

**United States Department of the Interior  
Bureau of Land Management  
Yuma Field Office**

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**Land Health Evaluation of Salome Allotment**

**INTRODUCTION**

The purpose of this land health evaluation is to gauge whether the Arizona Standards of Rangeland Health (Standards) are being achieved on the Salome allotment and to determine if livestock are the causal factor for either not achieving or not making significant progress towards achieving land health standards. This evaluation is not a decision document, but a standalone report that records the analysis and interpretation of the available inventory and monitoring data.

Land Health Standards are measurable and attainable goals for the desired condition of the biological resources and physical components/characteristics of the desert ecosystems found within the boundaries of these grazing allotments.

This evaluation seeks to determine: 1) if standards are being achieved or not achieved, and, in cases where standards are not achieved, that significant progress is being made towards achievement of land health. 2) Where it is determined that land health standards are not being achieved, identify whether livestock grazing is a significant factor causing that non-achievement.

**ABOUT SALOME ALLOTMENT**

The Salome Allotment is a Section 3 grazing permit under the Taylor Grazing Act which includes 10,405.2 acres of public land, 650 acres of state land, and 7,799 acres of private land. It is located south of Salome, Arizona in central La Paz County, Arizona. The allotment is bounded by U.S. Route 60 to the north and the Harquahala Mountains to the south (Figure 1). The elevation ranges from 1,650 feet to 3,000 feet.

Grazing use for the Salome Allotment is authorized for year round grazing of 21 cattle for 247 Animal Unit Months (AUMs). Grazing has been authorized for 5 cattle since 2013 due to a partial use request from the permittee.

The allotment vegetation community composed of desert upland scrub common to the Lower Colorado River Plateau-Sonoran Desert ecoregion. Typical species include creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), ratany species (*Krameria* spp.), ironwood (*Olneya tesota*), little leaf palo verde (*Parkinsonia microphylla*), blue palo verde (*Parkinsonia florida*), catclaw acacia (*Acacia greggii*), big galleta grass (*Pleuraphis rigida*), and mesquite (*Prosopis* spp.).

The Salome Allotment lies within Major Land Resource Area (MLRA) 40 Sonoran Basin and Range. MLRAs are described in USDA NRCS Agriculture Handbook 296: "Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin" (2006). MRLAs describe, on a large-landscape scale, the physiography, geology, climate, water, soils, biological resources and general land use. Ecological Site Descriptions produced by the NRCS are organized by MLRA for reference purposes.

There are seven Ecological Sites within the allotment. Four of these Ecological Sites make up 91% of the allotment: Basalt Hills 7-10", Granitic Hills 7-10", Limy Fan 7-10", and Limy Uplands 3-7". Limy

Upland 7-10", Sandy Wash 7-10", and Sandy Loam 7-10" Ecological Sites are also present but make up less than 9% of the total area of the allotment (Table 1).

**Table 1. Percent Acres of Ecological Sites in the Salome Allotment**

Ecological Site (NRCS Site ID)	Percent Acres
Basalt Hills 7-10" p.z. (R040XB201AZ)	38.7%
Granitic Hills 7-10" p.z. (R040XB206AZ)	29.9%
Limy Fan 7-10" p.z. (R040XB207AZ)	11.7%
Limy Upland 3-7 Deep" p.z. (R040XC311AZ)	11%
Limy Upland 7-10 Deep" p.z. (R040XB208AZ)	8.1%
Sandy Wash 7-10" (R040XB216AZ)	0.49%
Sandy Loam 7-10 Deep" (R040XB221AZ)	0.09%

This allotment is characterized by the Natural Resources Conservation Service (NRCS) as being part of the 7-10 inch precipitation zone (p.z.). It is important to note that the Salome allotment falls within the lower range of the 7-10" p.z. (Table 2). The annual average precipitation for the last ten years is 7.49 inches (Table 2).

