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Grazing Permit Renewal, Vegetation Treatments, and Structural Range Improvements For Lizard and Wolfhole Lake Allotments

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Chapter 1
PURPOSE AND NEED

1.1 Introduction and Background

The two allotments that are addressed in this environmental assessment (EA) are Lizard and Wolfhole Lake Allotments. The Lizard and Wolfhole Lake Allotments are located within the Arizona Strip Field Office and management is under the guidance of the Arizona Strip Field Office Resource Management Plan (RMP), approved February 2008 (BLM 2008a).

The Bureau of Land Management (BLM) conducted evaluations of rangeland health conditions on the Lizard Allotment in 2011; and the Wolfhole Lake Allotment in 2013 (see allotment maps in Appendix A). In summary, the Wolfhole Lake Allotment is meeting Arizona Land Health Standards for upland sites, but neither meeting nor making progress towards meeting standards for desired resource conditions due to a decrease in perennial grass composition and an increase in shrub/tree composition. The Lizard Allotment is meeting all applicable standards. A detailed discussion on rangeland health in these allotments can be found in Chapter 3 of this EA.

This EA has been prepared to disclose and analyze the environmental consequences of the proposed grazing permit renewal and alternative livestock management for the Lizard and Wolfhole Lake Allotments, as well as vegetation treatments and other (structural) range improvements on the Wolfhole Lake Allotment. This analysis provides information as required by the BLM implementing regulations for the National Environmental Policy Act (NEPA), the Taylor Grazing Act (TGA), and the Federal Land Policy Management Act (FLPMA) to determine whether to authorize grazing within these allotments, whether changes to current management are necessary, and whether to authorize the proposed vegetation treatments and other range improvements. This EA also serves as a tool to help the authorized officer make informed decisions that are in conformance with the Arizona Strip Field Office RMP. The actions culminate evaluations conducted on the allotments under the Arizona BLM Standards for Rangeland Health and Guidelines for Grazing Administration. In addition, this EA determines if current grazing management practices would maintain desirable conditions and continue to allow improvement of public land resources, or whether changes in grazing management for the allotments are necessary. This EA is intended to evaluate the findings of each land health evaluation as it relates to vegetation conditions and resource values for each allotment. This is done in an effort to balance demands placed on the resources by various authorized uses within the allotments.

The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the BLM in project planning and ensuring compliance with the NEPA, and in making a determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulations 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, one or more decision records (DR) in accordance with 43 CFR 4160 may be signed for the EA approving the selected alternative. A DR, including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in the Arizona Strip Field Office RMP (BLM 2008a).

1.2 Purpose and Need for the Proposed Action

The BLM is proposing to fully process the ten year term grazing permit on the Lizard and Wolfhole Lake Allotments, as well as consider the proposed vegetation treatments and proposed structural range improvements on the Wolfhole Lake Allotment, in accordance with all applicable laws, regulations, and policies. This grazing permit expired on November 30, 2017. As per BLM Instruction Memorandum 2015-0122, the BLM subsequently issued the permittee a new permit pending compliance with applicable laws and regulations. Compliance with all applicable laws and regulations includes consultation, coordination and cooperation with affected individuals, interested publics, States, and Indian Tribes; completion of the applicable level of NEPA review; consultation with the United States Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act; and ensuring that the allotments are achieving or making significant progress toward achievement of land health standards and RMP objectives.

The need for this action is to respond to the permittee's request to renew the term grazing permit. The BLM intends to consider whether to renew, renew with modifications, or not renew the grazing permit, in accordance with 43 CFR Part 4130.3. When issued, grazing permits must include appropriate terms and conditions designed to "achieve management and resource condition objectives for the public lands… and to ensure conformance with part 4180".

