



INTRODUCTION

The Kingman Field Office (KFO) has completed an evaluation of Standards for Rangeland Health (BLM-AZIM-99-012) for the White Hills Evaluation Area. The 3 Arizona *Standards for Rangeland Health* are:

- ⇒ *Standard 1*, Upland Health - Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform (Ecological site).
- ⇒ *Standard 2*, Riparian-Wetland Sites - Riparian-wetland areas are in proper functioning condition
- ⇒ *Standard 3*, Desired Resource Conditions - Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.

These are the determinations that must be made when evaluating the health of Arizona BLM public land.

Are plants as diverse and abundant as they should be? Is the soil protected from erosion? Are the riparian areas functioning as they should? These are some of the questions that are answered when the BLM evaluates rangeland health. They are important questions to answer because the health of the rangelands is essential for the continued use and enjoyment of these public rangelands.

The purpose of this evaluation is to determine if Rangeland Health Standards are being met within the evaluation area. This evaluation is completed in accordance with the BLM

Washington Office Instruction Memorandum 2009-007. Grazing allotments are mentioned throughout the evaluation only as a method of distinguishing the key areas.

EVALUATION AREA

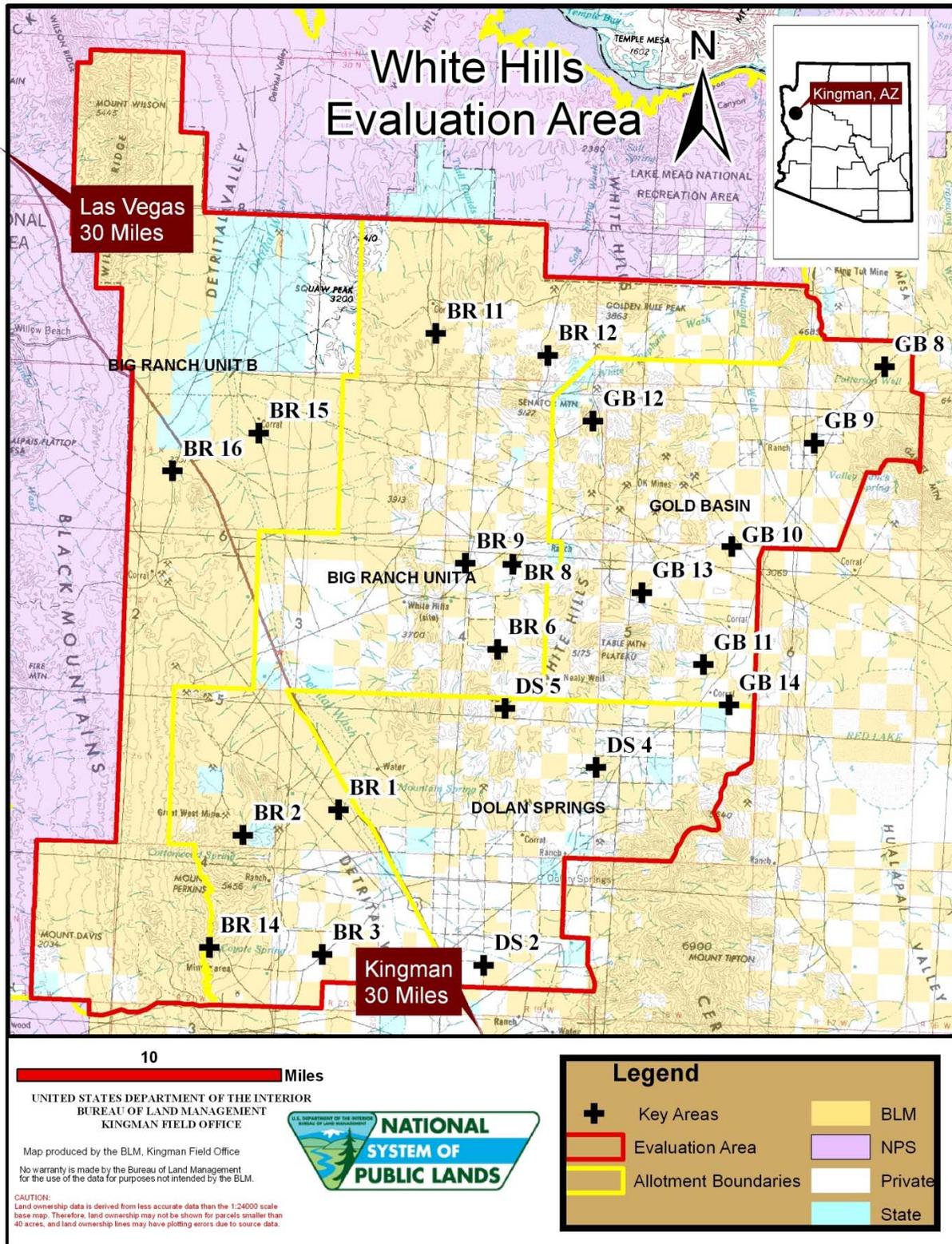
The White Hills Evaluation area consists of 476,095 acres in the northwest corner of Arizona, south of the Colorado River. This area includes 310,721 acres of public land. Portions of the White Hills, Black Mountains, Detrital Valley, and Hualapai Valleys encompass this area. Vegetation is comprised of Mohave Desert Scrub with some desert grassland influences. Typical species include Joshua tree, blackbrush, creosote bush, bursage, big galleta grass, Mormon tea, prickly pear cactus, and cholla. Average yearly precipitation ranges from 3-6 inches in the lowest elevations (~1,700 ft.) to 10-13 inches in the highest (~5,400 ft.). Most precipitation is received in the winter and a lesser amount in erratic summer monsoons.

Key Areas

Several methods are used to collect land health information but first, “key areas” must be chosen. Key areas are chosen to be representative of the major ecological sites within the evaluation area. Most key areas used in this evaluation were established in the 1980s with new sites added as necessary. Each key area is comprised of many different perennial plant species and although data is collected for each of them, “key” species are chosen and given closer scrutiny. Key species are selected depending on objectives and data needs. These are generally species that are an important component of a plant community and serve as indicators of change.

By monitoring the long-term change in abundance of these species, conclusions can usually be drawn about the health and maintenance of not only these plants, but also the other perennial plants and the overall health of the evaluation area. Therefore, the vegetative component of this evaluation, other than perennial cover, will be focused on key species at each key area. (Note: perennial cover data and perennial cover objectives include all perennial plants at the key area. Annuals are subjective based on rainfall for the year.)

Figure 1 White Hills Evaluation Area and Key Areas.



STANDARDS FOR RANGELAND HEALTH

METHODS USED

Standard 1 Upland Health: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform (Ecological Site Guide, NRCS).

Upland health is assessed by an interdisciplinary (ID) team of multiple resources using the 17 indicators from Technical Reference 1734-6 Interpreting indicators of Rangeland Health. This qualitative method uses 17 indicators to evaluate how well ecological processes are functioning based on the three attributes of soil/site stability, hydrologic function, and biotic integrity. Each indicator is evaluated by the ID team and compared to what is expected for the site. Expectations for the site are based on monitoring data (shown in Standard 3 below), NRCS Ecological Site Descriptions, NRCS Reference Sheets, weather data, and professional judgment. Indicators are rated according to their departure from the expected and when combined give the ID team an idea of how the three ecological processes are functioning and whether the site is meeting Standard 1.

