United States Department of the Interior
Bureau of Land Management

RANGELAND HEALTH ASSESSMENT AND EVALUATION REPORT

GRASSY WINDMILL ALLOTMENT #01134

October 16, 2015

DRAFT

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ALLOTMENT INFORMATION

Field Office: Jarbidge Field Office (JFO)
Name of Permittee: Ronnie Jones
Allotment Name/Number: Grassy Windmill (01134)
Date of Field Assessment: July 24, 2013
Stream Miles on Public Land (miles): 0

Table 1. Grassy Windmill Allotment acres

Total Acres	BLM Acres	State Acres	Private Acres	Other Acres
2,406	2,398	0	8	0

Table 2. Assessment participants

Name	Position
Darek Elverud	JFO Fisheries Biologist
Kate Crane	TFD Fisheries Biologist
Jim Klott	JFO Wildlife Biologist
Michael Haney	JFO Wildlife Biologist
Thomas Stewart	JFO Botanist
Krystle Wengreen	JFO Wild Horse and Burro Specialist
Dan Strickler	JFO Rangeland Management Specialist
Erik Kriwox	JFO Rangeland Management Specialist
Bonnie Ross	TFD GIS Specialist

CURRENT PERMITTED LIVESTOCK GRAZING USE

Total Active Use: 420 Animal Unit Months (AUMs)
Livestock Type: Cattle
Livestock Numbers: 190 Cattle
Season of Use: 04/01 to 10/31
Current Land Use Plan: 1987 Jarbidge Resource Management Plan (RMP)
Current Stocking Level: 5.7 Acres/AUM

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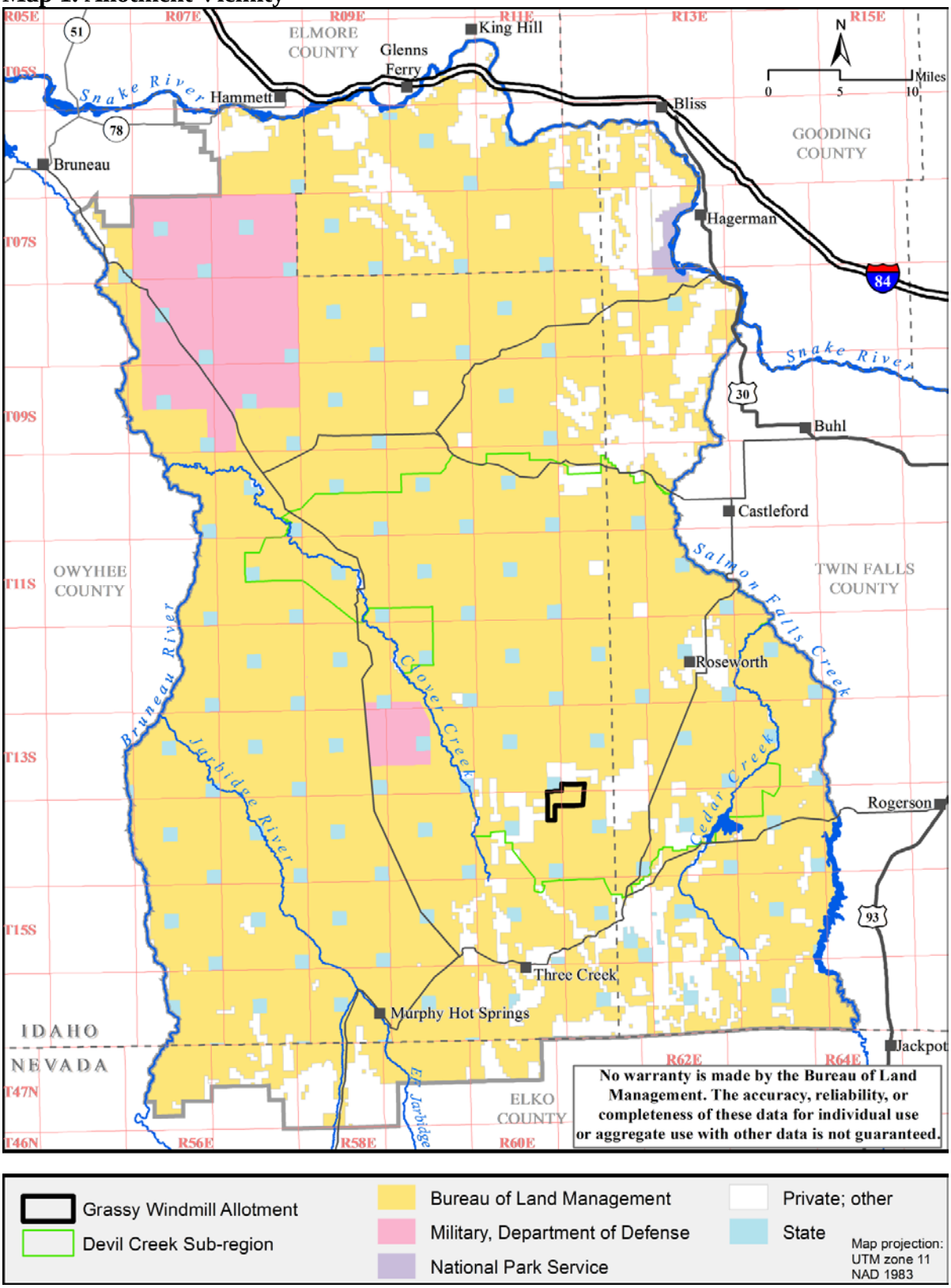
Map 1. Allotment Vicinity



Grassy Windmill Allotment
Devil Creek Sub-region
Bureau of Land Management
Military, Department of Defense
National Park Service
Private; other
State
Map projection: UTM zone 11 NAD 1983

ALLOTMENT PROFILE

The Grassy Windmill Allotment is located approximately 21 miles southwest of Castleford, Idaho (Map 1). The elevation ranges from approximately 5,400 feet to 5,600 feet.

Climate

Climatic conditions in south central Idaho are characterized by 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 Windmill Allotment ranges from 8 to 12 inches. The bulk of the moisture typically falls as rain and snow from late fall through late spring.

Weather data collected at the Horse Butte RAWS station is used to assess precipitation and temperature trends from 2004 to 2013. The RAWS station is located in an 8 to 12 inch precipitation zone approximately thirteen miles northwest of the Grassy Windmill Allotment. The thirty-year annual average precipitation at the Horse Butte RAWS station is 8.1". 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” and in 2013 it was 4.52”. 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), 2006 (10.1”), and 2010 (10.46).

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, ad 2013). Rainfall was especially low in 2012 (1.92”) and 2013 (1.48”). Plant growth was likely enhanced in 2005 and 2011 due to higher amounts of spring rainfall (2” or more above the spring average). Except for 2004, temperatures during the growing season were cooler than the thirty-year average (Figure 2).

Figure 1. Annual Precipitation (2004 – 2013) at the Horse Butte RAWS Station

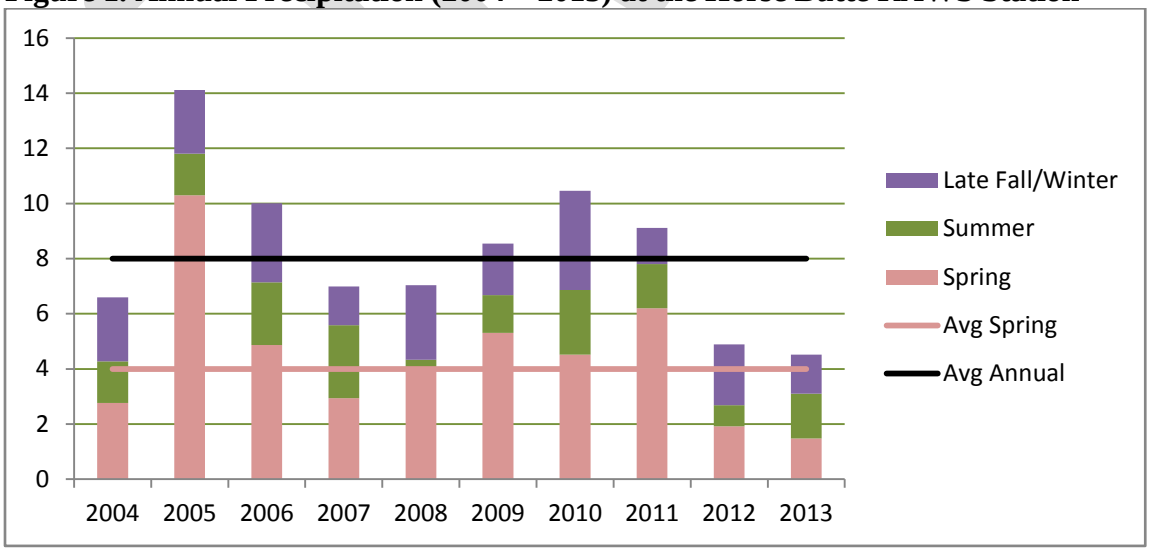
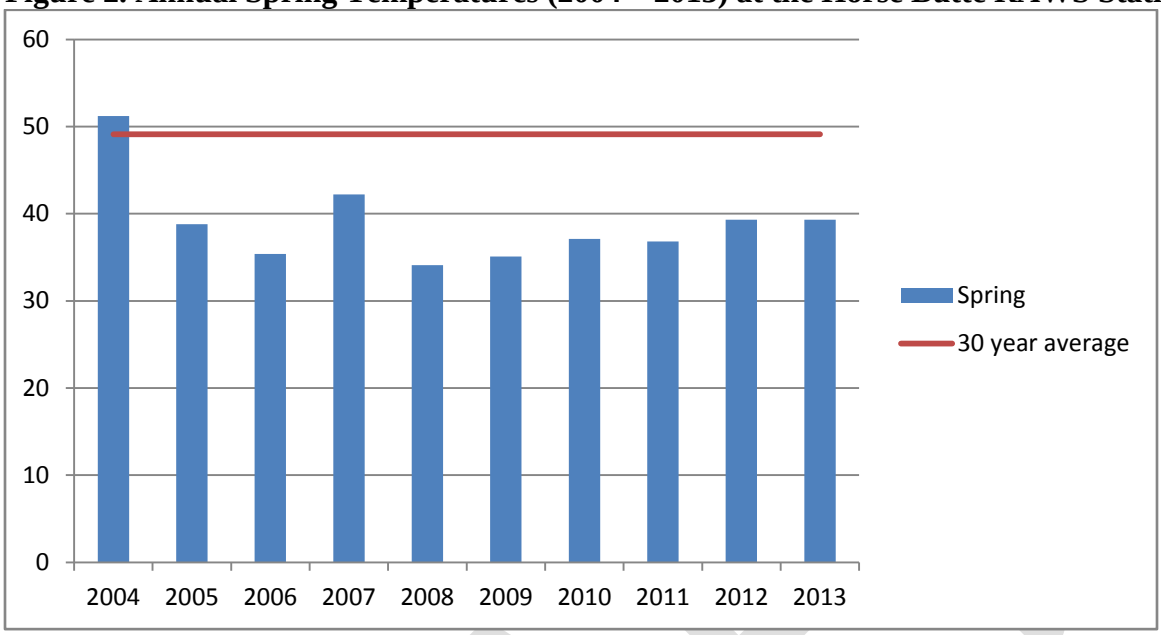