**Table 2. Precipitation (Inches) from the Aguila weather station, Arizona. The Aguila weather station is located 25 miles from the eastern boundary of the allotment.**

Year	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Total
2005	1.72	3.92	0.55	0.26	0	0.04	0.07	2.93	0.76	1.85	0.01	0	12.11
2006	0	0	0.27	0.02	0.05	0.14	0.59	3.07	1.5	0.19	0	0.13	5.96
2007	0.57	0.39	0.56	0	0	0	2.16	0.23	0.18	0.02	1	0.85	5.96
2008	1.47	0.62	0.11	0	0.18	0	1.81	1.82	0.09	0	0.74	1.21	8.05
2009	0.01	0.82	0	0.46	0.33	0	0.88	1.05	0.15	0	0	1.84	5.54
2010	5.08	1.02	0.88	0.08	0	0.01	0.91	0.8	0	0.77	0.05	1.4	11
2011	0	1.03	0.17	0.46	0	0	0.74	0.75	0.13	0.21	0.59	1.5	5.58
2012	0.13	0.02	0.56	0.12	0	0	1.79	0.75	0.45	0.01	0	0.84	4.67
2013	1.54	0.16	0.03	0.01	0	0	1.18	3.13	0.78	0.18	2.4	0.45	9.86
2014	0	0.11	0.32	0	0	0	1.72	2.37	1.94	0.05	0	0.97	7.48
2015	1.22	0.13	1.11	0.12	1.2	0.08	0.62	0.17	0.36	0.87	0.12	0.16	6.16
AVG	1.07	0.75	0.41	0.14	0.16	0.02	1.13	1.55	0.58	0.38	0.45	0.85	7.49

### ARIZONA STANDARDS FOR RANGELAND HEALTH

Rangeland Health Standards are measurable and attainable goals for desired conditions of the biological resources of the allotment. The Secretary of the Interior approved Arizona's Standards for Rangeland Health and Guidelines for Grazing Administration in 1997. The Decision Record, signed by the Bureau of Land Management (BLM) State Director provides full implementation of the Standards in Arizona BLM Land Use Plans. Three standards are used to evaluate the status of rangeland health.

*Standard 1 – Upland Health.* Upland Soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and Ecological Site.

Application to Salome Allotment: This is assessed using the 17 Indicators for Rangeland Health (*Technical Reference 1734-6 Interpreting Indicators of Rangeland Health*) which assesses soil stability, hydrologic function, and biotic integrity of an area. Each Ecological Site is described in depth by

Ecological Site Descriptions written by the NRCS. A departure from the Ecological Site Description or reference sheet of moderate or greater would be not meeting the standard.

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

Application to Salome Allotment: This standard is not applicable because there is no riparian/wetland habitat within the allotment.

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

Application to Salome Allotment: The desired resource conditions are specific to each Ecological Site and are identified by vegetation attributes such as composition, structure, and cover. Soil type, climate, and topography can also affect the natural limits of what can be produced in terms of vegetation resources. Information provided by the NRCS Ecological Site Descriptions and reference sheets were used to estimate site potential and desired plant community in order to determine if standards are being met.

### **LAND HEALTH EVALUATIONS**

The Yuma Field Office (YFO) completed a Rangeland Health Evaluation April 20-26, 2016 for the four major Ecological Sites of the Salome Allotment. YFO performed Rangeland Health Evaluations for the Salome Allotment using reference sheets accessed from the Ecological Site Description System. Some Ecological Site Descriptions and reference sheets had higher production values and species composition listed than what was found in the allotment due to having an annual average precipitation at the lower end of the spectrum with just over seven inches annually.

### **KEY AREA SELECTION**

Key areas were chosen by an interdisciplinary (ID) team based on being representative of the Ecological Site Description. The sites were picked in consultation with BLM, NRCS, and the University of Arizona Cooperative Extension. Data was collected at one key area per major Ecological Site (Figure 1).