If one or more of the attributes (soil/site stability, hydrologic function, and biotic integrity) exhibit a reduced functionality, then it may be determined that Standard 1 is not being met. A “preponderance of evidence” approach was used to determine the appropriate departure category for each attribute and helped to determine if Standard 1 is met. However, if the departure from expected of one indicator is of particular concern this could justify a determination that the site is not meeting Standard 1. For example, if the structural/functional group indicator was rated at moderate to extreme because the grass component is greatly reduced or absent, this could justify a determination that the site is not meeting Standard 1.

Each indicator is evaluated by the ID team and compared to what is expected for the site. Expectations for the site are based on past monitoring data, NRCS Ecological Site Descriptions, NRCS Reference Sheets, weather data, and professional judgment. Indicators are rated according to their departure from the expected and when combined give the ID team an idea of how the three ecological processes are functioning and whether the site is meeting Standard 1.

Standard 2 Riparian-Wetland Sites: Riparian-wetland areas are in proper functioning condition.

Proper functioning condition was assessed by an interdisciplinary team following the guidance in Technical Reference 1737-15 (Second Edition 2015) and 1737-16 (1999), (Revised 2003) Riparian Area Management. This qualitative method uses a series of indicators to determine if a riparian habitat and its ecological functions are intact and are capable of being sustained through drought, flooding, and current land uses.

The riparian areas within the White Hills evaluation area consist of riparian vegetation habitat supported by small springs and seeps. 14 springs on public land were evaluated to determine if they were in proper functioning condition.

Standard 3 Desired Resource Conditions: Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.

Objectives for Standard 3 were developed by an interdisciplinary team for each key area. The team used NRCS Ecological Site Descriptions, vegetation measures for composition, cover, and frequency, and professional judgment to describe site specific plant community objectives. In certain instances there was no ecological site guide written or one that matched the plant community found at a key area. In these cases the best matching ecological site was used. If there was no “best match” then past monitoring data and professional judgment was used to develop objectives. Current monitoring data was compared to the objectives for each study to determine if an area was meeting Standard 3. Attainment of the site specific objectives would ensure that Standard 3 is met.

- In order to Meet Standard 3 all of the following must be obtained:
 - a.) Objectives for site-specific plant composition, cover, and frequency are obtained.
 - b.) The frequency data indicates trend is static or upward.

At each key area point cover, pace frequency, and dry weight rank were measured following guidance in inter agency Technical Reference 1734-4 (1996). This information is gathered at 200 points along 4 transect lines using a 40 cm x 40 cm frame. The point cover data provides information about soil exposure, pace frequency provides information about how frequently a particular species occurs and dry weight rank provides information about the abundance of a particular species relative to other species (composition) at the key area.

Figure 2 Frame for Frequency and Dry Weight Rank Methods

Apparent trend

Apparent trend is a qualitative single point in time evaluation of a site based on plant composition, abundance of seedlings and young plants, amount of plant litter, plant vigor, and the condition of the soil surface. Apparent trend was evaluated on each site by an interdisciplinary team using the Natural Resource Conservation Service Apparent Trend worksheet NE-ECS-12 from Nebraska. Apparent trend can be rated as towards site potential, away from site potential or trend is not apparent.



DATA SUMMARY AND ANALYSIS

The data analysis will look at each key area and how it rated for Standard 1 and Standard 3 of the Standards for Rangeland Health. Springs are rated on whether they meet Standard 2.

Big Ranch Allotment (*Unit A*)

Key area # 1 Big Ranch (west pasture)

Standard 1: Not Meeting

Rationale: Nine of the 17 indicators were rated as more than a “none to slight departure” from expected. The biotic integrity attribute was rated as moderate to extreme departure from expected. There was some pedestalling observed around the remaining galleta grass plants. The amount, vigor, annual production, and reproductive capability of galleta grass on this site were greatly reduced compared to expectations for this ecological site.

Standard 3: Not Meeting

Rationale: The site was burned by wildfire 2005 which resulted in a decrease of perennial plant cover. Perennial plant cover has declined from 14% in 2000 before the 2005 fire, dropping to 1% in 2007 post fire. Perennial plant cover improved from 3% in 2011 to 6% in 2017. Frequency of big galleta has declined from 6% in 2000 before the 2005 fire to 2% in 2007 post fire. Frequency of big galleta was 0.5% in 2017 indicating static to downward trend post fire. The frequency of white bursage has remained static, showing no significant improvement. Overall this site shows no signs of recovery or no significant improvement in composition of key species.

Data Summary

Ecological Site – Limy Upland 6-9” precipitation zone (p.z.) deep.

Current perennial cover: 6%

Perennial cover objective: 9-19%

Table 1. Big Ranch Key Area 1 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	2%	1-5%	1%	3-9%	Down
White bursage	65%	35-45%	14%	7-17%	Static
Bush muhly	0%	1-5%	0%	1-5%	Static
Sand dropseed	0%	1-5%	0%	1-5%	Static

Apparent Trend

Rating: Away from site potential

Rationale: Mediterranean grass was common on the site. Very few galleta plants remain on site and those that remain are in very poor vigor. Few or no seedlings or young desirable plants were present. Bare ground is higher than what would be expected for this site.

Key area # 2 Big Ranch (west pasture)

Standard 1: Not Meeting

Rationale: Seven of the 17 indicators were rated as greater than a “none to slight” departure from expected. One indicator was not rated. Past fire has changed the community composition and few perennial grasses remain. Red brome was abundant at the site. The plants that are present are healthy.

Standard 3: Not Meeting

Rationale: The site was burned by wildfire 1994 and 2005 which resulted in a decrease of perennial plant cover. Perennial plant cover started at 19% in 1983 and went to 16.5% in 2000 before the fire 2005, dropping to 5% in 2007 post fire, and now 6% in 2017. Frequency of Mormon tea declined from 8% in 2000 before the fire, dropping to 1.5% in 2007 after the fire and at 1% in 2017 therefore trend is static. The plant composition data suggest that Mormon tea has declined as well. Mormon tea may not have actually declined as the data suggest that the change could be related partly to the increase in composition of other and/or additional species at this location post fire. Overall site shows little sign of recovery or any significant improvement in composition of key species.

Data Summary

Ecological Site – Granitic hills 10-13” p.z. alkaline

Current perennial cover: 6 %

Perennial cover objective: 14-24%

Table 2. Big Ranch Key Area 2 objectives and data summary.

Species	Current Composition	Composition Objective	Current frequency	Frequency Objective	Overall Trend
Desert needlegrass	2%	5-10 %	1%	3-9%	Static
Globemallow	6%	0-1%	7%	1-7%	Static
Mormon tea	2%	5-8 %	1%	4-12%	Down
Wire lettuce	2%	1-5%	3%	1-5%	Static
Mojave aster	3%	1-5%	2%	1-5%	Static

Apparent Trend

Rating: Away from site potential

Rationale: Red brome was common on the site with few desired species remaining. Few or no seedlings of desirable species were found. Site had burned in the past and has not recovered.

Key area # 3 Big Ranch (west pasture)

Standard 1: Not Meeting

Rationale: 14 of 17 indicators were rated as greater than a “none to slight” departure from expected. Most of the concerns on this site are related to biological functions and the loss of almost all grasses and most shrubs since the fire. The site is not showing any sign of recovering since the fire.

Standard 3: Not Meeting

Rationale: The site was also burned by wildfires in 1994 and 2005, which caused a big decrease in perennial plant cover. Perennial plant cover has declined from 28% in 1986 to 2% in 2017. Frequency of big galleta declined from 4% in 1986 to 0% in 2017 and bush muhly declined from 6% in 1986 to 0% in 2017. Globemallow appeared to one of the few species remaining on site, which makes for a larger composition value. The frequency nor composition of key species have shown any significant improvement and therefore this site shows no signs of recovering.