Figure 2. Annual Spring Temperatures (2004 – 2013) at the Horse Butte RAWS Station



Grazing Management

The Grassy Windmill Allotment is divided into two pastures (Table 3, Map 2). Both pastures are completely fenced (10.1 miles of perimeter fence and 0.7 miles of interior pasture fence). About 0,85 miles of fence created a 21 acres exclosure in the northern pasture. There are no natural perennial water sources within the allotment; livestock water is available via a water trough and ponds (Map 2). The northern pond is in a draw and fills in years where there is adequate moisture for run-off. Water in this pond is not reliable and does not persist through the summer. Livestock grazing is permitted in the allotment from April 1 to October 31. Permitted active use for the allotment is 420 AUMs. Grazing typically occurs within the allotment with cattle from mid-May through the end of October every year.

Table 3. Acreage by pasture and ownership.

Allotment Name	Pasture Name	Public	State	Private	Total*
Grassy Windmill	North^	1,994	0	8	2,002
	South	403	0	0	403
	Allotment Total	2,397	0	8	2,405

*Total acres may not match the sum of individual ownership acres due to rounding numbers.
^Includes 21 acre exclosure located within this pasture.

A summary of actual use and utilization in the Grassy Windmill Allotment from 2004 to 2013 is shown in Table 4. Since 2004, actual use within the Grassy Windmill Allotment has averaged approximately 333 AUMs (not including 2007 and 2008 when the allotment was burned and closed to livestock grazing as a result of the 2007 Murphy Complex Fire). Actual use by pasture is not available. In addition, Table 4 includes average utilization in the allotment by pasture and grass species from 2004 through 2013. Grass species on which utilization has been measured

include bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass (*Poa secunda*) and great basin wildrye (*Leymus cinereus*). Utilization measurements on Sandberg bluegrass during winter months can result in inconsistent measurements due to high amount of biomass loss to natural disarticulation from mechanical damage from wind, snow, and decomposition. As a result, the JFO ceased monitoring use of Sandberg's bluegrass during winter use periods. Utilization data was collected by the Height-Weight Method (Cooperative Extension Service et al., 1999). Locations of key utilization sites are shown on Map 2.

Table 4. Actual Use and Utilization Summary

Grazing Year	Number of Cattle	Season of Use	Actual Use AUMs	Percent Utilization		
				Bluebunch wheatgrass	Sandberg bluegrass	Great Basin wildrye
2004	60	05/10-10/27	337	-	-	-
2005	60	05/27-10/31	324	14%-South Pasture 12%-North Pasture	26%-South Pasture	20%-South Pasture
2006	60	05/23-11/29	377	3%-South Pasture 13%-North Pasture	11%-South Pasture	-
2007	60	06/16-07/18	65*	-	-	-
2008	0	N/A	0*	-	-	-
2009	60	05/16-10/31	334	22%-North Pasture	-	-
2010	60	05/24-10/31	318	-	-	-
2011	60	05/21-11/1	326	-	-	-
2012	60	05/10-10/31	345	-	-	-
2013	60	05/31-10/31	304	4%-South Pasture 5%-North Pasture	-	-

*Allotment was burned in the 2007 Murphy Complex Fire

In addition to permitted livestock use described above, livestock trailing is authorized through this allotment. Devil Creek Ranch trails 545 head of cattle north through the Grassy Windmill Allotment along the Grassy Hills Road between March 15 and April 5 each year. There are no overnight stays authorized, and typically it takes approximately 2 hours to trail through the allotment. Additional details of analysis and mitigation can be found the Jarbidge Field Office Livestock Trailing Environmental Assessment (EA# DOI-BLM-ID-T010-2012-0004-EA).

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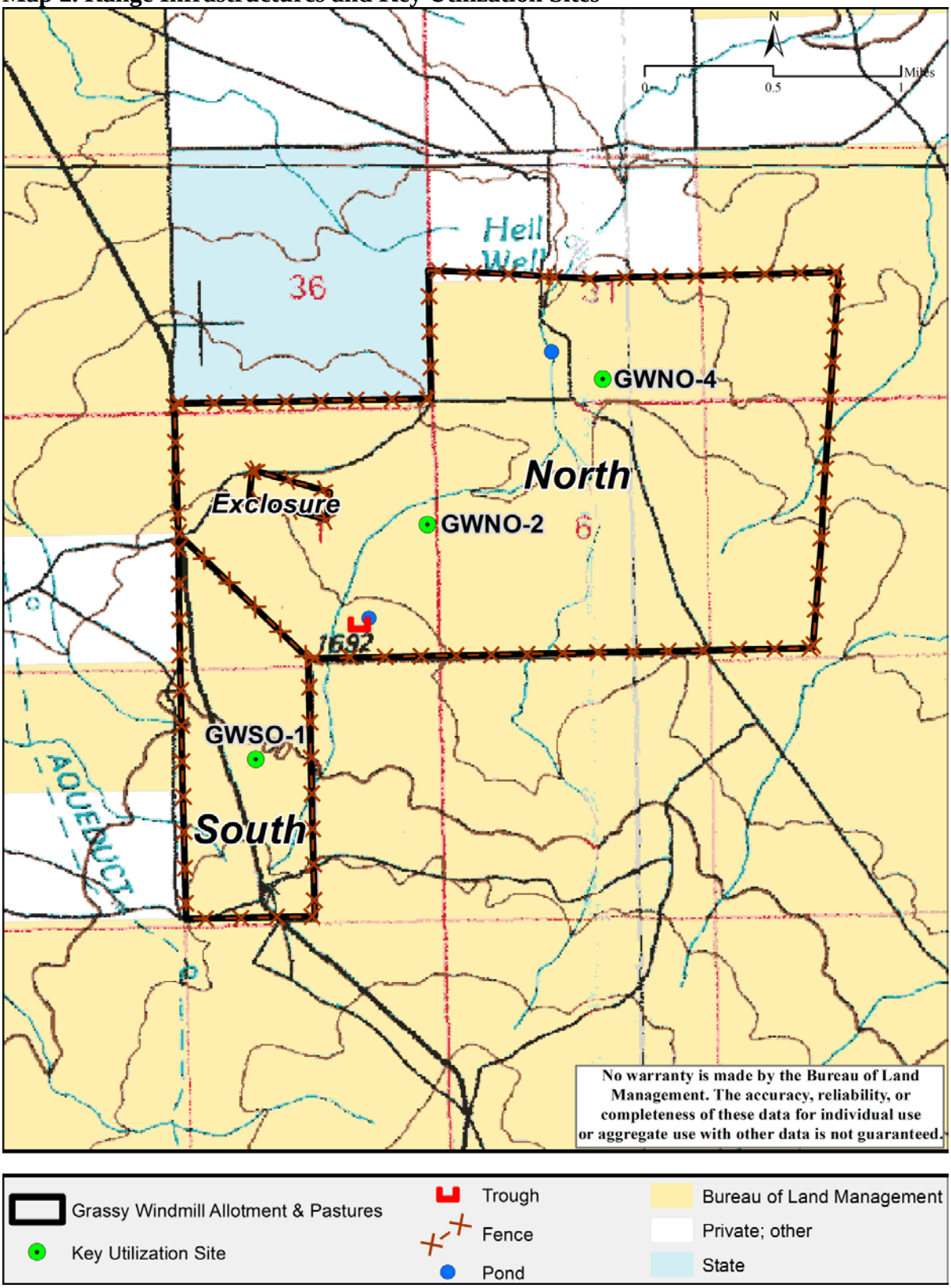
Map 2. Range Infrastructures and Key Utilization Sites



Vegetation

Vegetation in the allotment was initially mapped in 2006 using field observation, field cover data, and 2004 National Agriculture Imagery Program (NAIP) imagery. The vegetation map was updated in 2013 using field observations and NAIP imagery (Map 3). Fifty-three vegetation communities were classified and mapped based on dominant plant cover. These vegetation communities were subsequently organized into five classes and six sub-classes according to national standards (Grossman et al., 1998), with the exception of evergreen shrublands dominated by sagebrush; these communities were defined as having 10% or more shrub cover rather than the national standard of more than 25% shrub cover. This was done to provide consistency with defined habitat needs (Wisdom et al., 2000) and proposed management objectives for greater sage-grouse (sage-grouse). Vegetation communities were classified and mapped based on dominant plant cover using a minimum mapping unit of 20 acres, which is appropriate for landscape-level planning but has limited application for finer-scale analysis such as grazing permit renewals because the map does not always show the complexity of the vegetation communities. Other plant species, both native and non-native, are also present in the communities (Appendix B).

Historically this allotment was a shrub steppe plant community; however, the allotment has been affected by wildfires over the last 20 years. The entire Allotment has burned at least two times over the last twenty years, and some portions of the allotment have burned up to five times within that same time period (Map 3). There have been eight wildfires within the allotment since 1960, with six of those occurring since 1995. Fires that have burned within the allotment since 1995 include, the 1995 Heil Well Fire, the 1998 Roseworth #1 Fire, the 2000 Grass Fire, 2005 Marshall Butte Fire, 2006 Old Wind Fire, and most recently the 2007 Murphy Complex Fire.

Table 5. Fire Frequency by Pasture from 1993 to 2012.