The purpose of this action is to provide for livestock grazing opportunities on public lands under the TGA and other applicable laws. BLM Arizona adopted the Arizona Standards for Rangeland Health and Guidelines for Livestock Grazing Management (BLM 1997a); these Standards for Rangeland Health were incorporated into the Arizona Strip Field Office RMP. Rangelands should be achieving or making significant progress towards achieving the standards and to provide for proper nutrient cycling, hydrologic cycling, and energy flow. Guidelines direct the selection of grazing management practices and, where appropriate, livestock facilities to promote significant progress toward, or the attainment and maintenance of, the standards. The RMP identifies resource management objectives and management actions that establish guidance for managing a broad spectrum of land uses and allocations for public lands in the Arizona Strip Field Office. The RMP identified public lands within the Lizard and Wolfhole Lake Allotments as available for domestic livestock grazing. Where consistent with the goals and objectives of the RMP and land health standards, allocation of forage for livestock use and the issuance of grazing permits to qualified applicants are provided for by the TGA and FLPMA. The land health assessment completed for the Lizard Allotment identified Standards 1 and 3[1] as being met or progressing towards meeting standards on the allotment, including the majority of Desired Plant Community (DPC) objectives being met. Wolfhole Lake Allotment is meeting Standard 1 – Upland Sites; however, it is neither meeting nor making progress towards meeting Arizona Rangeland Health Standard 3 – Desired Resource Conditions of the Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (BLM 1997a). This is primarily due to sagebrush encroachment, as well as pinyon and juniper tree encroachment. Livestock are not identified as the causal factor for this encroachment. In the absence of disturbance such as fire, shrubs and trees become the dominant component in the community. Due to competition for limited resources, understory perennial grasses and forbs are outcompeted and ultimately reduced. Action is necessary to manage and enhance vegetation communities within the Wolfhole Lake Allotment to provide the necessary forage for livestock and forage and cover for healthy, self-sustaining wildlife populations. The purpose of the proposed vegetation treatments is to promote significant progress toward, or the attainment and maintenance of, the standards for rangeland health on the Wolfhole Lake Allotment.

[1] As described in Section 2.1.1 of this EA, Standard 2 – Riparian-Wetland Sites does not apply in the Lizard and Wolfhole Lake allotments.

There are currently very few water developments in the Wolfhole Lake Allotment. The proposed water developments would provide additional water sources for both livestock and wildlife. The *Arizona Strip Interdisciplinary Mule deer Management Plan 2015-2019*, which was developed jointly by the BLM and Arizona Game and Fish Department (AGFD) states that "water distribution should be improved in [Unit 13B] by utilizing both cooperative projects and wildlife catchments" (AGFD and BLM 2015). Wildlife species (including mule deer) would benefit from the proposed water developments by improving water distribution and improving habitat use by these species as well, which are also objectives contained within the Arizona Strip Field Office RMP (BLM 2008a).

The Arizona Strip Field Manager is the authorized officer responsible for the decisions regarding management of public lands within the Lizard and Wolfhole Lake Allotments. Based on the results of the NEPA analysis, the authorized officer will issue a determination of the significance of the environmental effects and whether an EIS would be required. If the authorized officer determines that it is not necessary to prepare an EIS, the EA would be deemed sufficient and provide information for the authorized officers to make an informed decision whether to renew, renew with modifications, or not renew the permit and if renewed, which management actions, mitigation measures, and monitoring requirements would be prescribed for the Lizard and Wolfhole Lake Allotments to ensure management objectives and Arizona Standards for Rangeland Health are achieved. The decision also would analyze whether to authorize vegetation and structural range improvements as described in Chapter 2 of this EA.

1.3 Conformance with Land Use Plan

The alternatives described in Chapter 2 of this EA are in conformance with the Arizona Strip Field Office RMP (BLM 2008a) approved February 2008. The alternatives are consistent with the decisions contained within this plan (see Appendix B). The allotments analyzed in this EA are classified as available for grazing under the RMP, with no seasonal restrictions. It has also been determined that the proposed action would not conflict with other decisions throughout the RMP.

1.4 Relationship to Statutes, Regulations, or Other Plans

The authority to renew grazing permits is provided for in 43 CFR 4100 where the objectives of the regulations are "....to promote healthy, sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions; to promote the orderly use, improvement and development of the public lands; to establish efficient and effective administration of grazing of public rangelands; and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands" (43 CFR 4100.0-2). The proposed action complies with 43 CFR 4100.0-8 which states, in part, "The authorized officer shall manage livestock grazing on public lands under the principle of multiple use and sustained yield, and in accordance with applicable land use plans." The proposed action also complies with 43 CFR 4130.2(a) which states, in part, "Grazing permits or leases shall be issued to qualified applicants to authorize use on the public lands and other lands under the administration of the Bureau of Land Management that are designated as available for livestock grazing through land use plans".