Data Summary

Ecological Site – Limy Upland deep 6-9” p.z.

Current perennial cover: 4%
 Perennial cover objective: 14-26%

Table 3. Big Ranch Key Area 3 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	0%	1-5%	0%	1-7%	Down
Bush muhly	0%	1-5%	0%	3-9%	Down
Globemallow	44%	1-3%	1%	2-8%	Down
Mormon tea	12%	1-3%	2%	1-5%	Static

Apparent Trend (Not Evaluated)

Key area # 6 Big Ranch (east pasture)

Standard 1: Meeting

Rationale: Four of 17 indicators were rated as more than a “none to slight” departure from expected. Red brome is common on the site and adds litter to the site which resulted in a slight to moderate departure for litter and a moderate departure for the presence of invasive species. Annual production by perennial plants was rated as a “slight to moderate” departure from expected due to decreased production. The reproductive capability of perennial plants was rated as a moderate departure from expected due to a lack of seed heads remaining from last year’s growth.

Standard 3: Meeting

Rationale: This site was set up in 2011, therefore the historic plant community is unknown. Perennial plant cover started at 5% in 2011 and moved to 8% in 2017. The frequency of big galleta remained static between years 2011 and 2017, with a flux in 2013. The composition of big galleta is exceeding the composition objective and its frequency is within the objective range for this species.

Data Summary

Ecological Site – Basalt slopes 6-9” p.z.

Current perennial cover: 8%
Perennial cover objective: 12-22%

Table 4. Big Ranch Key Area 6 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	39%	10-15%	16%	12-22%	Static
Bush muhly	0%	5-7%	0%	0-2%	Static
Sand dropseed	1%	2-3%	1%	0-2%	Static
Mormon tea	1%	3-9%	1%	0-2%	Static

Apparent Trend

Rating: Trend Not Apparent

Rationale: Vigor of desirable species was good, and some tillers were observed from big galleta. Red brome was common on the site. Very few seed heads on big galleta remained intact reducing the potential for reproduction. Black grama and bush muhly are present although not recorded during data collection in 2013 and in 2017.

Key area # 8 Big Ranch (east pasture)

Standard 1: Not Meeting

Rationale: Five of the 17 indicators were rated as more than a “none to slight” departure from expected. Most concerns were related to biological functions. Perennial grasses have declined and many of the bush muhly plants are dead or dying and overall the ability of grass species to reproduce has declined.

Standard 3: Not Meeting

Rationale: Perennial plant cover has slight increase from 13% in 1983 to 19% in 2016. The frequency of big galleta significantly decreased from 9% in 2000 to 3% in 2011. However, big galleta is meeting its objective for plant composition. The frequency of bush muhly significantly declined from 6% in 1986 to 0% in 2011. The frequency of Desert needlegrass also significantly declined from 4% in 1986 to 0% in 2011. Both bush muhly and Desert needlegrass are not meeting their objective for plant composition. Mormon tea is exceeding the composition objective and frequency started at 3% 1983 and has moved to 10% in 2011 trend is upward. Mormon tea may not have actually increased as the data suggest but the change could be related partly to the decline in composition of other species such as big galleta, bush muhly and desert needlegrass.

Data Summary

Ecological Site –Sandy loam upland 10-13” p.z. Limy Skeletal

Current perennial cover: 19%

Perennial cover objective: 14-24%

Table 5. Big Ranch Key Area 8 objectives and data summary.

Species	Current composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	4%	1-5%	3%	5-13%	Down
Desert needlegrass	0%	1-5%	0%	1-7%	Down
Bush muhly	0%	1-5%	0%	3-9%	Down
Globemallow	1%	2-5%	0%	0-4%	Static
Mormon tea	14%	5-10%	10%	6-14%	Up

Apparent Trend

Rating: Away from site potential

Rationale: Vigor of big galleta was good with some plants sending out tillers however bush muhly vigor was poor and almost half of the plants observed were dead and the remainder with little or no signs of reproduction. Red brome was common on the site.

Key area # 9 Big Ranch (east pasture)

Standard 1: Meeting

Rationale: Only three of 17 indicators were rated as more than a “none to slight” departure from expected. The concerns with this site were related to soil erosion. Perennial plant cover has slightly increased, many of the other forage species have slightly increased in frequency at this location. There appeared to be a correlation between gravel and bare ground, which may explain the increase of current bare ground. Bush muhly has shown poor vigor, which could affect reproduction over time.

Standard 3: Meeting

Rationale: Perennial plant cover fluctuated at this site but showed a slight increase from 14% in 1983 to 19% in 2016. The frequency of bush muhly fluctuated over the evaluation moving from 5% in 1983 to 2% in 2016 indicating a static to slightly downward trend. The frequency of big galleta increased from 10% in 1983 to 19% in 2016 and exceeding the frequency objective. Mormon tea is exceeding the composition objective and its frequency has slightly increased since 1986 from 3% to 7% in 2016.

Data Summary

Ecological Site –Limy upland deep 10-13” p.z.

Current perennial cover: 19%.
 Perennial cover objective: 9-19%

Table 6. Big Ranch Key Area 9 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	25%	15-25%	19%	8-18%	Upward
Bush muhly	2%	1-5%	3%	2-8%	Static
Mormon tea	6%	1-5%	7%	1-7%	Static

Apparent Trend

Rating: Away from site potential

Rationale: Vigor of desirable species was average to poor and few seedlings or signs of reproduction were present on the site. Bare ground, gravel and rock has remained static at the site over the evaluation period. Some red brome was found on the site.

Key area # 11 Big Ranch (east pasture)

Standard 1: Meeting

Rationale: One of the 17 indicators was rated as other than “none to slight” departure from expected. The presence of red brome on the site was the only concern. The present big galleta showed high vigor. Site appears to be in a lower precipitation zone than what is indicated by the ecological site guide.

Standard 3: Not Meeting

Rationale: Perennial plant cover has increased since 2000 from 16% to 23% in 2016. The frequency of bush muhly declined from 4% in 1983 to 0% in 2016. The frequency of big galleta has declined from 14% in 1986 to 3% in 2017, but has remained static from 2000 to 2016. The frequency of Mormon tea has increased from 2% in 1983 to 6% in 2016. Field notes in the 1980s and 1990s indicate that utilization at this site has been low due to a lack of permanent water. The elevation of this site may put the key area in a 3-6 inch precipitation zone which is considered ephemeral rangelands.

Data Summary

Ecological Site –Limy upland 6-9” p.z.

Current perennial cover: 23%

Perennial cover objective: 20-30%

Table 7. Big Ranch Key Area 11 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	3%	0-1%	2%	5-13%	Down
Bush muhly	0%	0-1%	0%	1-7%	Down
Globemallow	1%	1-4%	1%	4-14%	Down
Mormon tea	7%	1-6%	6%	2-8%	Up

Apparent Trend

Rating: Trend not Apparent

Rationale: Vigor of desirable species was good, but few seedlings were observed and red brome was common on the site. Site is in a very low precipitation zone, reproduction is likely a rare event.