Pasture	Number of Times Burned from 1993 to 2012	Acres Of Pasture	Percent of Pasture
North (1,994 acres)	2	1,133	57%
	3	445	22%
	4	373	19%
	5	44	2%
South (403 acres)	2	72	18%
	3	331	82%

As a result of wildfire, plant communities within the Grassy Windmill Allotment have been modified. Various drill and aerial seeding efforts have been undertaken to rehabilitate areas burned by wildfire. Following the 2000 Grass Fire, the majority (approximately 2,100 acres; 88% of the allotment) of the allotment was drill and aerially seeded. The Allotment was drill seeded with 'Goldar' bluebunch wheatgrass, 'Arriba' western wheatgrass (*Pascopyrum smithii*), bottlebrush squirreltail (*Elymus elymoides*), and fourwing saltbrush (*Atriplex canescens*). The Allotment was also aerially seeded with 'Ladak" alfalfa (*Medicago sativa*), 'Eski' sainfoin (*Onobrychis viciifolia*), 'Appar' Lewis flax (*Linum lewisii*), 'Delar' small burnett (*Sanguisorba minor*), western yarrow (*Achillea millefolium*), Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), and basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*). The entire

Allotment burned in the 2007 Murphy Complex Fire and was aerially seeded with Wyoming sagebrush. Currently, the allotment is predominantly vegetated with a mixture of perennial and annual grass and forb species, with little shrub component (Map 3, Table 6). Rabbitbrushes (*Ericameria nauseosa* and *Chrysothamnus viscidflorus*) have increased as a result of repeated fires. However, its density and the size of patches do not meet mapping criteria at this time.

Table 6. Vegetation Community in Acres and Percentage by Pasture.

Pasture	Sandberg Bluegrass
North Pasture	1,994 (100%)
South Pasture	403 (100%)

*Vegetation community is listed by dominate cover species. Numerous other plant species, both native and non-native, are present in the communities.

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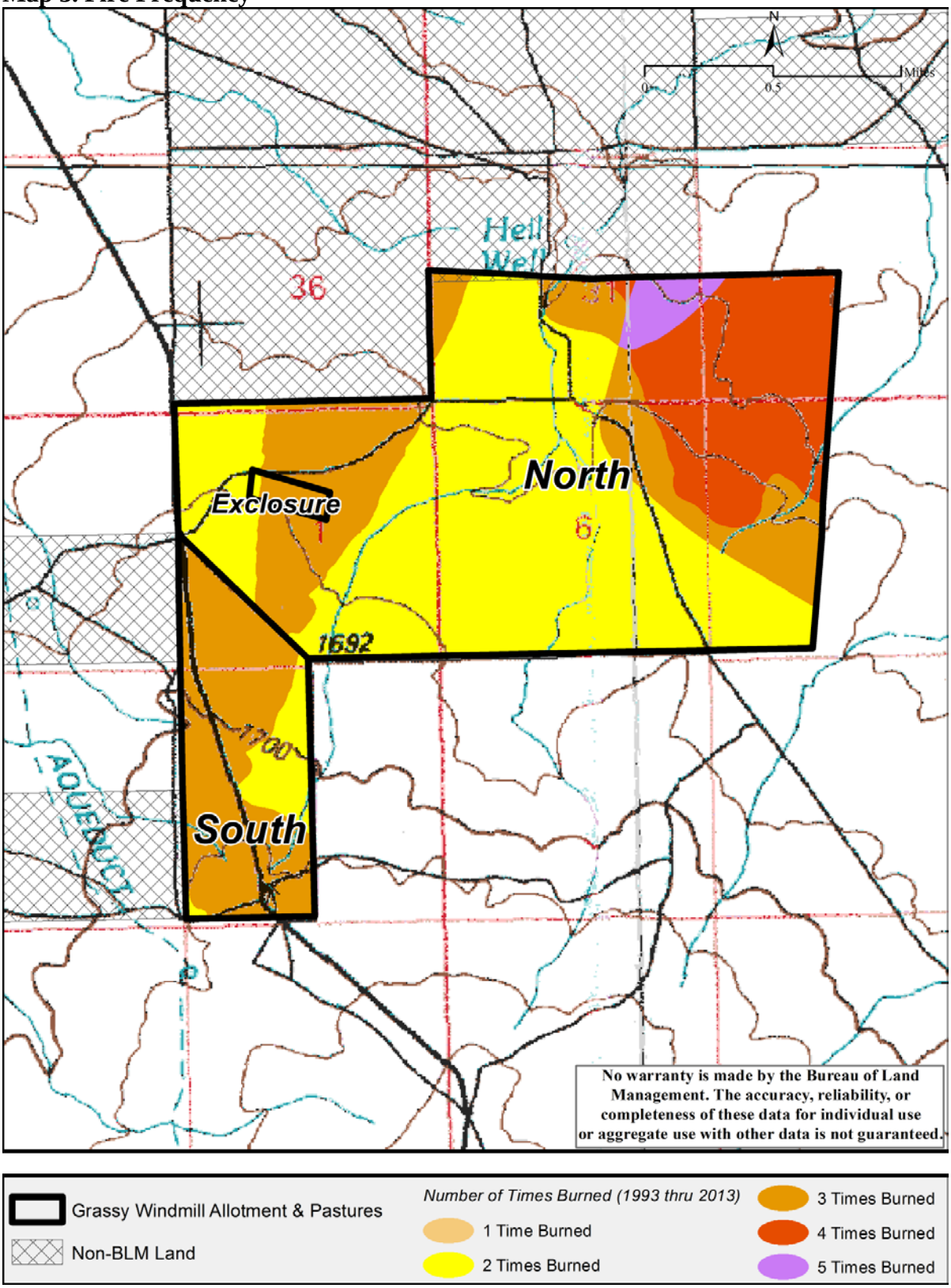
Map 3. Fire Frequency



Two Ecological Site Inventory (ESI) sites (Map 4) are located within the Grassy Windmill Allotment, with one site in each pasture. Vegetative production data and cover data recorded during the 2006 ESI is summarized in Table 4 and Table 10. Cover data was also collected in the North Pasture in 2003 (Table 10). All of the sites were burned in the 2007 Murphy Complex Fire, but data is included to show pre-fire conditions.

Trend plots have not been established in this allotment. Due to differences in sampling locations and methodology (e.g. number of transects per site and number of points per transect) among the 2003 (Step Point Method, TR 1734-4) data, the 2006 ESI data, 2012 and 2013 Habitat Assessment Framework (HAF) data and the 2014 (Step Point Method, TR 1734-4) 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.

Table 7. Summary of 2006 production data (total dry weight, in pounds per acre)

Vegetation Class	Species	Site		
		Loamy 11-13 ARTRT/PSSPS ESD*	2006-RA-34a (North Pasture)	2006-RA-101a (South Pasture)
Perennial Grasses	*Bluebunch wheatgrass*	240-520	91.2	406.5
	Sandberg bluegrass	21-45	24.6	93.2
	Thickspike wheatgrass	-	54	0.0
	Great basin wildrye	1-26	9.8	1.2
Annual Grasses	*Cheatgrass*	-	21.7	0.0
Perennial Forbs	*Silky lupine*	1-20	0.0	3.0
	Longleaf phlox	1-20	0.9	0.0
	Tapertip hawksbeard	21-45	0.0	0.9
Annual Forbs	*Tall willowherb*	-	1.8	0.0
	Tall tumblemustard	-	0.0	1.4
	Blue mustard	-	15.2	0.0
Shrubs	*Yellow rabbitbrush*	1-26	0.0	69.5
	TOTAL	**600-1300**	**219.2**	**575.7**

*Only those native plants found in both the Ecological Site Description (ESD) and production plots are listed in the Table. Therefore, totals for the differing plant types are not a sum of those listed in the Table, but of all plants expected to occur in the ESD.

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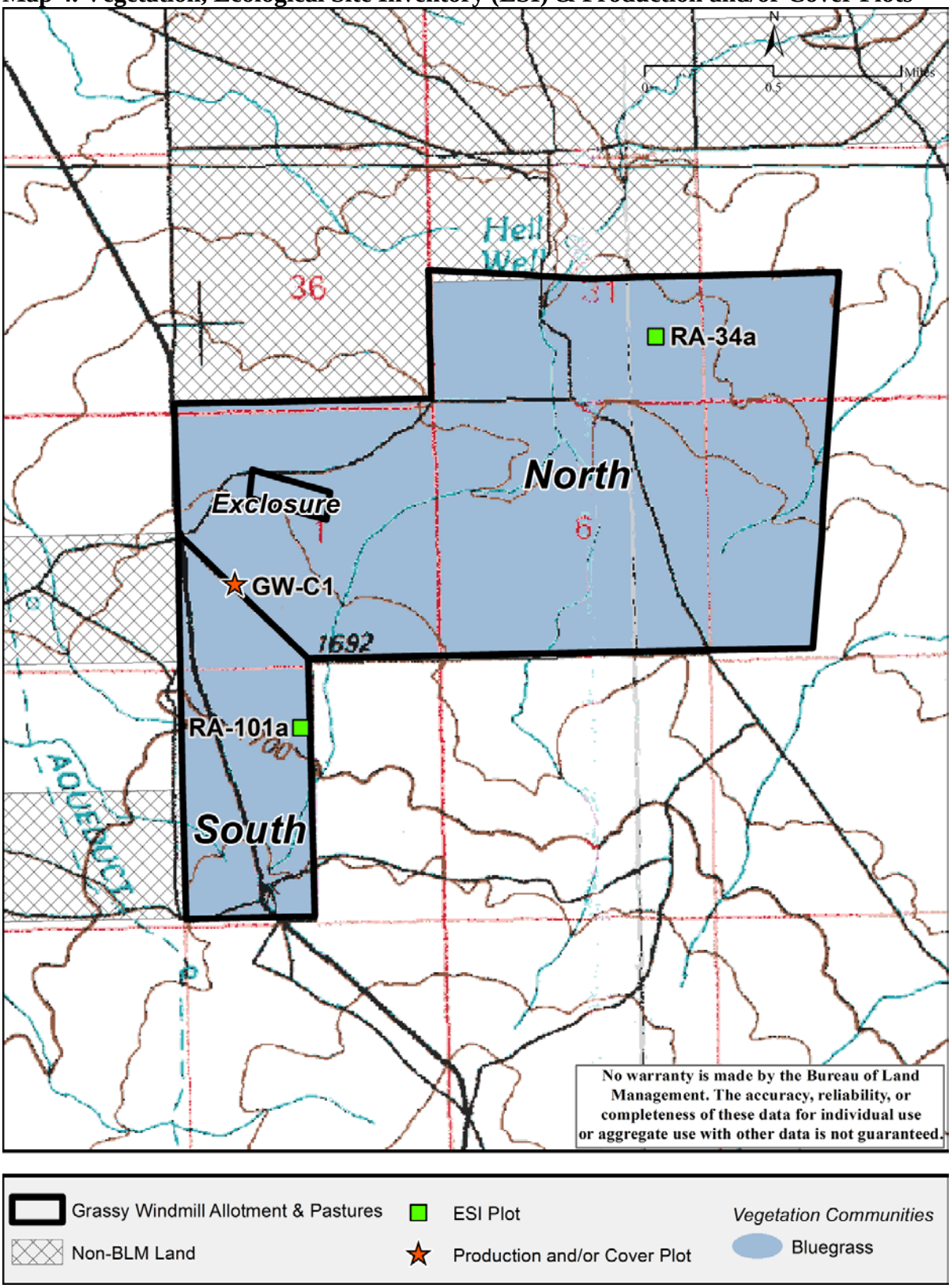
Map 4. Vegetation, Ecological Site Inventory (ESI) & Production and/or Cover Plots