### **METHODS**

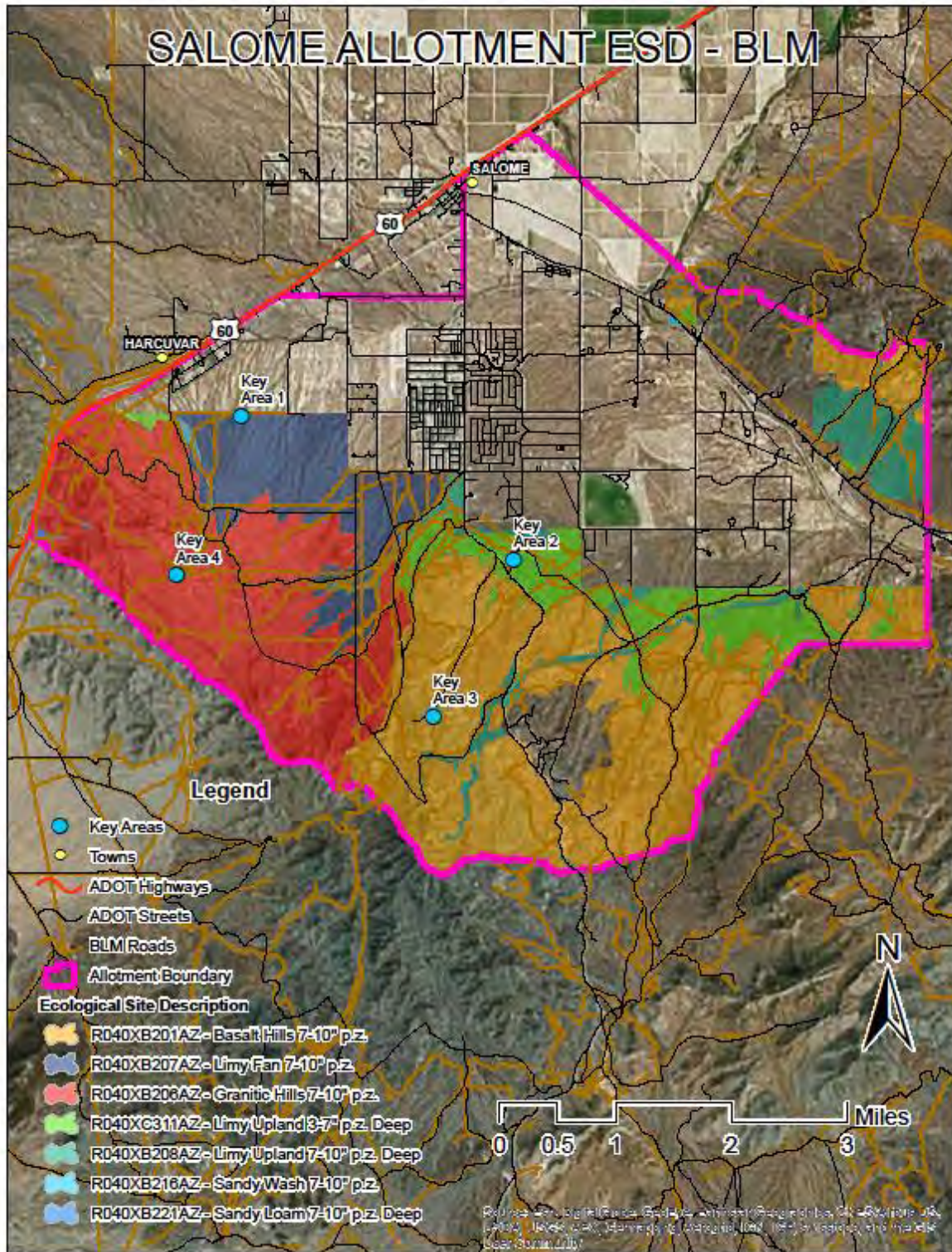
Standard 1 – Upland Health was assessed using an Evaluation Matrix included in the *Interpreting Indicators of Rangeland Health handbook* (BLM Technical Reference 1734-6). The Evaluation Matrix includes five descriptions for each of the 17 indicators which reflects a range of departure from what is expected for the site per the reference sheet, with “none to slight” being the least departure and “extreme to total” being the most.