Key area # 12 Big Ranch (east pasture)

Standard 1: Not Meeting but Making Significant Progress towards

Rationale: Two of the 17 indicators were rated as moderate departure from expected and the remainder were rated at “none to slight” departure. The presence of red brome and the type conversion of functional structural groups by fire were the main concerns on this site. However it appears that the functionality of the biotic community is intact as key species have high vigor, diverse age class, and there were abundant seed heads. The site appears to be improving after wildfire alteration in the vegetative community which has changed site potential of this key area.

Standard 3: Not Meeting but Making Significant Progress towards

Rationale: Wildfire before 1991 (study notes) type converted the area from Joshua tree and creosote bush to rayless goldenhead and slim tridens so site potential remains unknown. There was a loss of bush muhly and desert needlegrass in both composition and frequency after the wildfire. Since the fire, slim tridens has increased from 12% in 2001 to 24% in 2017 indicating upward trend. Both Globemallow and Slim tridens exceed their composition and frequency objectives at this site. Site showing improvement since the fire but has not fully recovered. Overall the ecological functions relating to soil stability and hydrology appear to be intact but the biotic integrity has been altered. As long as soil stability and hydrology functionality remains intact this site will continue to make significant progress towards meeting the standard.

Data Summary

Ecological Site –Granitic hills 10-13” p.z. alkaline

Current perennial cover: 10%

Perennial cover objective: 14-26%

Table 8. Big Ranch Key Area 12 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	2%	1-5%	1%	1-7%	Static
Bush muhly	1%	1-5%	0%	7-15%	Down
Slim tridens	19%	0-2%	24%	11-21%	Static
Desert needlegrass	1%	10-15%	1%	0-2%	Static
Globemallow	19%	0-2%	24%	22-34%	Static
Mormon tea	1%	5-8%	1%	10-20%	Down

Apparent Trend

Rating: Trend not Apparent

Rationale: Vigor of desirable species was good, but few seedlings were observed and red brome was common on the site. Site potential was changed by a past fire.

Key area # 14 Big Ranch (west pasture)

Standard 1: Meeting

Rationale: Three of the 17 indicators were rated as more than a “none to slight” departure from expected. Functional structural groups was rated as a slight to moderate departure because past fires have modified which species are present, but there are species present from each structural group and they exhibit good vigor. Litter amount also rated as slight to moderate because of the abundance of red brome that adds to the overall litter on the site. Invasive weeds rated as a “moderate to extreme” departure from expected due to the abundance of red brome on the site. Overall the ecological functions relating to soil stability and hydrology appear to be intact but the biotic integrity has been altered.

Standard 3: Not Meeting

Rationale: Wildfire occurred in 1994 and again in 2005 which converted the area from a blackbrush community to more of an herbaceous plant community, but site potential remains unknown. Perennial plant cover started at 6% in 2007 moving to 9% in 2017 which is an indication of static trend. *Tridens muticus* dropped from 13% in 2011 to 2% in 2017. Site showing some signs of improvement post fire but has not fully recovered.

Data Summary

Ecological Site –Granitic hills 10-13” p.z. alkaline

Current perennial cover: 9%.

Perennial cover objective: 11-21%.

Table 9. Big Ranch Key Area 14 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Sand dropseed	1%	0-2%	2%	0-2%	Static
Slim tridens	2%	0-2%	2%	8-18%	Down
Desert needlegrass	1%	10-15%	1%	3-9%	Down
Three-awn	5%	1-3%	4%	6-14%	Down
Globemallow	20%	0-2%	19%	12-22%	Up
Mormon tea	3%	5-8%	5%	1-7%	Static
Wire lettuce	9%	1-5%	12%	7-17%	Up

Apparent Trend

Rating: Trend not Apparent

Rationale: Vigor of desirable species was good, but few seedlings were observed and red brome was common on the site.

Big Ranch Allotment (*Unit B*)

Key Area # 15 Big Ranch

Standard 1: Meeting

Rationale: Five of the 17 indicators were rated as more than a “none to slight” departure from expected. The main forage species big galleta was within the expected composition for this range site, however, its overall vigor was poor with lowered ability to reproduce due to few seed heads at site.

Standard 3: Meeting

Rationale: This site was established in 2013. Apparent trend data rated this site as not apparent or static. Collected trend data also suggests the site is static, however, frequency of big galleta is on the lower end. The Galleta grass at this site has poor vigor, which is expected on these lower elevation ecological range sites. This is the first year of data collection therefore there is no long-term frequency data to know what the long-term trend is up or down. A comparison of the current plant community with the ecological site guide for this site suggests this key area is meeting its composition objectives for all species. This site is located within ephemeral range and match the potential plant community for this range type.

Data Summary

Ecological Site –Sandy loam upland limy 6-10” p.z.

Current perennial cover: 21%.

Perennial cover objective: 8-18%.

Table 10. Big Ranch Key Area 15 objectives and data summary.

Current Composition	Composition Objective	Current Frequency	Frequency Objective
Big galleta 1%	1-7%	1%	1-5%

Apparent Trend

Rating: Trend not apparent at this site potential

Rationale: Vigor of desirable species was poor and few or no seedlings were observed which is what was expected due to prolonged drought conditions. Red brome was common on the site as this site is ephemeral range.

Key area # 16 Big Ranch

Standard 1: Meeting

Rationale: Four of the 17 indicators rated as a “none to slight” departure from expected. Concerns on the site were the presence of red brome, and the lack of galleta grass on the site. This site is in a very low precipitation zone and big galleta may not be a component of the upland community

Standard 3: Meeting

Rationale: This site was established in 2013. There is no trend data as this is the first year of data collection. A comparison of the current plant community composition with the ecological site guide suggests that this site is meeting the composition objective for the key species globemallow, Mormon tea, and Mohave aster. Vigor of desirable species was poor and few or no seedlings were observed which is what was expected due to this site being in ephemeral range and under prolonged drought conditions. Red brome was common on the site as this site is ephemeral range. A comparison of the current plant community composition with the ecological site guide suggests that this site is meeting the composition objective for all species. This site is located within ephemeral range and match the potential plant community for this range type.

Data Summary

Ecological Site –Granitic hills 3-6” p.z.

Current perennial cover: 16%

Perennial cover objective: 19-31%.

Table 11. Big Ranch Key Area 16 objectives and data summary.

	Current composition	Composition Objective	Current Frequency	Frequency Objective
Globemallow	2%	1-4%	1%	0-2%
Mormon tea	8%	0-3%	6%	1-5%
Mojave aster	1%	1-5%	1%	0-2%

Apparent Trend

Rating: Away from site potential

Rationale: Vigor of desirable species was okay, but few seedlings were observed and red brome was common on the site.

GOLD BASIN ALLOTMENT

Key area # 8 Gold Basin

Standard 1: Not Meeting

Rationale: Eight of 17 indicators were rated as greater than a “none to slight” departure from expected. Soil movement, presence of red brome, and the reduction of annual production and reproductive capability of perennial grasses and shrubs were the main concerns about the site.

Standard 3: Not Meeting

Rationale: Perennial plant cover started at 25% in 1988 moving to 36% in 2017 with an increase in woody cover of about 10%. The amount of big galleta on site is not within the range shown in the ecological site guide for this site. The frequency of big galleta has been static starting at 29% in 1983 decreasing to 24% in 2018. The frequency of all other key forage species has also been static to slightly down and all grasses at the lower end of frequency objectives. None of the grass species are meeting plant composition objectives for this site. Paper flower is the only key species which increased in frequency moving from 4% in 1983 to 12% in 2018. Also paper flower is the only species that exceeded its plant composition objective.

