142         |
|                     | 2006        | 06/02 – 06/05 | 36          |
|                     |             | 06/15 – 07/18 | 30          |
|                     | 2007        |               | 0           |
|                     | 2008        |               | 0           |
|                     | 2009        | 11/09 – 11/30 | 268         |
|                     | 2010        | 05/29 – 06/11 | 74          |
|                     |             | 06/29 – 07/16 | 229         |
|                     | 2011        | 05/29 – 06/10 | 69          |
| 06/30 – 07/16       |             | 219           |             |
| 2013                | 07/26–08/10 | 256           |             |
| New Field           | 2010        | 04/19–05/06   | 183         |

| Pasture           | Year        | Season of Use | Actual AUMs |
|-------------------|-------------|---------------|-------------|
|                   | 2011        | 06/11-06/25   | 79          |
|                   |             | 04/19-05/06   | 184         |
|                   |             | 06/11-06/25   | 79          |
|                   | 2012        | 06/10-07/25   | 373         |
|                   | 2013        | 07/31-08/10   | 134         |
| East 71           | 2004        | 07/15-07/22   | 135         |
| East 71 Continued | 2006        | 06/07-06/18   | 140         |
|                   |             | 10/20-11/21   | 255         |
|                   | 2007        |               | 0           |
|                   | 2008        | 10/02-10/15   | 53          |
|                   |             | 11/03- 1/21   | 243         |
|                   | 2009        | 04/04-04/11   | 76          |
|                   |             | 06/16-06/19   | 52          |
|                   |             | 07/20-08/03   | 97          |
|                   | 2010        | 06/12-07/14   | 80          |
|                   | 2011        | 06/10-07/15   | 101         |
|                   | 2013        | 08/11- 8/24   | 136         |
| West 71           | 2004        | 07/03-07/14   | 202         |
|                   | 2005        | 08/02-08/30   | 190         |
|                   | 2006        | 06/29-07/31   | 159         |
|                   | 2007        |               | 0           |
|                   | 2008        |               | 0           |
|                   | 2009        | 09/18-10/11   | 146         |
|                   |             | 10/13-10/20   | 39          |
|                   |             | 11/01-11/06   | 71          |
|                   | 2010        | 09/22-10/04   | 79          |
|                   |             | 10/07-10/11   | 32          |
|                   | 2011        | 09/20- 0/04   | 91          |
| 10/07-10/11       |             | 32            |             |
| South 71          | 2004        | 07/02-07/07   | 49          |
|                   |             | 07/23-08/02   | 185         |
|                   | 2005        | 07/08-07/18   | 88          |
|                   | 2006        | 06/19-07/04   | 186         |
|                   | 2007        |               | 0           |
|                   | 2008        |               | 0           |
|                   | 2009        | 08/04-08/05   | 13          |
|                   |             | 08/17-08/25   | 9           |
|                   |             | 10/05-10/12   | 39          |
|                   |             | 10/14-10/30   | 186         |
|                   | 2010        | 04/14-06/28   | 96          |
|                   |             | 06/30-07/08   | 76          |
|                   | 2011        | 04/12-06/28   | 101         |
|                   |             | 6/30-07/08    | 81          |
| 2012              | 07/26-08/01 | 57            |             |
| 2013              | 08/25-09/15 | 75            |             |
| Section           | 2004        | 06/10-06/21   | 40          |