Noxious Weeds

The State of Idaho has listed 65 plant species as noxious weeds. Four are known to occur in the Grassy Windmill Allotment: rush skeletonweed (*Chondrilla juncea*), Russian knapweed (*Rhaponticum repens*), scotch thistle (*Onopordum acanthium*), and diffuse knapweed (*Centaurea diffusa*) (Map 3). There are 13 known rush skeletonweed occurrences in the allotment, which were chemically treated in 2007 and 2008. There is one known occurrence of Russian knapweed in the North Pasture that was chemically treated in 2008. Within the South Pasture, there are three known occurrences of scotch thistle that were chemically treated in 2005 and 2008, along with four occurrences of diffuse knapweed that were chemically treated 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 infestations in areas where they presently do not occur.

Many of the known noxious weed infestations are found and treated through the Twin Falls District (TFD) Emergency Stabilization and Rehabilitation (ESR) program. Approved ESR plans allow three year funding for weed control and play a vital part in the reestablishment of naturally recovering vegetation, as well as in the successful establishment of newly seeded areas. Weed personnel grid the burned areas and treat noxious weed occurrences in order to allow for reduced competition during reestablishment of desired vegetation. Crews also treat road corridors throughout the field office which helps prevent the spread of weeds from vehicles that may be transporting weed seeds to new areas. Control methods used within the TFD for the treatment of noxious weeds include biological, mechanical, and chemical.

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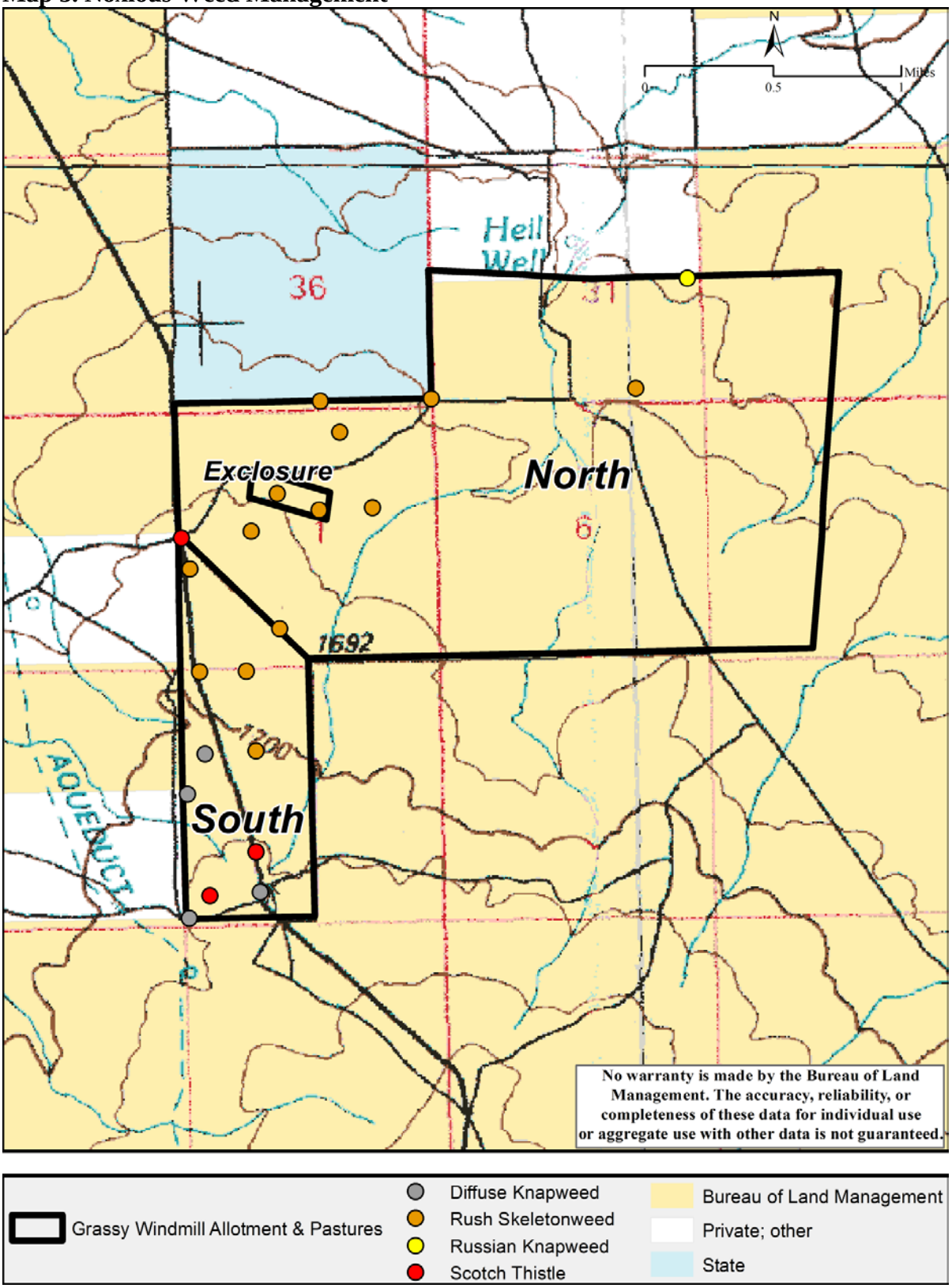
Map 5. Noxious Weed Management



IDAHO RANGELAND HEALTH STANDARDS ASSESSMENT

There are eight Standards for healthy rangelands that apply to BLM lands in the state of Idaho. Not all of the Standards apply to the Grassy Windmill Allotment due to variances in the land type and geographical area. Of the eight Idaho Standards for Rangeland Health, the following three standards are applicable to the Grassy Windmill Allotment.

- **Standard 1 –** Watersheds provide for the proper infiltration, retention, and release of water appropriate to soil type, 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 8 –** Habitats are suitable to maintain viable populations of threatened and endangered, sensitive, and other special status species.

Standards 2, 3, 4, 6, and 7 do not apply to the Grassy Windmill Allotment

Table 8. Standards Applicable to the Grassy Windmill Allotment by Pasture.

Standard	Pastures
1	All Pastures (North and South)
2	Not applicable
3	Not applicable
4	Not applicable
5	All Pastures (North and South)
6	Not applicable
7	Not applicable
8	All Pastures (North and South)

An interdisciplinary team conducted an Interpreting Indicators of Rangeland Health (IIRH) field evaluation at one representative site of the Grassy Windmill Allotment during July of 2013 (Map 6). The site at which the IIRH evaluation was completed was a HAF site located in the North Pasture within a seeded native vegetation community.

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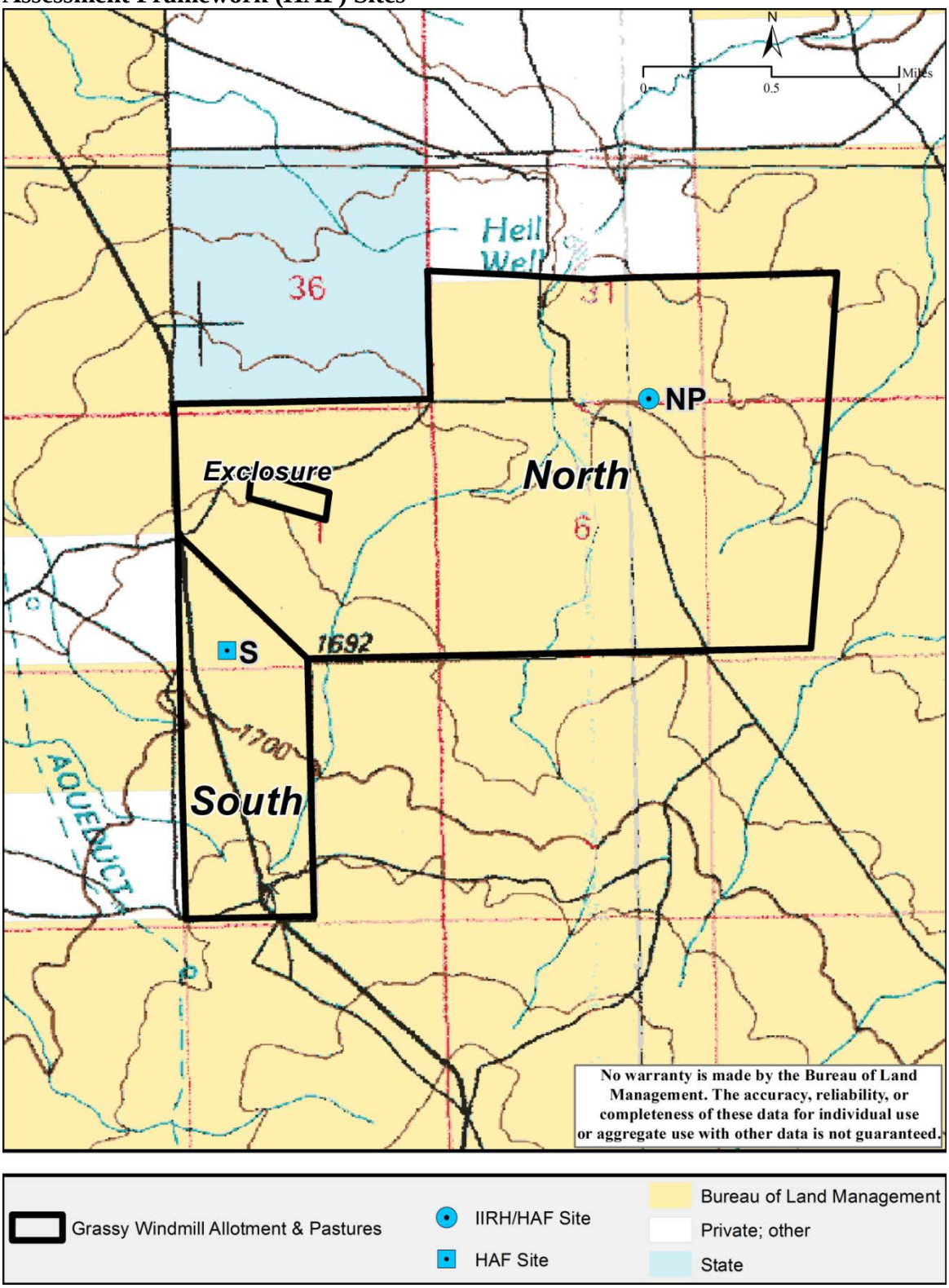
Map 6. Interpreting Indicators of Rangeland Health (IIRH) & Sage-grouse Habitat Assessment Framework (HAF) Sites