The proposed action is consistent with the Fundamentals of Rangeland Health (43 CFR 4180.1) and Arizona's Standards and Guidelines, which were developed through a collaborative process involving the Arizona Resource Advisory Council and the BLM State Standards and Guidelines team. The Secretary of the Interior approved the Standards and Guidelines in April 1997. These standards and guidelines address watersheds, ecological condition, water quality, and habitat for special status species. These resources are

addressed later in this document.

The regulations at 43 CFR Part 10 specifically require land use authorizations, including leases and permits, to include a requirement for the holder of the authorization to notify the appropriate Federal official immediately upon the discovery of human remains and other items covered by the Native American Graves Protection and Repatriation Act (see 43 CFR 10.4(g); the actual requirement for persons to notify the Federal agency official and protect the discovery is in 43 CFR 10.4(b) and (c)). This requirement has been incorporated into the alternatives.

Executive Order 13186 requires the BLM and other Federal agencies to work with the USFWS to provide protection for migratory birds. Implementation of the proposed action is not likely to adversely affect any species of migratory bird known or suspected to occur on the allotment. No take of any such species is anticipated**.**

The subject allotments are in Mohave County, Arizona. The alternatives are consistent with the *Mohave County General Plan* (adopted in 1994 and revised December 5, 2005). While livestock grazing is not specifically addressed in the Mohave County General Plan, this action does not conflict with decisions contained within the Plan.

The alternatives comply with the following laws and/or agency regulations, other plans and is consistent with applicable federal, state and local laws, regulations, and plans to the extent possible. This list is not intended to be inclusive but lists principle laws, regulations, and other plans that were considered.

- Taylor Grazing Act of 1934
- Federal Land Policy and Management Act (FLPMA) of 1976 (43 U.S. Code 1701 et seq.) as amended
- Public Rangelands Improvement Act (PRIA) of 1978
- Endangered Species Act of 1973, as amended
- 43 CFR 4100 Grazing Administration - Exclusive of Alaska
- Arizona Water Quality Standards, Revised Statute Title 49, Chapter II
- Section 106 of the National Historic Preservation Act of 1966, as amended
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S. Code 3001-3013; 104 Stat. 3048-3058)
- National Environmental Policy Act (NEPA) of 1969.

1.5 Identification of Issues

Identification of issues for this assessment was accomplished by considering the resources that could be affected by implementation of one of the alternatives. These issues were identified by the Rangeland Resources Team, Interdisciplinary Assessment Team, and livestock permittee during the scoping meeting held on November 10, 2005 for the Lizard Allotment; scoping meeting on November 10, 2005 and a field visit on September 5, 2006 for Wolfhole Lake Allotment (see Standards for Rangeland Health and Guidelines for Grazing Administration Implementation Project: Allotment Assessment for Lizard and Wolfhole Lake Allotments)[2] (BLM 2007b, BLM 2011, and BLM 2013), as well as through the public review process for this grazing permit renewal EA. The issues identified through the process described above are:

[2] The Lizard and Wolfhole Lake allotment evaluations are available at the Bureau of Land Management's Arizona Strip Field Office, 345 E. Riverside Drive, St. George, Utah 84790.

- Livestock grazing – permit renewal is required in order to allow continued livestock use on the allotments.

- Vegetation – the potential exists for deterioration in ecological conditions if proper livestock grazing practices are not followed. The shift in species composition from grass dominated sites to shrub or tree dominated ones in the Wolfhole Lake Allotment would continue unless vegetation treatments occur to reduce the sagebrush and pinyon-juniper dominance.

- Wildlife (including big game, sensitive species and migratory birds) – habitat for these species, as well as for their prey, may be impacted if proper livestock grazing practices are not followed, and/or if vegetation treatments are implemented.

- Soils – the potential exists for impacts to soil resources if proper livestock grazing practices are not followed. In addition, vegetation treatments have the potential to impact soils through: (1) changes in soil erosion potential; (2) ground disturbance and soil compaction; and (3) disturbance or removal of biological soil crusts.

Chapter 2
DESCRIPTION OF THE ALTERNATIVES

2.1 Introduction

The BLM interdisciplinary team explored and evaluated several different alternatives to determine whether the underlying need for the proposed action – providing for livestock grazing opportunities on public lands while ensuring that the allotments are achieving (or progressing toward meeting) land health standards – would be met. This EA analyzes four alternatives:

1. Alternative A (No Action) – continuance of existing grazing practices, no vegetation treatments.
2. Alternative B (Proposed Action) – continuance of existing grazing practices; vegetation treatments and structural range improvements on the Wolfhole Lake Allotment.
3. Alternative C (Reduced Grazing) – active animal unit months (AUMs)[3] based on average billed; no vegetation treatments or range improvements.
4. Alternative D (No grazing).