| Pasture                      | Year        | Season of Use | Actual AUMs |
|------------------------------|-------------|---------------|-------------|
|                              | 2005        | 06/21-06/24   | 15          |
|                              | 2006        | 06/06-06/30   | 79          |
|                              | 2007        |               | 0           |
|                              | 2008        | 12/13-12/19   | 64          |
|                              | 2009        | 04/14-04/20   | 66          |
|                              |             | 06/15-07/10   | 44          |
|                              | 2010        | 10/04-10/11   | 49          |
|                              |             | 10/12-11/02   | 371         |
| 2011                         | 10/04-10/22 | 179           |             |
| Section And A Half           | 2004        | 06/10-06/21   | 52          |
|                              | 2005        | 06/13-07/13   | 145         |
|                              | 2006        | 06/06-07/14   | 143         |
| Section And A Half Continued | 2007        |               | 0           |
|                              | 2008        | 10/16-10/20   | 19          |
|                              |             | 11/08-11/27   | 256         |
|                              | 2009        | 04/21-04/27   | 66          |
|                              |             | 06/02-06/15   | 204         |
|                              |             | 08/17-08/18   | 2           |
|                              |             | 10/21-10/24   | 30          |
|                              |             | 11/07-11/08   | 29          |
|                              | 2010        | 04/13-04/24   | 71          |
|                              |             | 06/09-07/01   | 62          |
|                              | 2011        | 04/14-04/25   | 72          |
|                              |             | 06/08-07/01   | 63          |
|                              | 2012        | 11/13-11/26   | 165         |
|                              | 2013        | 08/11-08/15   | 61          |
| Two Sections                 | 2004        | 06/22-07/01   | 81          |
|                              | 2005        | 07/04-07/07   | 32          |
|                              |             | 07/14-07/28   | 53          |
|                              | 2007        | 06/06-06/30   | 79          |
|                              | 2008        | 10/21-11/10   | 212         |
|                              |             | 11/22-12/12   | 212         |
|                              | 2009        | 04/28-05/03   | 57          |
|                              |             | 06/14-07/20   | 239         |
|                              | 2010        | 05/13-05/20   | 39          |
|                              |             | 06/19-07/15   | 162         |
|                              | 2011        | 05/15-05/20   | 30          |
|                              |             | 06/19-07/15   | 162         |
|                              | 2012        |               | 0           |
|                              | 2013        | 08/11-08/16   | 48          |
| Deklotz                      | 2004        | 06/16-07/02   | 192         |
|                              | 2005        | 07/16-08/04   | 199         |
|                              | 2006        | 05/19-06/28   | 281         |
|                              | 2007        |               | 0           |
|                              | 2008        |               | 0           |
|                              | 2009        | 10/16-11/08   | 190         |

| Pasture     | Year       | Season of Use | Actual AUMs |
|-------------|------------|---------------|-------------|
|             | 2010       | 05/01-05/30   | 156         |
|             | 2011       | 05/01-05/30   | 160         |
|             | 2012       | 11/27-12/04   | 137         |
|             | 2013       | 10/25-10/30   | 53          |
| Salls Field | 2009       | 11/09-11/30   | 214         |
|             | 2010       | 04/01-04/30   | 156         |
|             | 2011       | 04/01-04/30   | 153         |
|             |            | 10/25-11/15   | 268         |
|             | 2012       |               | 0           |
| 2013        | 12/4-12/09 | 44            |             |
| Buck Flat   | 2004       | 03/27-05/03   | 326         |
|             | 2005       | 06/06-06/20   | 59          |
|             | 2006       | 06/15-06/26   | 65          |
|             | 2007       |               | 0           |
|             | 2008       |               | 0           |
|             | 2009       | 10/12-11/01   | 128         |
| Catlou      | 2004       | 07/08-07/09   | 16          |
|             | 2005       | 06/19-07/02   | 16          |
|             |            | 07/29-07/30   | 7           |
|             | 2006       | 07/07-07/08   | 16          |
|             |            | 08/01-08/02   | 11          |
|             |            | 10/19-10/20   | 7           |
|             | 2007       |               | 0           |
|             | 2008       |               | 0           |
|             | 2009       | 07/10-07/10   | 13          |
|             |            | 08/06-08/06   | 6           |
|             | 2010       | 07/16-07/17   | 25          |
|             |            | 07/26-07/27   | 17          |
|             | 2011       | 07/15-07/17   | 38          |
| 07/28-07/28 |            | 9             |             |
| Farm        | 2004       | 06/16-07/02   | 94          |
|             | 2005       | 06/16-07/14   | 21          |