HAF sites were randomly generated through a GIS process (Appendix B). Key utilization sites were selected in representative areas based on the presence of key forage species, distance from livestock water, and accessibility of the area to livestock grazing. When the ID Team conducted IIRH field evaluations, the HAF sites were visited first. If the HAF site(s) was not representative of the vegetation community, an ESI site was then selected if available within that vegetation community. If no ESI site was available, a key utilization site was used. When the ID Team determined that none of the pre-determined sites were representative of the vegetation community, a new location was selected that was representative of the vegetation community.

Indicators of rangeland health (Table 9) were used to evaluate three rangeland health attributes (Table 10): Soil and Site Stability, Hydrologic Function, and Biotic Integrity (TR 1734-6). The IIRH evaluation sheet was completed at each site, photographs were taken, and a list of plant species observed was recorded. In addition, general field notes were recorded for the allotment that included such items as presence of noxious weeds, wildlife sign, recreation impacts, and presence or condition of range infrastructure.

A cover transect to determine vegetative cover was recorded at the IIRH site following the Line Point Intercept method as described in the Sage-grouse Habitat Assessment Framework (BLM 2010) protocol. Because forbs are important to sage-grouse, the line point intercept method was augmented using Daubenmire frames. Forb species were recorded in 7.9 inch by 19.7 inch (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.

In addition to evaluating rangeland health indicators at the IIRH site, the ID Team also examined other areas to ensure the evaluation site was representative of the vegetation communities throughout the allotment. Data collected at the evaluation sites were compared to the Natural Resource Conservation Service's (NRCS) ESD reference sheet for the soil types and potential vegetation communities in the Cedar Crossing Allotment. The evaluation site in the allotment occurred in the Loamy 11-13" Basin Big Sagebrush/Bluebunch wheatgrass ecological site. The ESD reference sheet describes the expected condition of the ecological site in state 1, phase A of the reference state. This plant community should have Basin big sagebrush in the overstory with bluebunch wheatgrass dominating the understory. Sandberg bluegrass, Thurber's needlegrass (*Achnatherum thurberianum*), bottlebrush squirreltail, arrowleaf balsamroot (*Balsamorhiza sagittata*), taper-tip hawksbeard (*Crepis acuminata*) and antelope bitterbrush (*Purshia tridentata*) should be sub-dominant species. Natural fire frequency should be 20-50 years.

Indicator ratings for the site in the Grassy Windmill Allotment are shown in Table 9. Rangeland health attributes ratings are shown in Table 10.

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Table 9. 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 H=Hydrologic Function B = Biotic Integrity	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills	S, H					NP
2. Water-flow Patterns	S, H					NP
3. Pedestals and/or terracettes	S, H					NP
4. Bare ground	S, H					NP
5. Gullies	S, H					NP
6. Wind-scoured, blowouts, and/or deposition areas	S					NP
7. Litter movement	S					NP
8. Soil surface resistance to erosion	S, H, B					NP
9. Soil surface loss or degradation	S, H, B					NP
10. Plant community composition and distribution relative to infiltration	H				NP	
11. Compaction layer	S, H, B					NP
12. Functional/structural groups	B				NP	
13. Plant mortality/decadence	B					NP
14. Litter amount	H, B		NP			
15. Annual production	B					NP
16. Invasive plants	B				NP	
17. Reproductive capability of perennial plants	B					NP

NP= IIRH evaluation site in North Pasture

The ratings of the 17 indicators do not result in a single rating of rangeland health for a site. The 17 indicators are related to three components of rangeland health known as attributes (soil and site stability, hydrologic function, and biotic integrity). The second column of Table 8 identifies which indicators are related to each of the three attributes. The ID team arrived at attribute departure ratings by considering the preponderance of evidence of departure for the group of indicators related to each attribute. Indicators showing departure from reference conditions may be weighted more heavily, based upon the effect of the departure on ecological function of the site being evaluated. The degree of departure ratings for each of the three attributes of rangeland health are shown in Table 10.

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Table 10. 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					NP
Hydrologic Function					NP
Biotic Integrity				NP	

NP= IIRH evaluation site in North 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.

The IIRH site was evaluated using the ESD (R025XY043ID) reference sheet for the Loamy 11-13" Basin Big Sagebrush/Bluebunch wheatgrass ecological site (USDA and NRCS, 2013a). The reference sheet for this ESD indicates bare ground should range from 30 to 40%, litter cover should range from 5 to 10%, and soil stability test values should range from 4 to 6 (Scale of 1 to 6; Pellant et al., 2005). Litter percentage calculations used for rating indicator 14 include all litter, detached and standing. While the ESD indicates that litter cover should range from 5 to 10%, ESI and HAF data collected within the allotment show that litter values actually range from approximately 42 to 92% (cover for all layers). With this, even though the litter indicator may have been rated as a departure from the reference condition, this departure may not be reflected in the overall attribute rating. Average percentage of bare ground recorded in the 2006 ESI data, as well as the 2012, and 2013 HAF data ranges from 3 to 21% of cover. The ID team determined that the soil stability test (Pellant et al., 2005) completed in the North Pasture of Grassy Hills Allotment was also representative of the soils in the Grassy Windmill Allotment and resulted in an average soil stability value of 4.0 indicating adequate soil surface resistance to erosion (Photo 1. Soil Profile).

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Photo 1. Soil Profile (North Pasture)

Soils within the Grassy Windmill Allotment are silt loams. The majority of the allotment is relatively flat. The Soil Survey Geographic (SSURGO) Database (NRCS 2012) shows that 100% of the allotment has a moderate wind erosion hazard and 100% of the allotment has a high water erosion hazard.

Although the soil survey shows potential for both wind and water erosion in this allotment, no indications of active soil loss or active erosion were noted during the 2013 IIRH field visit. Adequate soil cover is present within the allotment to reduce potential erosion. Bare ground is generally low, with an abundance of vegetation and biological soil crusts throughout the majority of the allotment (Tables 11, 12, and 13).

<u>North Pasture</u>

IIRH Site NP (Loamy 11-13")

IIRH Site NP, which is also a HAF site, is located in a seeded native vegetation community where Thurber's needlegrass is the dominant deep-rooted perennial grass species (18% cover), and Sandberg bluegrass is the dominant shallow-rooted perennial bunchgrass species (13% cover). A variety of other perennial grass species are present including bluebunch wheatgrass (8% cover), bottlebrush squirreltail (4% cover), and western wheatgrass (3% cover). In addition,

biological soil crusts comprise 12% of the cover (Table 11). The site is of relatively flat topography with a north aspect and was most recently burned in 2007 Murphy Complex Fire.

Table 11. Percent ground cover (top layer) at IIRH site

Ground Cover	IIRH Site NP
	North Pasture
Perennial Grasses	46%
Annual Grasses	3%
Perennial Forbs	8%
Annual Forbs	4%
Shrubs	1%
Biological Soil Crust	12%
Bare Ground	5%
Litter	20%
Rock	0%

The indicator for plant community composition and distribution relative to infiltration was rated as a slight to moderate departure from the reference condition due to the low abundance of shrubs at the site. The litter amount was rated as a moderate to extreme departure from the reference condition due to an increase in the amount of litter (56%) found at the site.

Some historic pedestals were present but appeared to be inactive. Pedestalling may have occurred immediately following the 2007 Murphy Complex Fire. Soils likely stabilized as perennial vegetation recovered from the burn. Soil movement after a wildfire is not unexpected considering the high water and moderate wind erosion hazards identified for the allotment.

All other indicators related to the Soil and Site Stability and Hydrologic Function attributes were rated none to slight departure from the reference condition. Therefore, the Soil and Site Stability and Hydrologic Function attributes were each rated as none to slight departure.

Evaluation of Standard 1

Some evidence of soil loss was observed at the site. Field notes indicate that some soil loss may have occurred following the 2007 Murphy Complex, as evidenced through some slight historic pedestalling. It was also noted that the pedestalling was minor and did not appear to be active; therefore, the indicator for pedestals and/or terracettes was rated none to slight.

The site was rated slight to moderate departure for plant community composition and distribution relative to infiltration and runoff due to the low abundance of shrubs at the site.

The amount of litter found within the allotment is higher than what is described in the ESD. However, litter is providing cover for site protection, and replenishing nutrients, and does not appear to be negatively affecting ecological processes.

The Soil and Site Stability and Hydrologic Function attributes were rated none to slight departure from the reference condition.