Data Summary

Ecological Site –Sandy loam upland 10-13” p.z. limy

Current perennial cover: 36%
Perennial cover objective: 20-32%

Table 12. Gold Basin Key Area 8 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	13%	15-25 %	24%	23-35%	Static
Bush muhly	1%	5-10%	1%	1-5%	Static
Black grama	1%	5-10%	1%	1-5%	Static
Globemallow	1%	2-5%	1%	1-5%	Static
Mormon tea	1%	1-5%	3%	3-11%	Static
Paperflower	11%	1-5%	12%	7-17%	Up

Apparent Trend

Rating: Away from site potential

Rationale: Vigor of desirable species was average but few seed heads, tillers or seedling were observed. Mormon tea was not flowering on this site even though it is flowering in most other areas in 2010. Red brome was common on the site. Rills and gullies were common on and around the site.

Key area # 9 Gold Basin

Standard 1: Meeting

Rationale: Each indicator rated a “none to slight” departure from expected at this site except for the percent bare ground which rated a moderate departure. Overall the ecological functions are intact at this site.

Standard 3: Not Meeting

Rationale: Perennial plant cover was 10% in 2000 increasing to 11% in 2016. Big galleta and bush muhly are not meeting their composition or frequency objectives on the site. Bush muhly has been the dominant grass at this site since the BLM started collecting data at this site in the 1983, however the frequency has decreased from 9% in to 3% in 2016 indicating trend is downward. Also, the composition of Bush muhly has decreased from 12% in 2010 to 6% in 2016 at this site.

Data Summary

Ecological Site –Loamy Upland 9-12” p.z.

Current perennial cover: 11%

Perennial cover objective: 6-14%

Table 13. Gold Basin Key Area 9 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	1%	5-10%	0%	1-5%	Static
Bush muhly	6%	10-15%	3%	5-13%	Down
Paper flower	5%	1-5%	3%	1-5%	Static
Globemallow	0%	1-5%	0%	1-5%	Static

Apparent Trend

Rating: Not Evaluated

Key area # 10 Gold Basin

Standard 1: Meeting

Rationale: Each indicator rated a “none to slight” departure from expected except for rill and water flow patterns which both rated a moderate departure and pedestals which rated a slight to moderate departure. Overall the ecological functions are intact at this site. But it is apparent that the soil stability and hydrologic function of this site is beginning to degrade. There has been a steady decline in the frequency of galleta grass.

Standard 3: Not Meeting

Rationale: Site is meeting the perennial plant cover objective. None of the grasses are meeting their frequency objectives at this site. The frequency of galleta grass has declined from 22% in 1983 to 14% in 2018 indication of downward trend. The frequency of black grama has declined from 9% in 1983 to 1% in 2018 indication of downward trend.

Data Summary

Ecological Site –Loamy Upland 9-12” p.z.

Current perennial cover: 22%
 Perennial cover objective: 19-31%

Table 14. Gold Basin Key Area 10 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	15%	10-20%	14%	23-35%	Down
Bush muhly	1%	1-5%	1%	3-8%	Down
Black grama	0%	10-20%	1%	5-13%	Down
Threeawn	0%	1-5%	0%	1-5%	Static
Mormon tea	1%	1-5%	1%	1-5%	Static
Globemallow	2%	1-3%	1%	1-5%	Static

Apparent Trend

Rating: Away from site potential

Rationale: Vigor of desirable species was very poor and few or no seedlings or tillers were observed.

Key area # 11 Gold Basin

Standard 1: Meeting

Rationale: Each indicator rated a “none to slight” departure from expected. Overall the ecological functions are intact at this site.

Standard 3: Not Meeting

Rationale: Perennial plant cover started at 23% in 1983 decreasing to 12% in 2010 and is not meeting its objective for this site. Bush muhly, black grama, sand dropseed, and desert needlegrass are not meeting their composition objectives. Additionally black grama, sand dropseed, big galleta, and desert needlegrass are not meeting the frequency objectives. Sand dropseed, big galleta, threeawn, and globe mallow have also declined in frequency.

Data Summary

Ecological Site –Limy Fan 10-13” p.z.

Current perennial cover: 12%
 Perennial cover objective: 17-29%

Table 15. Gold Basin Key Area 11 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	19%	15-25 %	12%	17-29%	Down
Bush muhly	1%	5-10%	1%	1-5%	Static
Threeawn	2%	1-5%	1%	1-7%	Down
Sand dropseed	0%	1-5%	0%	4-12%	Down
Black grama	0%	1-5%	0%	1-5%	Static
Desert needlegrass	0%	1-5%	0%	1-5%	Static
Globemallow	1%	1-5%	1%	1-5%	Down
Mormon tea	3%	1-5%	2%	1-7%	Static
Paper flower	6%	1-5%	4%	2-8%	Static
Wire lettuce	1%	1-5%	1%	1-5%	Static

Apparent Trend

Rating: Not Evaluated

Key area # 12 Gold Basin

Standard 1: Not Meeting

Rationale: Each soil/hydrological indicator rated a “none to slight” departure from expected at this site except for rills which rated a “slight to moderate” departure. Plant community composition rated a moderate departure, functional structural groups rated a moderate departure, and plant mortality and decadence rated a slight to moderate

departure from reference. A wildfire removed the majority of the major plant species in vegetative community at this site, which has altered this plant community. Site potential remains unknown at this key area due to the alteration of the major plant species within the vegetative community by fire. Overall the ecological functions relating to soil stability and hydrology appear to be intact but the biotic integrity has been altered. As long as soil stability and hydrology functionality remains intact this site will continue to make significant progress towards meeting the standard.

Standard 3: Not Meeting

Rationale: Site burned in the past and as a result the majority of the species that made up this site were removed. This site is recovering but has not completely recovered from the effects of the fire. However it appears that the functionality of the biotic community is intact as key species have high vigor, diverse age class, and there were abundant seed heads. The site appears to be slowly improving towards its new potential plant community as site potential remains unknown.

Data Summary

Ecological Site –Sandy loam terrace 10-13” p.z.

Current perennial cover: 14%.

Perennial cover objective: 9-19%.

Table 16. Gold Basin Key Area 12 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Slim tridens	1%	5-10 %	2%	5-13%	Down
Threeawn	2%	1-2%	2%	2-8%	Static
Big galleta	0%	5-10%	0%	3-9%	Down
Bush muhly	0%	5-10%	0%	3-9%	Down
Black grama	0%	5-10%	0%	3-9%	Down
Globemallow	3%	1-5%	3%	2-8%	Static
Mormon tea	26%	5-10%	18%	13-23%	Up

Apparent Trend

Rating: Not Evaluated

Key area # 13 Gold Basin

Standard 1: Meeting

Rationale: Each indicator rated a “none to slight” departure from expected. Overall the ecological functions are intact at this site.

Standard 3: Meeting

Rationale: Site is exceeding the perennial plant cover objective. Big galleta and Mormon tea have increased in frequency, an indication of upward trend. All key forage species are meeting their composition objectives as well.

Data Summary

Ecological Site –Granitic Schist Upland 10-13” p.z. alkaline

Current perennial cover: 34%
 Perennial cover objective: 19-31%.

Table 17. Gold Basin Key Area 13 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	3%	5-10%	8%	5-13%	Static
Bush muhly	2%	1-5%	2%	1-7%	Static
Black grama	1%	1-5%	2%	1-5%	Static
Mormon tea	3%	5-10%	5%	3-9%	Up
Globemallow	3%	0-1%	1%	1-5%	Static
Paperflower	1%	1-5%	2%	1-5%	Static

Apparent Trend

Rating: Not Evaluated

Key area # 14 Gold Basin

Standard 1: Not Meeting

Rationale: Erosion was a problem on this site especially linked to gullies which rated as “moderate to extreme” departure from expected. Rills, soil surface resistance to erosion, and soil surface loss rated as slight to moderate departure from expected. Overall the biotic integrity of the site remains intact but the soil stability and the hydrologic function have been degraded.