Standard 3 – Desired Resource Conditions were assessed using species composition and vegetation cover measurements. From each Ecological Site a range of acceptable species composition and vegetation cover was calculated from the ESD reference sheet. Species composition refers to the contribution of each plant species to the vegetation at the site. Density is used to calculate species composition. Density is determined by counting the number of individuals per unit area. Belt density was measured at each key area by walking along the transect tape while holding a six foot pole and counting any perennial plant rooted within six feet. Using the following equation density is converted to species composition:

$$\text{Species Composition of Species A} = \frac{\text{Species A Density}}{\text{Total Species Density}} \times 100 \%$$

Vegetation cover is the percentage of ground obscured by vegetation canopy. Line intercept is used to measure cover along ten 100-foot transects by recording points on the tape where cover begins and ends.

Figure 1. Map of Salome Allotment



## DATA SUMMARY

### Limy Fan 7-10" p.z. (R040XB207AZ)



Limy Fan occurs on fan terraces and stream terraces ranging in elevation from 1,000 to 2,000 feet with slopes from 1-3%. The soils in this ecological site are deep and formed of loamy alluvium of moderate age and from mixed origins. These soils are calcareous throughout and are not skeletal. Bare ground ranges from 10-60% and the soil surface is resistant to erosion due to surface crusting formed by raindrop impact. Vegetation is dominated by white bursage and creosote bush with ratany and big galleta grass throughout.

#### **KEY AREA #1**

The Limy Fan key area is located near the northern boundary of the allotment approximately one mile south of U.S. Route 60. This site was chosen as a key area by the ID team because it fit the Ecological Site Description definition of a Limy Fan. The soil surface is covered in gravel with a light coloring. There is moderate vegetation cover, with most plants occurring in areas where gravel cover has been disturbed to allow water infiltration.

#### Standard 1 – Upland Health

At the Limy Fan Ecological Site the ID team rated 14 indicators as “none to slight” and three indicators as “slight to moderate” departure from what is expected for the site. The team found this site to be extremely stable as there was minimal evidence of disturbance. The only disturbances noted were use from off-road vehicles and dumping (i.e. trash from shooting or other miscellaneous garbage).

Indicator 2 Water Flow Patterns was a “slight to moderate” departure from the reference sheet because some of the water flow patterns were connected and continuous.

Indicator 3 Pedestals and/or terracettes were a “slight to moderate” departure from what is expected for the site in height but only occurred on older plants with large bases.

Indicator 8 Soil Surface Loss or Degradation was a “slight to moderate” departure from what is expected due to the naturally occurring water flow patterns on the site.

The site was found to be meeting Standard 1 as the results of the assessment indicated no significant departure from the Ecological Site Description reference sheet.

Standard 3 – Desired Resource Conditions

The desired resource conditions were met for the forb composition. The objective range for forb composition was five to 33 percent, at the site five percent of the species composition was forbs (Table 3). The site met the objective for shrub composition, with 84 percent of the species composition of shrubs which fell in the 44 to 89 percent objective range (Table 3). The objective range for grass was six to 22 percent and the site had a grass composition of 11 percent. There was no tree component to species composition, which is to be expected for the Limy Fan Ecological Site.

This site is meeting the desired resource condition objectives for species composition.