**APPENDIX B: PLANT LIST (ASSEMBLED DURING UPLAND ASSESSMENTS)**

| Scientific Name                 | Common Name                    | Species Type                  | Site(s) where species occurred                    |
|---------------------------------|--------------------------------|-------------------------------|---|
| <b>Perennial Grasses</b>        |                                |                               |   |
| <i>Achnatherum hymenoides</i>   | Indian ricegrass               | Native                        | BB, SF  |
| <i>Achnatherum thurberianum</i> | Thurber's needlegrass          | Native                        | BB, OP, SF, S71                                   |
| <i>Agropyron cristatum</i>      | Crested wheatgrass             | Exotic, Seeded                | NF, TS, W71                                       |
| <i>Elymus elymoides</i>         | Squirreltail                   | Native                        | BB, DZ, E71, NF, OP, SF, SH, SP, S71, TS          |
| <i>Elymus lanceolatus</i>       | Thickspike wheatgrass          | Native                        | BB, E71, NF, SP, S71                              |
| <i>Festuca idahoensis</i>       | Idaho fescue                   | Native                        | BB, E71, S71, TS                                  |
| <i>Leymus cinereus</i>          | Basin wildrye                  | Native                        | BB, E71, SF, SH, SP, S71, TS                      |
| <i>Pascopyrum smithii</i>       | Western wheatgrass             | Native                        | BS, E71, NF, OP, SF, SH, S71, TS                  |
| <i>Poa ampla</i>                | Sandberg bluegrass             | Native                        | E71, S71  |
| <i>Poa bulbosa</i>              | Bulbous bluegrass              | Exotic                        | S71   |
| <i>Poa secunda</i>              | Sandberg bluegrass             | Native                        | BB, BS, DZ, E71, NF, OP, SF, SH, SP, S71, TS, W71 |
| <i>Pseudoroegneria spicata</i>  | Bluebunch wheatgrass           | Native, Seeded                | BB, BS, DZ, E71, NF, OP, SF, SH, SP, S71, TS, W71 |
| <b>Annual Grasses</b>           |                                |                               |   |
| <i>Bromus hordeaceus</i>        | Soft brome                     | Exotic                        | BB  |
| <i>Bromus tectorum</i>          | Cheatgrass                     | Exotic, Invasive              | BB, BS, DZ, E71, NF, OP, SF, SH, S71, TS, W71     |
| <i>Vulpia octoflora</i>         | Sixweeks fescue                | Native                        | BB  |
| <b>Perennial Forbs</b>          |                                |                               |   |
| <i>Achillea millefolium</i>     | Western yarrow                 | Native, Sage-grouse Preferred | BB, BS, DZ, OP, SP                                |
| <i>Allium</i> spp.              | Onion                          | Native                        | BB, SF  |
| <i>Allium acuminatum</i>        | Tapertip onion                 | Native                        | BB, DZ, NF, SF, SH, SP, S71, TS                   |
| <i>Antennaria dimorpha</i>      | Low pussytoes                  | Native, Sage-grouse Preferred | S71   |
| <i>Arnica</i> spp.              | Arnica                         | Native                        | E71, TS   |
| <i>Aster</i> spp.               | Aster                          | Native                        | SF  |
| <i>Astragalus</i> spp.          | Milkvetch                      | Native                        | BB, OP  |
| <i>Astragalus atratus</i>       | Mourning milkvetch             | Native                        | BB, DZ, E71, OP, SF, SP, S71                      |
| <i>Astragalus lentiginosus</i>  | Freckled milkvetch             | Native                        | BB, BS, DZ, E71, NF, SF, SH, SP, S71, TS, W71     |
| <i>Astragalus purshii</i>       | Woollypod milkvetch            | Native                        | DZ, NF, SF, SP, S71                               |
| <i>Balsamorhiza hookeri</i>     | Hooker's balsamroot            | Native                        | E71, S71  |
| <i>Castilleja angustifolia</i>  | Northwestern Indian paintbrush | Native                        | OP, SP  |