2.2 Common to All Action Alternatives

Common to all action alternatives would be the ability to substitute up to three domestic horses for three cattle in the Lizard Allotment. Horse and cattle AUMs are equivalent. The proposed horse addition would allow the permittee flexibility to keep saddle horses used on the Lizard Allotment in that allotment. These AUMs can continue to be used for cattle when horses are not on the allotment. No changes in total AUMs or season of use for this allotment would occur. The combination of total cattle and horse AUMs would not exceed permitted total AUMs for allotment. This action would be included as part of the permit but is not specifically shown in the tables presented in this chapter for the grazing proposed for each action alternative.

The regulations at 43 CFR Part 10 specifically require land use authorizations, including leases and permits, to include a requirement for the holder of the authorization to notify the appropriate Federal official immediately upon the discovery of human remains and other items covered by the Native American Graves Protection and Repatriation Act (see 43 CFR 10.4(g); the actual requirement for persons to notify the Federal agency official and protect the discovery is in 43 CFR 10.4(b) and (c)). This requirement is incorporated as a term and condition of any grazing permit that would be issued.

2.2.1 Arizona Standards for Rangeland Health

The allotments would be managed to achieve the following objectives, as described in the Arizona Standards for Rangeland Health (BLM 1997a):

1) Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).
2) Riparian and wetland areas are in properly functioning condition.[4]

[3] An AUM, or Animal Unit Month, is a unit of measurement indicating how much forage is eaten by a cow/calf pair or a horse in one month.

[4] This standard does not apply to the Lizard and Wolfhole Lake allotments. As described in Table 3.2 of this EA, there are no wetland/riparian areas in the allotments.

3) Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.

2.2.2 Desired Plant Community

The allotments would be managed to achieve the DPC objectives included in the Standards for Rangeland Health and Guidelines for Grazing Administration Implementation Project: Allotment Assessments for Lizard and Wolfhole Lake Allotments (BLM 2011 and BLM 2013). The allotment assessments include an evaluation update which evaluates achievement of the allotments' DPC objectives. These objectives, expressed in species Composition by Weight (CBW), provide for the habitat needs (both forage and cover) of wildlife, protection for soils and hydrologic functions, and forage for livestock. See Section 3.2.3 Land Health Evaluation discussion to compare Land Health Standards compliance and DPCs.

Many factors influence changes or differences in frequency of vegetation as shown in the ecological site guides developed by the Natural Resources Conservation Service (NRCS); the potential vegetation types for each ecological site are determined primarily by soil type, which is determined by parent material, time, climate, relief and organisms. It is important to note that the site guides are just that – they are "guides. Long-term monitoring of a site indicates what a particular area is capable of producing. The DPC objectives therefore reflect the potential of each site.

For the Lizard Allotment key area (Key Area #1), DPC objectives are partially being met for this site. Ground cover and perennial grass both exceed the objectives. Shrub and forb composition do not meet the objectives. This site is a stable late seral shrub-dominated plant community. The ecological site guide lists few shrubs that may occur on this site, the most prominent being *Ambrosia dumosa*. However, in the 33 years of data that has been collected, *Ambrosia dumosa* has not been encountered. This leads us to believe the key area contains small inclusions within the site, which therefore change somewhat the overall plant composition found and expected at the site. It should be noted that the vegetative composition listed in the site guides is an average across the entire ecological site; variations in an ecological site (due to inclusions or transition zones) may result in an actual plant composition that is different from that listed in the site guide. While DPCs were established for forbs, it should be noted that their composition is highly variable and is influenced by timing and amounts of precipitation (i.e., during normal or wet years, sufficient forbs would be present).