**Table 3. Limy Fan species composition objectives and data summary. “P” indicates the site is meeting the objective. “F” indicates the site is not meeting the objective.**

Plant Type	Species Composition Objective	Key Area	
		1	1
Forb	5-33%	5%	P
Shrub	44-89%	84%	P
Grass	6-22%	11%	P

**Limy Upland Deep 7-10” p.z. (R040XC208AZ)**



This Ecological Site occurs in an upland position and elevation ranges from 1,000-2,100 feet. These sites may suffer from run-off but also benefit from run-on moisture from adjacent sites. This site is dominated by shrubs and subshrubs. Composition and production will vary annually depending on conditions, location, aspect, and natural variability of the soils. Dominant vegetation includes: creosote bush, white bursage, white ratany, and big galleta grass.

**KEY AREA #2**

The Limy Upland Deep key area is located near the center of the allotment approximately 3 miles south of U.S. Route 60. This site was chosen as a key area by the ID team because it fit the Ecological Site Description definition of Limy Upland Deep with an elevation of 1,879 feet. The soil was gravely loam that was deep to bedrock.

Standard 1 – Upland Health

The ID team rated all 17 indicators as “none to slight” departure from what is expected for the site. The team found this site to be extremely stable as there was no evidence of disturbance. The site was found to be meeting Standard 1 as the result of the assessment indicating no departure from the Ecological Site Description reference sheet.

Standard 3 – Desired Resource Conditions

The desired resource conditions were not met for the forb composition. The site was expected to have a range of five to ten percent forb composition; there were none recorded during data collection but forbs were observed in the general area (Table 4). The shrub composition exceeded the expected range of 81 to 97 percent (Table 4). The site met the objectives for grass composition. There was no tree component to species composition, which is to be expected for Limy Uplands Deep.

Although Table 4 shows a lack of a forb component, annual and perennial forbs were observed in the key area. No forbs were recorded due to the sampling technique used. These forbs were smallseed sandmat (*Chamaesyce polycarpa*), desert indianwheat (*Plantago ovata*), Turkshead (*Chorizanthe rigida*), skeletonweed buckwheat (*Eriogonum deflexum*), and common fiddleneck (*Amsinckia menziesii*). Due to these observations the ID team determined this site to be meeting the desired resource conditions for species composition.

**Table 4. Limy Upland Deep species composition objectives and data summary.**  
**“P” indicates the site is meeting the objective. “F” indicates the site is not meeting the objective.**

Plant Type	Species Composition Objective	Key Area	
		1	1
Forb	5-10%	0%	F
Shrub/Cacti	81-97%	95.35%	P
Grass	2-10%	4.65%	P
Tree	0-.01%	0%	P

This Ecological Site occurs on hillsides and ridgetops associated with basalt, diabase, and related bedrock. Rock outcrops make up a small percentage of the area, while large areas of rock slides intermingled with soil areas make up approximately 15-30 percent of this Ecological Site. Elevations Range from 900 to 2,500 feet. Vegetation is dominated by brittle bush, creosote bush, white bursage, and cholla species.

## Basalt Hills 7-10" p.z. (R040XB201AZ)



### KEY AREA #3

The Basalt Hills key area is located near the southern boundary of the allotment near an old mining road. This location was chosen as a key area by the ID team because it fit the Ecological Site Description definition of a Basalt Hills Ecological Site due to elevation of 2,117 feet and 15% slope. This hillside is dominated by brittlebush, creosote, and cholla species which are all plants commonly associated with the first and second community component of this Ecological Site.

#### Standard 1 – Upland Health

For the Basalt Hills Ecological Site all 17 indicators were rated as “none to slight” departure from what is expected for the site.

The Basalt Hills site is meeting Standard 1 as the results of the assessment indicate a slight departure from the Ecological Site Description reference sheet.