Standard 3: Not Meeting

Rationale: The composition of big galleta is high whereas the composition for other key forage grass species such as bush muhly, black grama, and Indian rice-grass together only

make up 2% of the plant composition. These three species should represent a greater composition in this plant community. The loss of individuals out of the plant community may weigh the composition more heavily towards big galleta grass. The frequency of Mormon tea, globemallow and all other key forage species is down at this site.

Data Summary

Ecological Site –Limy fan 9-12” p.z.

Current perennial cover: 12%
 Perennial cover objective: 24-36%

Table 18. Gold Basin Key Area 14 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	50%	15-25 %	34%	32-46%	Static
Bush muhly	1%	5-10%	1%	3-11%	Static
Black grama	1%	1-5%	1%	11-21%	Down
Indian ricegrass	0%	1-5%	0%	2-8%	Down
Globemallow	4%	1-5%	4%	5-13%	Static
Mormon tea	1%	1-5%	1%	3-9%	Static
Paperflower	3%	1-5%	2%	2-8%	Static
Winterfat	1%	1-10%	1%	1-5%	Static

Apparent Trend

Rating: Not Evaluated

DOLAN SPRINGS ALLOTMENT

Key area # 2 Dolan Springs

Standard 1: Not Meeting

Rationale: Four of the 17 indicators rated at a “none to slight” departure from expected, the remaining indicators rated from “slight to moderate”, to “extreme to total” departure from expected. Signs of accelerated wind and water erosion were prevalent. The biotic integrity attribute was rated as moderate to extreme. The health and vigor of perennial grass species was low and many dead perennial grasses were present on the site.

Standard 3: Not Meeting

Rationale: Frequency of big galleta declined from 16% in 1988 to 1% in 2017 while creosote bush increased from 12% to 18% in that same time. Except for big galleta all of the desirable forage species on site appear to have a static trend; however these species

have been a minor component of the community. Overall perennial plant cover has also declined from a high of 21% in 1988 to 12% in 2017 and is not meeting its objective.

Data Summary

Ecological Site –Sandy Loam upland 6-9” p.z.

Current perennial cover: 12%.

Perennial cover objective: 14-26%.

Table 19. Dolan Springs Key Area 2 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	2%	15-25%	1%	11-21%	Down
Bush muhly	1%	5-10%	1%	1-5%	Static
Mormon tea	0%	1-2%	1%	1-5%	Static
Globemallow	0%	1-5%	0%	1-5%	Static

Apparent Trend

Rating: Away from site potential

Rationale: Vigor of desirable species was low and no seedlings or young plants were observed. Undesirable species were abundant and many desirable species were dead or dying. Erosion was also occurring on site.

Key area # 4 Dolan Springs

Standard 1: Not Meeting

Rationale: Twelve of the 17 indicators rated as “none to slight” and the remaining five rated between slight to moderate and moderate to extreme. The functionality of the biotic community is degraded. Invasive species are increasing on this site and the site is becoming dominated by annuals. The mortality of black grama is high. There has been a decline of big galleta and black grama. Vigor is average and reproductive capability of key species is good.

Standard 3: Not Meeting

Rationale: Big galleta is the dominate species on the site and its frequency has declined from 47% in 1988 to 30% in 2017 indicating downward trend. The frequency of black grama has declined from 6% in 1988 to 0% in 2017 also indicating downward trend. The trend for other forage species on this site is static. Live perennial plant cover has fluctuated from a high of 22% in 1988 to 21% in 2017 but over the long term trend has been static. Creosote bush has increased in frequency from 1% in 1983 to 7% in 2017 the

increase in a non-forage species also indicating downward trend. Overall the species at this site appeared vigorous and healthy in 2012.

Data Summary

Ecological Site –Sandy loam upland 6-10” p.z. fine

Current perennial cover: 21%

Perennial cover objective: 17-29 %.

Table 20. Dolan Springs Key Area 4 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	67%	15-25 %	30%	35-49%	Down
Bush muhly	1%	5-10%	1%	2-8%	Static
Black grama	4%	5-10%	0%	3-9%	Down
Threeawn	0%	1-2%	0%	1-5%	Static
Sand dropseed	0%	1-5%	1%	1-5%	Static
Indian ricegrass	0%	1-5%	0%	1-5%	Static

Apparent Trend

Rating: Away from site potential

Rationale: Vigor of desirable species was average but few seedlings or young plants were observed. There was an average abundance of seed heads on big galleta and lots of seed heads on bush muhly.

Key area # 5 Dolan Springs

Standard 1: Not Meeting

Rationale: Twelve of the 17 indicators rated as “none to slight” and the remaining five rated between slight to moderate and moderate to extreme. These five indicators are all related to biological integrity which suggests that this ecological process is being degraded Live perennial vegetation cover is decreasing and there is a downward trend on galleta grass, bush muhly, and three-awn.

Standard 3: Not Meeting

Rationale: Live perennial plant cover has declined from 24% in 1988 to 7% in 2017 and therefore long term trend is down. Frequency of big galleta has declined from 64% in 1988 to 29% in 2017 and bush muhly has also declined from 6% to 1% in that same time indicating downward trend. The frequency of black grama has fluctuated from 4% in 1983 to 2% in 2017 indicating static trend for this species.

Data Summary

Ecological Site- Clayey Upland 10-13" p.z.

Current perennial cover: 7%
 Perennial cover objective: 18-30%.

Table 21. Dolan Springs Key Area 5 objectives and data summary.

Species	Current Composition	Composition Objective	Current Frequency	Frequency Objective	Overall Trend
Big galleta	48%	30-40%	29%	53-67%	Down
Bush muhly	1%	1-15%	1%	3-9%	Down
Black grama	2%	1-5%	2%	1-7%	Down
Threeawn	0%	1-5%	0%	1-5%	Static
Dropseed	0%	T-2%	0%	1-5%	Static
Indian ricegrass	0%	T-2%	0%	1-5%	Static
Globemallow	1%	3-5%	1%	1-5%	Static
Mormon tea	2%	1-5%	1%	1-5%	Static
Paperflower	0%	3-5%	0%	1-5%	Static

Apparent Trend

Rating: Away from site potential

Rationale: Vigor of desirable species was poor and had very few to no seedlings, young plants, or seed heads. Site also had a moderate presence of red brome. We have met the composition objective for bush muhly however we did not meet the frequency objective because there has been a 4% drop in frequency for this species. We know however that composition could have been higher in the past because frequency was higher. Indian rice-grass and paper flower, both palatable species have been present in the past but were not found within the sample plots in 2012.