Evaluation Finding – Allotment is:
_X_ Meeting the Standard
__ Not meeting the Standard, but making significant progress towards meeting
__ Not meeting the Standard

Rationale for Evaluation Finding
Abundant perennial vegetation, as well as biological soil crusts, is present within the Grassy Windmill Allotment to provide protection for site stability. Additionally, bare ground is lower than expected throughout the allotment and topography is relatively flat.

The litter amount indicator ratings deviated from the reference condition found in the ESD at the site. However, the ID Team determined that the litter amount was appropriate for site stability and ecological processes as shown by adequate soil moisture, as well as plant growth/annual production matching what is expected at the site.

Observations made by the ID Team during 2013 IIRH evaluation, as well as cover data (Tables 11, 12, and 13) collected within the Grassy Windmill Allotment indicate that ground cover (vegetation, biological soil crusts, litter, etc.) is sufficient for soil stability. Adequate vegetation and litter are present to protect the soil surface from erosion. While some evidence of past soil loss, in the form of slight pedestal formation, was observed, pedestals were noted to be minor and inactive. It was also noted that the minor soil loss likely occurred after the site burned in 2007. Additionally, no signs of soil loss, or active pedestal formation, were noted in any other areas of the allotment. Moreover, other signs of accelerated erosion, such as active rills, water flow patterns, gullies, or other indications of soil erosion were not present within the allotment. Infiltration, retention, and release of water processes relative to soil, vegetation, climate and landform appear to be providing for appropriate nutrient and hydrologic cycling and energy flow.

Due to recent wildfire (2007), shrubs are of lower abundance within the plant communities of the allotment. However, yellow rabbitbrush (*Chrysothamnus viscidiflorus*) is present in lower quantities throughout the allotment. At the HAF site in the North Pasture yellow rabbitbrush was 1% of the cover and 11.5% of the cover at the HAF site in the South Pasture (Tables 12 and 13). Shrubs trap snow and have a taproot that penetrates deep into the soil profile; therefore, the lack of shrubs has the potential to affect infiltration and retention of soil moisture. However, some shrub species, as well as abundant deep-rooted perennial bunchgrasses, are present to carry soil moisture deep into the soil profile. Furthermore, although wildfire has effectively removed the above-ground biomass of the shrubs, it is likely that some root structure is still present to assist infiltration deep into the soil profile. In addition, perennial grasses appeared vigorous and were producing seedheads, suggesting that the reduction of shrub cover is not negatively affecting infiltration to the point of reducing plant vigor or reproductive capability.

The Grassy Windmill Allotment is meeting Standard 1.

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.

_X_Standard Doesn't Apply

All streams within the Grassy Windmill Allotment are classified as ephemeral (National Hydrography Data (USGS 2014). Ephemeral streams only flow in direct response to precipitation, are above the water table throughout the year (BLM 1998) and do not support riparian vegetation. One small reservoir is also present in the allotment. Naturally occurring riparian vegetation, springs, or wetlands are not present within the allotment. Therefore, Standard 2 does not apply to the Grassy Windmill Allotment.

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.

_X_Standard Doesn't Apply

See rationale under 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.

_X_Standard Doesn't Apply

Almost the entire Grassy Windmill Allotment was seeded to native cultivars following the 2000 Grass Fire. The JFO interdisciplinary team determined that the allotment should be assessed as a seeding rather than a native plant community.

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.

Rangeland Health Assessment
As a result of wildfire, plant communities within the Grassy Windmill Allotment have been modified. Various drill and aerial seeding efforts have been undertaken to rehabilitate areas burned by wildfire. Following the 2000 Grass Fire the majority (approximately 2,100 acres; 88% of the allotment) of the allotment was drill and aerially seeded. The Allotment was drill seeded with 'Goldar' bluebunch wheatgrass, 'Arriba' western wheatgrass, bottlebrush

squirreltail, and fourwing saltbrush. The Allotment was also aerially seeded with 'Ladak" alfalfa, 'Eski', 'Appar' Lewis flax, 'Delar' small burnett, western yarrow, Wyoming big sagebrush, and basin big sagebrush. The entire Allotment also burned in the 2007 Murphy Complex Fire and was aerially seeded with Wyoming sagebrush. Currently, the allotment is predominantly vegetated with a mixture of perennial and annual grass and forb species, with little shrub component (Tables 12 and 13). Due to the wide scale seeding of the allotment, both the North and South Pastures are evaluated under Standard 5.

IIRH evaluation site NP is located in a seeded native vegetation community, as shown by vegetation cover data (Table 12). Vegetative cover data was collected at multiple layers; however, Tables 12 and 13 display only the top layer. Thurber's needlegrass comprises the highest percent foliar cover across the seeded plant community, followed by Sandberg bluegrass, biological soil crusts, and bluebunch wheatgrass.

Table 12. Percent ground cover (top layer) at IIRH Site

Vegetation Class	Species	Percent Cover
		IIRH Site NP (2013)
Perennial Grasses	*Bluebunch wheatgrass*	8%
	Bottlebrush squirreltail	4%
	Sandberg bluegrass	13%
	Thurber's needlegrass	18%
	Western wheatgrass	3%
Annual Grasses	*Cheatgrass*	3%
Perennial Forbs	*Bare-stem lomatium*	1%
	Longleaf phlox	4%
	Lupine	2%
	Onion	1%
Annual Forbs	*Small blue eyed Mary*	1%
	Spring whitlow-grass	1%
	Yellow salsify	2%
Shrubs	*Yellow rabbitbrush*	1%
	Vegetation Total	**62%**
Other Cover	*Bare Ground*	5%
	Biotic Crust	12%
	Litter in Contact with Soil	16%
	Litter Standing	4%
	Persistent Litter	1%
	Rock or Gravel	0%
	Grand Total	**100%**

Other plant species not recorded during cover transects but observed at the IIRH site are listed in Appendix B.

Table 13. Percent ground cover (top layer) recorded in 2003, 2006, and 2012 in other areas of the Grassy Windmill Allotment

Vegetation Class	Species	Percent Cover			
		HAF site S (2012)	RA-34a (2006)	RA-101a (2006)	GW-C1 (2003)
		South Pasture	North Pasture		
Perennial Grasses	*Sandberg bluegrass*	15%	20.7%	19.3%	30%
	Basin wildrye	9%	2%	1.3%	0%
	Bluebunch wheatgrass	6.5%	14.7%	39.3%	21%
	Thurber's needlegrass	25.5%	0%	0%	0%
	Western wheatgrass	6.5%	0%	0%	2%
	Thickspike wheatgrass	0%	16.7%	0%	0%
	Bottlebrush squirreltail	0%	0.7%	0%	0%
	Crested wheatgrass	0%	0%	1.3%	0%
Annual Grasses	*Cheatgrass*	0.5%	3.3%	3.3%	8%
Perennial Forbs	*Long leaf phlox*	0%	0.7%	0%	1%
	Silverpuffs	0%	0%	0.7%	1%
	Onion	0%	0%	0%	2%
	Lupine	0%	0%	0%	3%
	Desert parsley	0%	0%	0%	1%
	Death camas	0%	0%	0%	1%
	Buckwheat	0%	0%	0%	1%
Annual Forbs	*Tall willowherb*	0%	0%	0.7%	0%
	Bur buttercup	0%	0.7%	0%	1%
	Blue mustard	0%	2%	0%	0%
	Russian thistle	0%	0%	0%	9%
	Tumble mustard	0%	3.3%	1.3%	0%
	Clasping pepperweed	0%	1.3%	0%	0%
	Blue eyed Mary	0%	0%	0%	2%
Shrubs	*Wyoming sagebrush*	0%	0%	0%	1%
	Yellow rabbitbrush	11.5%	0%	4.7%	1%
	Vegetation Total	**74.5%**	**66.1%**	**71.9%**	**85%**
Other Cover	*Bare Ground*	8%	21.3%	3.3%	9%
	Biotic Crust	1%	1.3%	0.7%	0%
	Litter in Contact with Soil	13%	8.7%	15.3%	4%
	Litter Standing	3.5%	2.7%	8.7%	0%
	Rock or gravel	0%	0%	0%	0%
	Grand Total	**100%**	**100%**	**100%**	**99%***

Due to differences in sampling locations and methodology (e.g. number of transects per site and number of points per transect) among the 2003 production and cover data, the 2006 ESI data, and the 2012 and 2013 HAF data, statistical tests cannot be used to analyze vegetative cover across

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years. However, the data can be used to describe general similarities or differences in vegetation between years or locations within the allotment.

North Pasture

IIRH Site NP (Loamy 11-13")

Site NP is located in a seeded native vegetation community where Thurber's needlegrass is the dominant deep-rooted perennial grass species (18% cover), and Sandberg bluegrass is the dominant shallow-rooted perennial bunchgrass species (13% cover). The site was most recently burned in the 2007 Murphy Complex Fire. A variety of other perennial grass species are present including bluebunch wheatgrass (8% cover), bottlebrush squirreltail (4% cover), and western wheatgrass (3% cover). In addition, biological soil crusts comprise 12% of the cover (Table 12). The site is of relatively flat topography with a north aspect (Photo 2. IIRH Site NP). The 2013 IIRH field notes, as well as the 2013 cover data, indicate that perennial forb species were abundant and diverse in the seeded plant communities of the North Pasture (Table 12).

Photo 2. Overview of IIRH Site NP (North Pasture)

The functional/structural group indicator was rated as a slight to moderate departure from what is expected for the site because shrub cover was generally lacking. Yellow rabbitbrush was present at low levels throughout much of the allotment (1% cover at site the IIRH site NP), but overall cover was reduced when compared to the reference condition.

Cheatgrass was noted in the 2013 IIRH evaluation notes to occur within disturbed areas (roads, rodent burrows, etc.), and comprised 3% of the cover (Table 12). Based on the amount of cheatgrass, the indicator for invasive species was rated slight to moderate departure from the ESD.

The litter amount was rated as a moderate to extreme departure from the reference condition due to an increase in the amount of litter (56% cover for all layers) at the site.

All indicators other than functional/structural groups, invasive plants, and litter amount were rated none to slight departure from the reference condition. Therefore, the Biotic Integrity attribute was rated as a slight to moderate departure from the reference condition.