For the Wolfhole Lake Allotment Key Area #1, although current trend is upward relative to the base year of 1982, the area is still not meeting two out of five DPC objectives which were established from the ecological site guide, nor is it progressing towards meeting. Perennial grass composition has remained relatively static over the 10 years. While shrub composition has increased 14%. This shift in species composition from a grass dominated PNC site to a shrub dominated one will continue unless a treatment (fire, herbicide or mechanical) occurs and reduces the sagebrush dominance and expansion. Although the data does not show the encroachment of the pinyon/juniper community at the key area, encroachment is occurring from the fan terraces into the bottoms. With the decrease in the grass component, increased erosion will likely occur. Excessive runoff from the surrounding tree dominated fan terraces is exacerbating the erosion problems along the drainages. It is therefore recommended that vegetation treatments and seeding (to reduce sagebrush and pinyon/juniper composition in these sites and also on the fan terraces) be implemented. These treatments, along with reassessing the level of permitted grazing use, should allow this site to turn around and start progressing towards PNC and meet DPC objectives.

Wolfhole Lake Key Area #2, trend is static at this key area relative to the base year of 1982, the area is still not meeting two out of five DPC objectives which were established from the ecological site guide,

nor is it progressing towards meeting. Perennial grass composition has shown an increase in the last 10 years while shrub composition has remained relatively constant. The areas adjacent to this key area show both sagebrush and PJ encroachment. Although not as extreme as Key Area #1, this shift in species composition from a grass dominated PNC site to a shrub dominated one will continue unless a treatment (fire, herbicide or mechanical) occurs and reduces the sagebrush dominance and expansion. With the decrease in the grass component, increased erosion will likely occur. Excessive runoff from the surrounding tree dominated fan terraces is exacerbating the erosion problems along the drainages.

The DPC objectives by allotment and pasture for Lizard and Wolfhole Lake Allotments can be found in Appendix C.

2.2.3 Adaptive Management

The alternatives considered in this EA include adaptive management, which provides management options that may be needed to adjust decisions and actions to meet desired conditions as determined through monitoring. Adaptive management is a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. The BLM resource specialists would periodically monitor the allotments over the 10-year term of the grazing permit to ensure that the fundamentals or conditions of rangeland health are being met or making progress towards being met, in accordance with 43 CFR 4180 (see Section 4.7 of this EA). If monitoring indicates that desired conditions are not being achieved and current livestock grazing practices are causing non-attainment of resource objectives, livestock grazing management of the allotments would be modified in cooperation with the permittee. Adaptive management allows the BLM to adjust the timing, intensity, frequency and duration of grazing; the grazing management system; and livestock numbers temporarily or on a more long-term basis, as deemed necessary. For example, drought conditions, fire, or flood events could require adaptive management adjustments to be made. If a permittee disagrees with the BLM's assessment of the resource conditions or the necessary modifications, the BLM may nevertheless issue a Full Force and Effect Grazing Decision to protect resources. In addition, the principles of adaptive management would be used to ensure treatments are meeting objectives and minimizing adverse impacts over the course of project implementation while also considering other factors (such as drought) in the success of treatments and any adjustments in treatment methods that may be needed to ensure success.

2.2.4 Existing Range Improvements

Existing range improvements would be maintained as currently required. Any new range improvements to assist in grazing practices and promote rangeland health would be considered through a separate NEPA process.

2.3 Alternative A – No Action

The livestock grazing management practices proposed under this alternative (i.e., season of use; utilization levels; and ecological condition and desired plant community objectives) were designed to manage the overall rangeland resources present, provide for a diversity of wildlife and plant species, maintain functioning ecosystems, and maintain and/or improve ecological condition. Specifically, under this alternative the BLM would:

- Renew the existing grazing permit for the Lizard and Wolfhole Lake allotments for a period of ten years. There would be no proposed changes in number of livestock or season of use for the allotments. Livestock grazing would occur with the number of Animal Unit Months (AUMs)[5] limited to the current active preference (Table 2.1).

Table 2.1. Grazing Proposed Under Alternative A

Allotment Name	No.	Kind	Season of Use	Active AUMs	Total Active AUMs by Allotment	Suspended AUMs	Public Land (acres)	% Federal Range
Wolfhole Lake	80	Cattle	3/1 - 2/28	921	928	0	12,590	96
	1	Cattle	3/1 - 9/30	7				
Lizard	30[6]	Cattle	3/1 - 6/15	106	210	0	4,198	100
	23[6]	Cattle	10/16 - 2/28	103				
	1	Cattle	3/1 - 3/30	1				