STANDARD 2 -RIPARIAN WETLAND AREAS**Table 22. Springs evaluated by allotment with findings and rationale. Each spring represents 1 acre.**

Allotment	Spring	Determination	Rationale	Date Evaluated
Big Ranch A	Coyote/Summit Spring	Not Applicable	Spring has dried up and no longer supports riparian vegetation.	04/25/2012
	Cottonwood Spring	Not Meeting Standard 2	Spring rated as Functional at Risk, with a downward trend. The spring is perennial and supports a pool of water approximately 4' wide by 4' long. Riparian vegetation and a wetted area occur below the source for at least 20 feet. Tadpoles and aquatic insects were found at the source. Almost no perennial herbaceous vegetation is present. Cottonwood trees (estimated 10-20 years old) are healthy as they are above the browse line. No young or old trees present and very little understory except for red brome. Trampling, compaction, overuse of riparian vegetation in the riparian zone and at the spring source is occurring. <i>Baccharis sergiloides</i> (water willy) is present but most is heavily used. This spring is providing limited habitat for migratory birds and wildlife but it is not producing habitat at its full potential.	11/08/2011
	Hombre Spring	Not Applicable	Spring has dried up and is no longer riparian.	11/8/2011
	Kemple Spring	Not Meeting Standard 2	No riparian vegetation development as water is	11/07/2011

Allotment	Spring	Determination	Rationale	Date Evaluated
Gold Basin			diverted to two troughs. Outside trough overflows to a muddy puddle that supports no riparian vegetation. The troughs do not back the excess water to the source.	
	Lower Cross Seep (feeds defunct pipeline to Cow Camp)	Not Meeting Standard 2	Spring rated as Functional at Risk, Trend Not Apparent. Riparian vegetation is heavily used and trampled. Riparian vegetation development is below potential.	11/07/2011
	Upper Cross Seep (feeds defunct pipeline to Cow Camp)	Meeting Standard 2	Spring rated in Properly Functioning Condition. The spring is located in a narrow canyon where access is difficult due to bedrock boulders. Riparian vegetation is fully developed. Area is not trampled and vegetation use was slight. This spring provides habitat, forage, cover, and water for migratory birds and other wildlife species.	06/20/2019
	Middle Water Spring	Not Applicable	Spring has dried up and is no longer riparian.	11/06/2011
	Missouri Spring	Meeting Standard 2	Spring was rated in Proper Functioning Condition based on well developed, dense riparian vegetation. The spring provides habitat, forage, cover, and perennial water for migratory birds, bighorn sheep, and other wildlife species. Use on riparian vegetation was slight to light. Abundance of yellow star-thistle.	06/19/2019
	Joshua Tree Spring	Not Meeting Standard 2	Spring is rated as Functional at Risk as riparian area supports a dense cover of <i>Baccharis sergiloides</i> and water is subsurface. This vegetation provides habitat, forage and	06/05/2019

Allotment	Spring	Determination	Rationale	Date Evaluated
Dolan Springs			cover. Use of riparian vegetation is slight.	
	Red Willow Spring	Not Meeting Standard 2	Spring is rated as Functional at Risk. Riparian area supports a dense cover of <i>Baccharis sergiloides</i> . Water is subsurface. This spring provides habitat, forage, cover, and water for migratory birds and other wildlife species. Use of riparian vegetation is slight.	06/03/2019
	Alta Spring	Meeting Standard 2	Spring was determined to be in Proper Functioning Condition. This contact spring comes out of rock face and is appears to be protected from most potential impacts. Standing water is shaded by dense vegetation. Riparian plant community is productive and diverse and provides forage, cover, and water to migratory birds and other wildlife species.	05/22/2019
	Mountain Spring	Not Meeting Standard 2	Spring rated as Functional at Risk. Biological functionality is greatly reduced with little or no woody or herbaceous riparian vegetation. Spring provides water for wildlife but little or no cover, nesting or foraging habitat. Spring source is intact but has little protection and has been altered in the past. Algae is present within water source.	05/22/2019
	Mud Spring	Not Meeting Standard 2	Spring rated as Non-functional. Biological functionality is greatly reduced with no perennial and little annual herbaceous riparian vegetation. Three willow trees are present. The spring provides water for wildlife but little or no cover,	05/16/2013

Allotment	Spring	Determination	Rationale	Date Evaluated
			nesting or foraging habitat. Spring source is trampled but intact and altered by a 18” x 18” x 12” deep dug-out pool at the source.	
	Antelope Spring	Meeting Standard 2	Spring was rated at Proper Functioning Condition. Perennial water is present at this spring and the vegetation surrounding the spring provides habitat in the form of water, forage and cover for migratory birds and other wildlife species. No perennial herbaceous wetland species occurs at the source. This is a spring that needs to be further monitored to determine if affected by recreation or use by ungulates.	05/20/2019

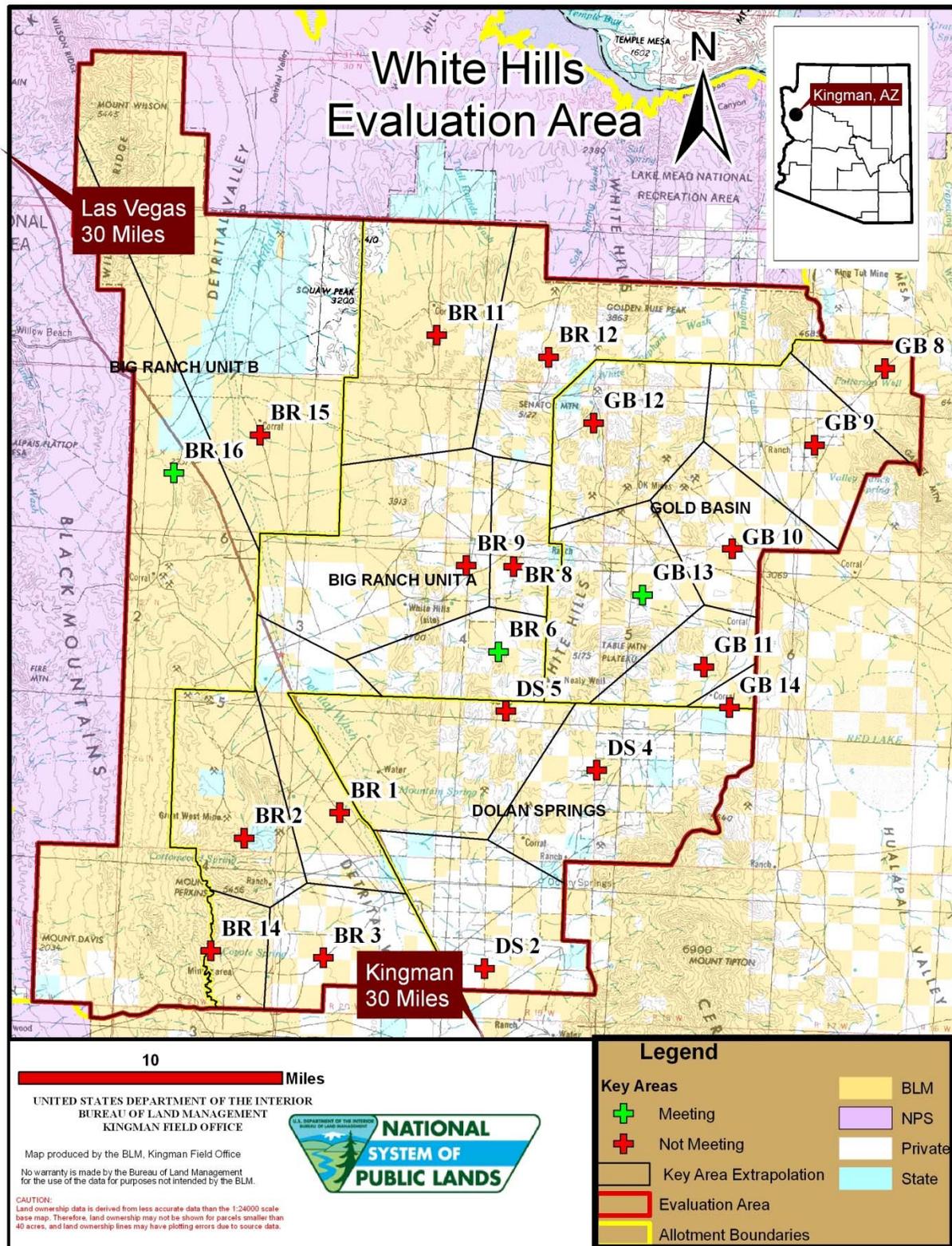
CONCLUSIONS

Table 23. Summary of conclusions.