|                                 |                        |                               |   |
|---------------------------------|------------------------|-------------------------------|---|
| <i>Cirsium</i> spp.             | Thistle                | Native                        | E71, S71  |
| <i>Crepis</i> spp.              | Hawksbeard             | Native, Sage-grouse Preferred | NF, OP  |
| <i>Crepis acuminata</i>         | Tapertip hawksbeard    | Native, Sage-grouse Preferred | BB, E71, NF, SF, SH, SP, S71, TS, W71             |
| <i>Crepis atribarba</i>         | Slender hawksbeard     | Native, Sage-grouse Preferred | DZ, S71, TS                                       |
| <i>Crepis occidentalis</i>      | Largeflower hawksbeard | Native, Sage-grouse Preferred | BB, E71, NF, S71                                  |
| <i>Delphinium andersonii</i>    | Anderson's larkspur    | Native                        | DZ, NF, SF, SP, S71                               |
| <i>Erigeron pumilus</i>         | Shaggy fleabane        | Native, Sage-grouse Preferred | BB, BS, DZ, E71, NF, OP, SF, SH, SP, S71, TS, W71 |
| <i>Ionactis alpina</i>          | Lava aster             | Native, Sage-grouse Preferred | DZ, S71   |
| <i>Linum lewisii</i>            | Lewis flax             | Native                        | BB, E71, OP, SH, TS                               |
| <i>Lomatium</i> spp.            | Desertparsley          | Native, Sage-grouse Preferred | E71, NF, SP                                       |
| <i>Lomatium cous</i>            | Cous biscuitroot       | Native, Sage-grouse Preferred | BS, DZ, E71, SH, S71                              |
| <i>Lomatium foeniculaceum</i>   | Desert biscuitroot     | Native, Sage-grouse Preferred | S71   |
| <i>Lomatium nudicaule</i>       | Barestem biscuitroot   | Native, Sage-grouse Preferred | E71, W71  |
| <i>Lomatium triternatum</i>     | Nineleaf biscuitroot   | Native, Sage-grouse Preferred | TS  |
| <i>Lupinus</i> spp.             | Lupine                 | Native                        | BB, BS, DZ, E71, OP, SH, SP, S71, TS, W71         |
| <i>Lupinus arbustus</i>         | Longspur lupine        | Native                        | TS  |
| <i>Lupinus argenteus</i>        | Silvery lupine         | Native                        | E71, S71  |
| <i>Machaeranthera canescens</i> | Hoary tansyaster       | Native                        | BB, DZ, NF, SF, TS                                |
| <i>Mertensia oblongifolia</i>   | Oblongleaf bluebells   | Native                        | TS  |
| <i>Medicago sativa</i>          | Alfalfa                | Exotic, Sage-grouse Preferred | BB, BS, SF, S71, TS                               |
| <i>Onobrychis viciifolia</i>    | Sainfoin               | Exotic, Sage-grouse Preferred | BB, TS  |
| <i>Penstemon</i> spp.           | Penstemon              | Native                        | OP, SF  |
| <i>Phlox aculeata</i>           | Sagebrush phlox        | Native, Sage-grouse Preferred | BB, E71, DZ, NF, OP, SF, SP, S71, TS              |
| <i>Phlox hoodii</i>             | Spiny phlox            | Native, Sage-grouse Preferred | BB, BS, DZ, NF, OP, SF, SH, SP, S71               |
| <i>Phlox longifolia</i>         | Longleaf phlox         | Native, Sage-grouse Preferred | BB, BS, E71, NF, OP, SF, SH, SP, S71, TS, W71     |
| <i>Senecio integerrimus</i>     | Lambstongue ragwort    | Native                        | E71, S71  |
| <i>Sphaeralcea munroana</i>     | Munro's globemallow    | Native                        | BB, OP  |
| <i>Taraxacum officinale</i>     | Common dandelion       | Exotic, Sage-grouse Preferred | SF, TS  |
| <i>Tragopogon dubius</i>        | Yellow salsify         | Exotic, Sage-grouse           | BB, BS, DZ, E71, NF, SF,                          |