- Allowable use on key forage species on the allotments (which implement a rotational grazing system) would be no more than 50% utilization of current year's production, removed through grazing or other loss. (Key species for Lizard and Wolfhole Lake Allotments are listed in Section 3.4.2 of this EA.) The BLM would assess resource conditions through field inspections and determine, in consultation with the permittee, whether management changes (e.g., changes in livestock numbers, adjustment of move date, or other changes or use within the parameters identified under this alternative) may be implemented prior to reaching maximum utilization. Move dates (i.e., removal of livestock from a pasture) may be adjusted if monitoring indicates maximum utilization has been reached or due to unusual climatic conditions, fire, flood, or other acts of nature. If maximum utilization is reached on key species/areas in the allotment before a scheduled move date, the use of salt, herding, or other management options may be used to distribute livestock away from an area where maximum utilization has been reached, or livestock may be removed from the pasture (after consultation with the permittee), as deemed necessary by the BLM.
- Manage the allotments to achieve the DPC objectives listed in Appendix C of this EA.

2.3.1 Grazing System

The Lizard and Wolfhole Lake allotments are grazed in conjunction with the Blake Pond Allotment, which adjoins the allotments and is leased by the same permittee. Because Blake Pond Allotment is used with Lizard and Wolfhole Lake, there is added flexibility for deferment and rotation.

The Lizard Allotment is made up of two pastures – one on Arizona State land and one on BLM-administered land; the BLM-administered pasture is fenced separate from the pasture on State land. The allotment is used in a two pasture deferred rotation system. Under this system, the BLM pasture is grazed eight months out of each 24-month cycle (see Section 3.4.1). During each cycle it receives one 12 month period of rest and one 4 month period of rest. This system provides summer deferment every year and ensures one spring deferment every other year.

[5] An AUM, or Animal Unit Month, is a unit of measurement indicating how much forage is eaten by a cow/calf pair in one month.

[6] As described in Section 2.2, up to three of these cattle could be substituted for three horses; total AUMs would remain the same.

The Wolfhole Lake Allotment is approved for yearlong grazing use (see Section 3.4.1). However, the allotment has been incorporated as a pasture within the Lizard AMP area, which combines grazing use on the Wolfhole Lake, Lizard, and Blake Pond allotments. This system has been in place for the past 27 years. The Wolfhole Lake Allotment is used as a stopover for the herd if they are trailing to the Blake Pond Allotment (typically used for 1 to 1½ months in May and June). At the end of the summer grazing season, cattle trailing from the upper pastures of Blake Pond again use Wolfhole Lake (the Wolfhole Lake seeded pasture) as a stopover during the return trip to the lower pastures of Blake Pond and Lizard Allotments. This use normally occurs in December. Wolfhole Lake can be used at other times as well since it is approved for yearlong use. For example, if drought conditions have affected water availability on the Blake Pond Allotment then Wolfhole Lake is used during the summer grazing season.

2.3.2 Terms and Conditions of Grazing Permit

- Permittees must submit the actual use report within 15 days after their billing year ends. Livestock may be moved 15 days before or after scheduled move dates.
- Use of nutritional livestock supplements is allowed, including protein, minerals and salt. However, any supplements used must be dispersed at a minimum of ¼ mile from any known water sources, and cultural or sensitive sites. Any hay or other feed used in administering the livestock operation must be certified weed-free and subject to approval prior to use.
- The AMP for the Lizard and Wolfhole Lake allotments (approved in 1982) will continue to be followed as long as there is no conflict with current land use plans.

2.4 Alternative B – Proposed Action: Issue New 10-Year Grazing Permit with Vegetation Treatments and Structural Range Improvements

Under this alternative, a grazing permit for the Lizard and Wolfhole Lake allotments would be issued for a ten year term. The renewed grazing permit would be for the same number of AUMs as the current permit (see Table 2.1). Utilization levels and terms and conditions of the grazing permit would be the same as those for Alternative A. In addition, this alternative proposes vegetation treatments, including sagebrush and pinyon-juniper reductions, in order to move the Wolfhole Lake Allotment towards meeting Arizona Rangeland Health Standards (see Section 2.4.1 and Table 2.2) (BLM 1997a). This alternative also proposes the construction of structural range improvements, as described in Section 2.4.1 and summarized in Table 2.3.