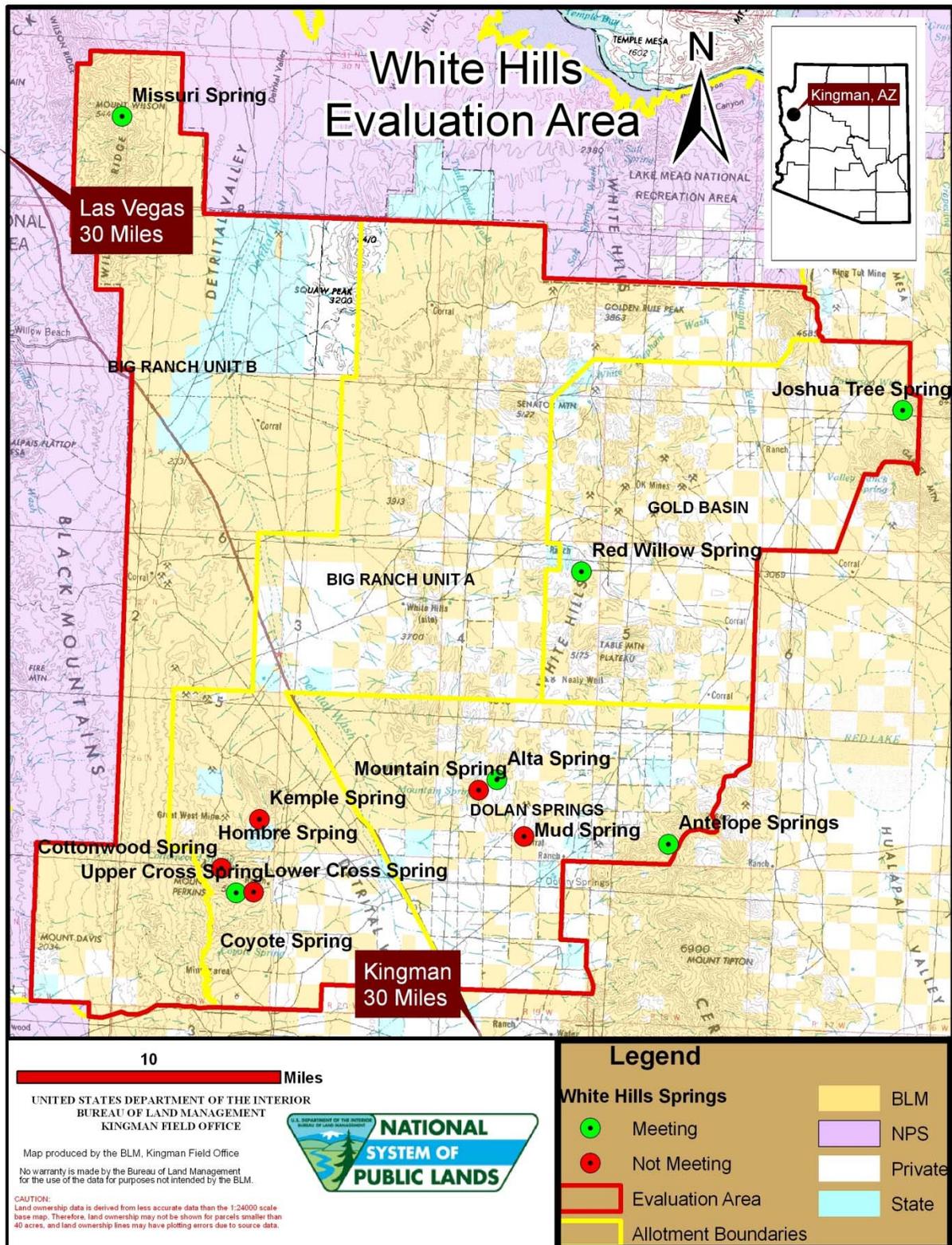
Allotment	Standard 1		Standard 2		Standard 3	
	Number of Key Areas Meeting	Number of Key Areas Not Meeting	Number of Springs Meeting	Number of Springs Not Meeting	Number of Key Areas Meeting	Number of Key Areas Not Meeting
Big R. A	4	5	2	3	1	8
Big R. B	2	0	0	0	2	0
Gold Basin	3	2	0	2	1	4
Dolan Springs	0	3	2	2	0	3
Total	9	10	6	5	4	15

Note: Key area #12 on the Big Ranch Allotment was the only study site Not Meeting standards 1 and 2 but Making Significant Progress towards.

Map 2. Key Areas and Extrapolated Area Meeting or Not Meeting Standards



Map 3. Spring Locations with Meeting or Not Meeting.



RESULTS

By extrapolating the data from the key areas out to the evaluation area and estimating each spring as one acre, we have determined that the White Hills Evaluation is currently meeting Standards on 82,385 public acres and is not meeting Standards on 228,249 public acres.

In accordance with BLM-IM-2012-124; 82,385 acres would be put into Category 1, Public Land Achieving; and 228,249 acres of public land on this allotment would be placed into Category 2a, Public Land Not Achieving- Significant Factor is Undetermined. This evaluation is completed in accordance with the BLM Washington Office Instruction Memorandum 2009-007.

Standard 1

In areas meeting Standard 1 biological and hydrological and soils are in line with what is expected for the site. Soils are not showing signs of excessive erosion, the functional structural groups of plants are typically intact, and the hydrological function of water retention and infiltration are working.

Areas not meeting Standard 1 typically show signs of degraded biological functions. Perennial plant cover is typically below what is expected, and plant vigor and reproductive capability is usually poor. On some of the sites erosion is apparent and water retention and infiltration are reduced by the lack of perennial plant cover. The ecological functionality appears to be intact on less than half of the key areas.

Standard 2

In areas meeting Standard 2 the riparian areas were rated in Properly Functioning Condition. The riparian plant communities are typically productive and diverse and provide adequate habitat, forage, cover, and water for migratory birds and other wildlife species. Those riparian areas in drainages were able to withstand flow events due to adequate vegetation covering the banks.

Standard 3

In areas meeting Standard 3 cover, composition and frequency objectives are typically met. These areas also tend to exhibit good palatable perennial plant vigor and reproductive capability.

In many areas not meeting Standard 3 palatable perennial plant frequency has typically declined and in many areas perennial plant cover has also declined. Composition objectives are also not being met in many of these areas. Generally the vigor of perennial grass is poor and reproductive capability has been limited.

NEXT STEPS

BLM will collaborate with stake holders, interested publics and other agencies to:

- ⇒ Determine the causal factors for areas not meeting Standards
- ⇒ Identify and analyze possible corrective actions under the National Environmental Policy Act
- ⇒ Take the appropriate corrective action to ensure that the White Hills Evaluation Area makes significant progress towards meeting Arizona's Standards for Rangeland Health. In terms of evaluating the standards /objectives it is expected that they would be met or making progress towards meeting within ten years of implementing management changes.