|  |   |                               |   |
|--|---|-------------------------------|---|
|  |   | Preferred                     | SH, S71, TS                                       |
| <i>Viola</i> spp.                        | Violet  | Native                        | S71   |
| <i>Viola beckwithii</i>                  | Beckwith's violet                                   | Native                        | DZ, SF  |
| <i>Zigadenus venenosus</i>               | Meadow deathcamas<br>( <i>Zigadenus venenosus</i> ) | Native                        | BB, DZ, E71, NF, OP, SF, SH, SP, S71, TS          |
| Annual Forbs                             |   |                               |   |
| <i>Agoseris glauca</i>                   | Pale agoseris                                       | Native, Sage-grouse Preferred | BB, BS, DZ, E71, NF, OP, SF, SH, SP, S71, TS, W71 |
| <i>Agoseris heterophylla</i>             | Annual agoseris                                     | Native, Sage-grouse Preferred | E71   |
| <i>Alyssum desertorum</i>                | Desert madwort                                      | Exotic                        | E71, NF   |
| <i>Camelina microcarpa</i>               | Littlepod false flax                                | Exotic                        | E71, SF, TS                                       |
| <i>Cerastium nutans</i>                  | Nodding chickweed                                   | Native                        | BB, SH, W71                                       |
| <i>Ceratocephala testiculata</i>         | Curveseed butterwort                                | Exotic                        | BB, BS, DZ, E71, NF, SF, S71, TS, W71             |
| <i>Collinsia parviflora</i>              | Maiden blue eyed Mary                               | Native                        | BB, BS, NF, OP, SF, SH, S71, W71                  |
| <i>Descurainia pinnata</i>               | Western tansymustard                                | Native                        | BB, DZ, E71, SF, SP, S71, TS                      |
| <i>Draba verna</i>                       | Spring draba  | Exotic                        | BB, DZ, NF, W71                                   |
| <i>Epilobium brachycarpum</i>            | Tall annual willowherb                              | Native, Sage-grouse Preferred | BB, BS, DZ, E71, NF, SH, SP, S71, TS              |
| <i>Gayophytum</i> spp.                   | Groundsmoke   | Native, Sage-grouse Preferred | E71, S71, TS                                      |
| <i>Lactuca serriola</i>                  | Prickly lettuce                                     | Exotic, Sage-grouse Preferred | BB, BS, DZ, E71, NF, SF, SP, S71                  |
| <i>Lappula occidentalis</i>              | Flatspine stickseed                                 | Native                        | E71   |
| <i>Lepidium perfoliatum</i>              | Clasping pepperweed                                 | Exotic                        | BB, BS, DZ, E71, NF, OP, SF, SH, SP, S71          |
| <i>Microsteris gracilis</i>              | Slender phlox                                       | Native, Sage-grouse Preferred | E71, OP, SF, S71, TS, W71                         |
| <i>Myosotis stricta</i>                  | Strict forget-me-not                                | Exotic                        | W71   |
| <i>Polygonum</i> spp.                    | Knotweed  | Native                        | S71   |
| <i>Salsola kali</i>                      | Russian thistle                                     | Exotic                        | NF  |
| <i>Sisymbrium altissimum</i>             | Tall tumbled mustard                                | Exotic                        | BB, BS, DZ, E71, NF, SF, SP, S71, TS, W71         |
| Shrubs                                   |   |                               |   |
| <i>Artemisia tridentata wyomingensis</i> | Wyoming big sagebrush                               | Native                        | BB, DZ, E71, NF, SF, S71                          |
| <i>Atriplex canescens</i>                | Fourwing saltbush                                   | Native                        | BB, DZ, SF, S71, TS                               |
| <i>Chrysothamnus viscidiflorus</i>       | Yellow rabbitbrush                                  | Native                        | BB, E71, NF, OP, SF, SH, S71, TS                  |
| <i>Ericameria nauseosa</i>               | Rubber rabbitbrush                                  | Native                        | DZ, SF, SP, TS                                    |

This list does not include all plants that can be found in the Grassy Hills AMP Allotment and is not exhaustive. Scientific and common names were derived from the USDA NRSC Plant Database (USDA and NRCS, 2013c).

## **APPENDIX C: PROCESS FOR GENERATING SAGE-GROUSE HABITAT ASSESSMENT FRAMEWORK SAMPLE SITES**

Sage-grouse Habitat Assessment Framework sites were randomly generated in the following manner. In GIS the vegetation layer was broken into the following habitat categories: shrublands, native perennial grass, non-native perennial grass, and annual grassland. The pasture layer was then incorporated and six random points were generated for each habitat category in the pasture.

Using National Agriculture Imagery Program imagery, any points that fell in non-habitat (maintained roads, ponds, gravel pits, cliffs) were removed. To ensure sampling transects did not cross allotment or pasture boundaries, randomly selected points within 100 meters of fences were removed. Random points were also evaluated for ease of access and to maximize sampling efficiency; random points that were more than one mile from a road, jeep trail, or fence were generally dropped. In cases where the amount of BLM land in a pasture was small and state or private land dominated the pasture, the pasture was generally dropped from sampling. Also if the habitat category was minimally present such as 30 acres of annual grassland out of a 1,200 acres pasture, no sampling would be done in the annual area. For shrublands to be evaluated they had to be at least 20 acres in size to accommodate sampling transects.

Ultimately, only two random sites in each habitat category were retained. Two points were retained to provide an alternate sampling site if the first point was not in the appropriate habitat category due to mapping errors. If both points were not in the appropriate habitat category, field crews were instructed to travel to the nearest appropriate habitat in the pasture, select a random bearing leading into the habitat category and pace a randomly selected distance prior to sampling.

Due to limited field crew and time when forbs are easily discernable, the following was the priority order for sampling: (1) shrubland habitats; (2) perennial native grassland, (3) non-native perennial grass; and (4) annual grass communities. When randomly generated points in shrubland habitats were in the same general area as randomly generated points in grassland habitats, field crews would often sample both sites on the same day regardless of their priority order. This was to increase sampling efficiency by reducing the amount of time spent traveling between points.