Evaluation of Standard 4

The 2013 IIRH field notes, as well as the cover data, indicate that perennial forb species are abundant and diverse in most areas of the North and South Pastures. The seeded plant communities have a high abundance of perennial bunchgrasses, as well as other desirable herbaceous vegetation that are providing soil cover and competition to invasive species, as documented in the 2003 production and cover data, the 2006 ESI data, and the 2012 and 2013 HAF data (Tables 12 and 13). Perennial species that are present within the allotment are appropriately productive and are capable of reproduction and recruitment of new seedlings. Overall shrub cover was lacking throughout most of the Allotment due to recent wildfires. IIRH field notes do not indicate any other invasive species were present. Overall, adequate desirable perennial species are present to hinder the spread or establishment of cheatgrass or other invasive or noxious plant species.

The litter amount indicator was rated moderate to extreme departure at the site. While the litter amount indicator rating deviated from reference condition, the increased litter amount did not appear to be negatively affecting ecological processes.

The Biotic Integrity attribute was rated as a slight to moderate departure from the reference condition.

Evaluation Finding – Allotment is:

_X_ Meeting the Standard
__ Not meeting the Standard, but making significant progress towards meeting
__ Not meeting the Standard

Rationale for Evaluation Finding

The overall diversity of perennial species within the seeded areas of the Grassy Windmill Allotment do not appear to be diminishing over time, as evidenced by the continued presence of seeded and native plant species. Following the Grass Fire of 2000, the allotment was seeded with bluebunch wheatgrass, western wheatgrass, and bottlebrush squirreltail, all of which are still present within the allotment, along with other native grass species such as Sandberg bluegrass and Thurber's needlegrass (Table 12 and 13). The 2013 IIRH field notes, as well as the 2012 and 2013 cover data, indicate that perennial forb species were abundant and diverse in some

seeded plant communities within the North Pasture but were less abundant and diverse in the South Pasture (Tables 12, 13, and Appendix B). Cover of perennial forbs ranged from 0% to 8% across the cover transects recorded within the allotment in 2012 and 2013. The perennial species present within the seeded areas are appropriately productive and are capable of reproduction and recruitment of new seedlings.

The current plant community lacks vertical structure due to the 2007 Murphy Complex Fire burning through it and removing any shrubs present prior to the fire. Yellow rabbitbrush is present at low levels within the North Pasture (1% cover) and South Pasture (11.5% cover). 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. However, as shrubs re-establish and mature these animals should return to the area. In the meantime, the seeded 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*).

Adequate litter is present within the seeded plant communities to provide cover for site protection. The litter amount indicator rating deviated from the reference condition found in the ESD at the site and was rated as a moderate to extreme departure. The presence of seeded species can result in higher biomass production, resulting in more litter than is described in the ESD reference sheet. However, the ID Team determined that the litter amount was appropriate for site stability and ecological processes as shown by adequate soil moisture, as well as plant growth/annual production matching what is expected at each site.

Cheatgrass comprised 3% of the cover and was noted in the 2013 IIRH field notes to occur within disturbed areas (roads, rodent burrows, etc.). No other noxious or invasive weed species were noted within the allotment during the field evaulation. Invasive species can become a threat to biotic integrity following large scale disturbances such as wildfire; however, adequate desirable perennial species and biological soil crusts are present within the seeded plant communities to hinder the spread or establishment of invasive or noxious plant species.

The seeded vegetation communities in the Grassy Windmill Allotment are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle. Therefore, both pastures within the Grassy Windmill Allotment are meeting Standard 5.

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.

__X__Standard Doesn't Apply

The plant communities with the Grassy Windmill are dominated by seeded native species. 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.

__X__Standard Doesn't Apply

No water quality assessments have been completed within the allotment, and beneficial uses have not been designated as no intermittent or perennial water bodies are present within the allotment (IDEQ 2014). Standard 7 does not apply to the 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 plants within the allotment. In the JFO special status plants are generally associated with distinct soil types that occur in scattered portions of the field office. None of these soil types occur within the allotment based on SSURGO soil data (NRCS, 2012). The Grassy Windmill Allotment does not contain habitat for slickspot peppergrass (*Lepidium papilliferum*; Proposed Endangered, BLM sensitive species) (BLM, 2012). The nearest known occupied habitat for slickspot peppergrass is 5 miles away, on the west side of Clover Creek.

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

There are no BLM sensitive or federally listed fish or aquatic invertebrates or their habitat within 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 that are 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 remain in a single general area throughout the year.

In 2010, 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% canopy cover of sagebrush, perennial herbaceous cover should average at least 7" in height with at least 10% canopy cover for grasses and at least 5% for forbs and a diversity of forb species during spring (Connelly et al., 2000).

- Late brood rearing habitat should support 10-25% 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% canopy cover of sagebrush with at least 10-14" exposed above the snow (Connelly et al., 2000).

The Murphy Complex Fires in 2007 burned the entire allotment which essentially eliminated all sagebrush in the allotment and in surrounding allotments (Map 7). The nearest area mapped as sagebrush is 4.2 miles to the northwest of the allotment. Following the fires, the BLM aerial seeded sagebrush in strips. Where sagebrush has been reseeded, recovery of the sagebrush community needed for sage-grouse is expected to take one (Wambolt and Payne, 1986) to several (Baker, 2006; Baker, 2011) decades assuming the absence of additional fire.

The Grassy Windmill Allotment contains 1 unoccupied sage-grouse lek. Within five miles there are 7 occupied, 9 undetermined (due to a lack of recent surveys), and 2 unoccupied sage-grouse leks (Map 7). Sage-grouse attendance at occupied leks within five miles of the allotment are shown in Table 14. Leks are considered occupied if there has been documented sage-grouse activity within the past five years.

Table 14. Sage-grouse Attendance at Occupied Leks within Five Miles of the Grassy Windmill Allotment, 2000-2014.

Lek	Location	Survey Year[1]														
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
2O-111	2.4 miles S	20	--	--	8	8	7	19	--*	0	19	19	14	11	2	2
2O-127	2.7 miles W										6	3	--	--	--	--
2O-114	3.6 miles SW										4	5	--	--	--	--
2O-151	4.1 miles SW	--	--	--	--	--	13	--	--*	8	3	3	0	6	--	5

Lek	Location	Survey Year[1]														
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
2O-076	4.4 miles SW	--	--	--	--	--	--	--	--*	--	--	5	--	--	--	--
2O-012	4.6 miles SW										8	--	12	--	--	--
2O-152	4.6 miles NW	--	--	--	--	0	--	--	--*	--	--	0	11	0	--	--

[1]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 (*).

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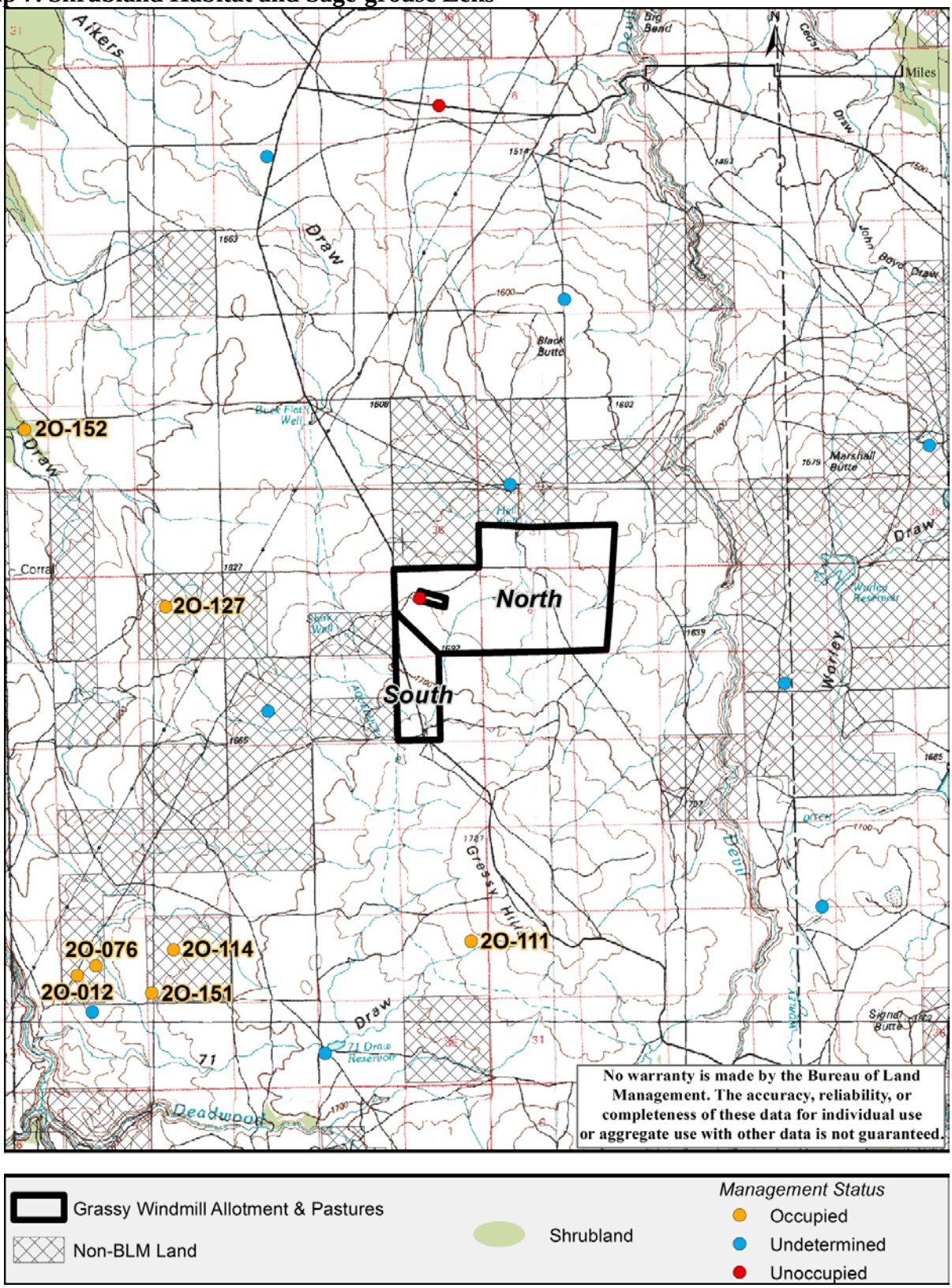
Map 7. Shrubland Habitat and Sage-grouse Leks



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 conducted in 2012 at HAF site **S-** South Pasture and in 2013 at HAF site **N-** North Pasture. Locations of sage-grouse habitat suitability assessments (HAF sites) are shown in Map 6.