#### Standard 3 – Desired Resource Conditions

The site met the objective for shrub composition, with 87 percent of the species composition as shrubs, which was above the 62 to 76 percent expected range (Table 5). The site met the objective for tree composition. The expected range for tree composition is one to five percent for this site, with the results showing one percent (Table 5). Given the results from the sampling technique, this site did not meet the objective for grass composition; however, sixweek needle grama (*Bouteloua aristidoides*) was observed on the site, but was not recorded because it is an annual. The desired resource conditions were also not met for the forb composition, which ranges from nine to 24 percent. This was also a result of the sampling technique used, which does not take into account the presence of annual vegetation. Although there were a few perennial forbs recorded (Table 5), many annual forbs were observed throughout the site. These forbs were smallseed sandmat, desert indianwheat, and common fiddleneck.



The ID team determined the site was meeting the desired resource condition objectives for species composition and vegetation cover.

**Table 5. Basalt Hills 7-10” species composition objectives and data summary.**  
**“P” indicates the site is meeting the objective. “F” indicates the site is not meeting the objective.**

Plant Type	Species Composition Objective	Key Area	
		1	1
Forb	9-24%	2%	F
Grass	5-19%	0%	F
Shrub	62-76%	87%	F
Tree	1-5%	1%	P

**Granitic Hills 7-10” p.z. (R040XB206AZ)**



This site occurs on hillslopes and ridgetops with slopes ranging from 15-65%. Soils are shallow/gravelly formed on acid igneous materials with large areas of rock outcrop and boulders occurring intermingled with soil areas. Elevation ranges from 1,000 to 2,500 feet and the slope is 15-65%. This site is classified as a shrubland dominated by white bursage, palo verde, and ratany species.

**KEY AREA #4**

The Granitic Hills key area is located south of key area 1 near the western boundary of the Salome allotment. This site was chosen as a key area by the ID team because it fit the Ecological Site Description definition of Granitic Hills. The slope on this site was approximately 15% and the soil was classified as a gravelly loam. The vegetation on site was dominated by white bursage, ratany, and desert trumpet (*Eriogonum inflatum*).

Standard 1 – Upland Health

At the Granitic Hills Ecological Site the ID team rated all 17 indicators as “none to slight” departure from what is expected for the site. The site was found to be meeting Standard 1 as the assessment results indicated no departure from the Ecological Site Description reference sheet.

Standard 3 – Desired Resource Conditions

The desired resource conditions were met for the forb composition. The species composition was 17 percent which fell within the expected range of five to 20 percent forb composition (Table 6). The site fell within the objective range of 68 to 88 percent for shrub composition, with 82 percent of the species composition being shrubs (Table 6). The site did meet the objectives for grass species composition. The expected range was five to 15 percent, with the species composition results showing one percent (Table 6). Although the results did not fulfill the requirements for grass composition, sixweeks needle grama was identified at this site in large quantities, but it was not recorded with the monitoring technique used due to it being an annual grass.

The ID team determined the site was meeting the desired resource condition objectives for species composition and vegetation cover.

**Table 6. Basalt Hills species composition objectives and data summary.**  
**“P” indicates the site is meeting the objective. “F” indicates the site is not meeting the objective.**

Plant Type	Species Composition Objective	Key Area	
		1	1
Forb	5-20%	17%	P
Grass	5-15%	1%	F
Shrub	68-88%	82%	P

**CONCLUSION**

All of the Ecological Sites were meeting Standard 1- Upland Health and standard 3 – Desired Resource Conditions (Table 6).

**Table 6. Summary of key area’s meeting and not meeting Standard 1 and Standard 3 of the Arizona’s Standards for Rangeland Health and Guidelines.**

Ecological Site	Standard 1- Upland Health		Standard 3- Desired Resource Conditions	
	Key Area's Meeting Standard	Key Area's Not Meeting Standard	Key Area's Meeting Standard	Key Area's Not Meeting Standard
Limy Fan Deep	1	0	1	0
Limy Upland Deep	1	0	1	0
Basalt Hills	1	0	1	0
Granitic Hills	1	0	1	0
<b>Total</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>0</b>

The ID team has determined the Salome Allotment to be passing Arizona Standards for Range Health in accordance with BLM Manual Handbook H-4180.