No sage-grouse droppings were observed during the assessments or during the IIRH field visits. 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 may be used to inform and interpret other rangeland health information and observations. Sage-grouse habitat suitability assessments are shown in Table 15.

Table 15. 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%**	**10 - < 15% or > 25%**	**< 10%**
			N(0%), S(0% sagebrush, 15% yellow rabbitbrush)
Average Sagebrush Height	**12 - 30”**	**10 -11” or >30”**	**< 10”**
			N(0”), S(0”)
Sagebrush Growth Form	**Spreading**	**Mix of spreading and columnar**	**Columnar**
			N, S
Average Grass Height	**≥ 7”**	**5 - < 7”**	**< 5”**
	N(8”), S(10”)		
Average Perennial Grass Canopy Cover	**≥ 10%**	**5 - < 10%**	**< 5%**
	N(58%), S(65%)		
Average Forb Canopy Cover	**≥ 5%**	**3 - < 5%**	**< 3%**
	N(21%)		S(1%)
Preferred ForbAbundance and Diversity	**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**
	N		S
Overall Site Evaluation			N, S
Pasture Evaluation			North, South

The North Pasture contains one HAF site. Wildfire has eliminated sagebrush in the pasture making it unsuitable for sage-grouse. HAF site N is located in an area mapped as Sandberg bluegrass. Grass and forb indicators were rated suitable at the site. Twelve species of forbs were observed with the most common being longleaf phlox (*Phlox longifolia*), pale agoseris (*Agoseris glauca*), lupine (*Lupinus* spp.), and onion (*Allium* spp.). Cheatgrass was recorded at 4% cover (all layers). This pasture has potential for restoration since all habitat indicators are suitable except for the lack of sagebrush.

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One HAF site is located in the South Pasture. Wildfire has reduced sagebrush to trace levels in the pasture making it unsuitable for sage-grouse. HAF site S is located in an area mapped as Sandberg bluegrass. Yellow rabbitbrush was measured at 15% cover at the site (all layers). Grass indicators were rated suitable at the site and forb indicators were rated unsuitable. Eleven species of forbs were observed at the site but the all occurred at low density. The only common forbs were Lambstongue ragwort (*Senecio integerrimus*) and lupine. Cheatgrass was recorded at 1% cover (all layers).

A list of plants species observed at each site, including preferred sage-grouse forbs is included in Appendix B.

Late Brood Rearing Habitat
No late brood rearing habitat is present in the allotment. The allotment does not contain areas where moisture collects to maintain forbs throughout the summer.

Winter Habitat
The allotment is unsuitable for wintering sage-grouse since sagebrush has been eliminated by wildfire. 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 2-4 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.

Ferruginous hawks are not known to nest in the allotment. The nearest active nest is 3.4 miles to the north in the Cedar Butte Devil Creek Allotment. Pastures in the allotment do not contain suitable nesting trees for ferruginous hawks. 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). Brewer's sparrows primarily nest in big sagebrush (81%), but also nest in other shrubs, such as spiny hopsage (*Grayia spinosa*) (10%), antelope bitterbrush (*Purshia tridentata*) (6%), and rabbitbrush (*Chrysothamnus visicidflorus*) (3%) (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, and averaged 9 inches from the top of the shrub and averaged 7 inches from the edge of the shrub canopy (Rotenberry et al., 1999). These sparrows feed on small insects and seeds (Rotenberry et al., 1999).

Wildfire has eliminated the sagebrush in the allotment making it unsuitable for Brewer's Sparrow nesting. The South pasture contains yellow rabbitbrush which provides some limited nesting habitat. The yellow rabbitbrush averaged 15.5" tall with the tallest rabbitbrush on the transects being 24".

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 (*Sarcobatus vermiculatus*) 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.

Wildfire has eliminated the sagebrush in the allotment making it unsuitable for Loggerhead shrike nesting.

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 sparrow 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 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).

Wildfire has eliminated the sagebrush in the allotment making it unsuitable for sagebrush sparrow nesting. The South pasture contains yellow rabbitbrush which provides 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%) in a generally small area (less than 200 feet radius [3 acres]) from the burrow within a larger (90 to 170 acres) home range. The primary food of pygmy rabbits is sagebrush which comprises 99% of its winter diet (Green and Flinders, 1980). Grasses and forbs make up more of the diet in the late spring into early summer.

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 dominated by 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 allotment 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) pastures in the allotment were 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 not present in the allotment. Potential roosting habitat lies along the cliffs associated with Devil Creek which is 1 mile to the east and Clover Creek which is 5 miles to the west (outside the allotment). Spotted bats may forage over the allotment.

Evaluation of Standard 8
There are no known BLM sensitive or federally listed plants within the Grassy Windmill Allotment. The allotment does not contain habitat for slickspot peppergrass. The nearest known occupied habitat for slickspot peppergrass is 5 miles to the west, on the west side of Clover Creek.

There are no BLM sensitive or federally listed fish or aquatic invertebrates or their habitat within the allotment.

Habitat for BLM sensitive wildlife species occurs within the allotment. Overall habitat ratings for each species by pasture are shown in Table 16.

Table 16. Overall Habitat Suitability for BLM Sensitive Wildlife Species by Pasture.

Species Name and Type of Habitat	North	South
Sage-grouse (nesting & early brood rearing)	U	U
(late brood rearing)	U	U
(winter)	U	U
Ferruginous hawk (nesting)	U	U
(foraging)	M	M
Brewer's sparrow (nesting)	U	U
Sagebrush sparrow (nesting)	U	U
Loggerhead shrike (nesting)	U	U
Pygmy rabbit (year round)	U	U
Piute ground squirrel (year round)	M	M
Spotted bat (roosting)	U	U
(foraging)	M	M

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 sagebrush in the allotment. Grass height was rated suitable in both pastures. Forb abundance and diversity was suitable in the North Pasture and unsuitable in the South Pasture. No late brood rearing habitat is found within the allotment. Without sagebrush, wintering habitat was rated unsuitable.

Pastures in the allotment do not contain suitable nesting trees for ferruginous hawks. The allotment contains marginal habitat for prey species such as mountain cottontail, black-tailed jackrabbit and ground squirrels usually hunted by ferruginous hawk.

Without sagebrush the allotment was rated unsuitable for Brewer's sparrow, loggerhead shrike, and sagebrush sparrow nesting. Yellow rabbitbrush in the South Pasture may provide some limited nesting habitat for Brewer's sparrow and sagebrush sparrow. Pygmy rabbit habitat was also rated as unsuitable.

Wildfires have converted shrub-steppe habitats in the allotment 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) pastures in the allotment were rated marginal for Piute ground squirrels.

Spotted bat roosting habitat is not found in the allotment. The allotment is marginal for spotted bat foraging since there are limited habitat features that would attract bats to this allotment.

Evaluation Finding – Allotment is:

__ Meeting the Standard
__ Not meeting the Standard, but making significant progress towards meeting
X Not meeting the Standard

Rationale for Evaluation Finding

The 2007 Murphy Complex Fire essentially eliminated all sagebrush in the allotment making it unsuitable for sage-grouse and other sagebrush dependent species. The nearest area mapped as sagebrush is 4.2 miles to the northwest of the allotment. Although the allotment has been seeded with Wyoming big sagebrush and basin big sagebrush in 2000 and 2007, the IIRH field notes did not indicate that sagebrush seedlings were present within the allotment. Without sagebrush, the North and South Pastures of the Grassy Windmill Allotment are not meeting Standard 8.

Based on data collected during the IIRH field visit and during the sage-grouse habitat assessments the North Pasture has the best potential for sage-grouse habitat restoration.

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APPENDIX A: 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: shrub-lands, 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 shrub-lands 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.

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APPENDIX B: SPECIES LIST ACCUMULATED DURING UPLAND ASSESSMENTS

Scientific Name	Common Name	Species Type	Site(s) where species occurred
Perennial Grasses			
Achnatherum thurberianum	Thurber's needlegrass	Native	North, South
Elymus elymoides	Bottlebrush squirreltail	Native	North
Leymus cinereus	Basin wildrye	Native	South
Pascopyrum smithii	Western wheatgrass	Native	North, South
Poa secunda	Sandberg bluegrass	Native	North, South
Pseudoroegneria spicata	Bluebunch wheatgrass	Native, Seeded	North, South
Annual Grasses			
Bromus tectorum	Cheatgrass	Exotic, Invasive	North, South
Perennial Forbs			
Allium spp.	Onion	Native	North, South
Castilleja angustifolia	Northwestern Indian paintbrush	Native	South
Cirsium spp.	Thistle	Native	North, South
Crepis acuminata	Tapertip hawksbeard	Native, Sage-grouse Preferred	North
Erigeron pumilus	Shaggy fleabane	Native, Sage-grouse Preferred	North, South
Lomatium nudicaule	Barestem biscuitroot	Native, Sage-grouse Preferred	North
Lomatium triternatum	Nineleaf biscuitroot	Native, Sage-grouse Preferred	North
Lupinus spp.	Lupine	Native	North, South
Mertensia oblongifolia	Oblongleaf bluebells	Native	North, South
Phlox longifolia	Longleaf phlox	Native, Sage-grouse Preferred	North, South
Senecio integerrimus	Lambstongue ragwort	Native	South
Tragopogon dubius	Yellow salsify	Exotic, Sage-grouse Preferred	North
Zigadenus venenosus	Meadow deathcamas	Native	South
Annual Forbs			
Collinsia parviflora	Maiden blue eyed Mary	Native	North, South
Draba verna	Spring draba	Exotic	North, South
Epilobium brachycarpum	Tall annual willowherb	Native, Sage-grouse Preferred	North, South
Gayophytum spp.	Groundsmoke	Native	South
Microsteris gracilis	Slender phlox	Native, Sage-grouse Preferred	South
Myosotis stricta	Strict forget-me-not	Exotic	South
Sisymbrium altissimum	Tall tumblemustard	Exotic	South
Shrubs			
Artemisia tridentada ssp. *wyomingensis*	Wyoming big sagebrush	Native	South
Chrysothamnus viscidiflorus	Yellow rabbitbrush	Native	North, South

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

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