2.4.1 Vegetation Treatments

The Wolfhole Lake Allotment Rangeland Health Standard evaluation interdisciplinary team recommended vegetation treatments to address increasing density of pinyon-juniper. There is a threshold at which increases in density of pinyon-juniper in the overstory causes a decrease or even eliminates understory plants including native perennial grasses and forbs. In portions of the allotment, this threshold has been crossed. Selective reduction of sagebrush and pinyon-juniper can help increase desirable perennial forbs and grasses and enhance site resilience to disturbance and resistance to wildfire and invasive non-native annual grasses and forbs (Chambers 2014). Vegetation treatments would be implemented as a tool to move the allotment toward meeting Arizona Rangeland Health Standard 3. Through treatments, the pinyon, juniper, and sagebrush would be reduced to a more open mosaic rather than the current density – the treatments would result in a mosaic of tree densities, age classes, and openings across the allotment.

The overstory thinning would allow understory perennial vegetation, including grasses and forbs, to increase in both biomass and diversity.

The treatments proposed in the pinyon-juniper dominated areas, as well as areas with dense sagebrush stands, would follow guidelines developed by the project interdisciplinary team. These guidelines were developed to incorporate multiple use features for proposed vegetation treatments (Sink 2003, BLM 2007a, Bender 2012). Maps showing each proposed treatment unit are included in Appendix A. There are four proposed treatment units; each unit would be treated to incorporate varying levels of remaining overstory (tree) canopy closure in order to meet various resource needs. The treatment levels are:

1. **0 – 15% remaining canopy cover:** These areas would be scattered across the treatment units, and would be separated by treatment unit boundaries, pinyon-juniper stringers or corridors. Approximately 25 percent of each proposed treatment unit would consist of this level of thinning by mastication or lop and scatter.
2. **15 – 30% remaining canopy cover:** Of the trees retained, preference would be given to juniper trees >20 inch root crown diameter (RCD) and pinyon pines >10 inch DBH. Approximately 50 percent of each proposed treatment unit would consist of this level of thinning by mastication or lop and scatter.
3. **Untreated areas:** This category includes retention islands, thermal clumps (for wildlife), pinyon-juniper corridors, and areas of slopes greater than 30%. Boundaries of the leave areas are depicted in Appendix A, Figure 11 and 12, may be adjusted, and additional leave areas may be added, once surveys for sensitive resources are completed. Approximately 25 percent of each proposed treatment unit would remain untreated (also referred to as excluded) for other resource concerns and protection.

2.4.1.1 Lizard Allotment

No vegetation treatments are proposed for this allotment.

2.4.1.2 Wolfhole Lake Allotment

The Wolfhole Lake Allotment is meeting Standard 1 – Upland; however, it is neither meeting nor making progress towards meeting Arizona Rangeland Health Standard 3 – Desired Resource Conditions. This is primarily due to sagebrush encroachment, as well as pinyon-juniper encroachment, into historic perennial grasslands. Livestock are not identified as the causal factor for this encroachment. The land health evaluation for this allotment recommended that sagebrush, pinyon pine, and juniper treatments occur to address this encroachment. The evaluation also noted that increased erosion is a risk due to loss of understory vegetation. It is proposed that vegetation treatments, including manual (lop and scatter), mechanical, and chemical treatments, adhering to the guidelines listed above in Section 2.4.1 and the design features outlined in Section 2.4.1.4, would be implemented in the Wolfhole Lake Allotment. Approximately 4,761 acres of vegetation treatments are proposed in this allotment (see Figure 11 and Figure 12 in Appendix A). Table 2.2 lists the proposed treatment method and acres for the allotment by pasture/treatment area. Through treatments, the pinyon, juniper, and sagebrush would be altered to a mosaic of trees and openings, with a variety of different tree and shrub height structures and age classes, rather than the current density. Seeding would be used in areas where the onsite seed source is inadequate, or rhizomatous grasses are inadequate, to ensure successful revegetation of the site. Treatments would occur in approximately 36 percent of the acreage within this allotment. Areas not proposed for vegetation treatment are represented as “excluded areas” within treatment polygons. These areas of non-treatment are for protection of sensitive resources such as wildlife cover areas, and are in

addition to the remainder of the allotment with no proposed treatments, or a total of 8,567 acres (64 percent of the allotment) with no proposed vegetation treatment. Overstory thinning would allow understory perennial vegetation, including grasses and forbs, to increase in both biomass and diversity. See Appendix C, Table C1 for detailed dominant overstory composition. This table depicts current composition and proposed treatment acreage.

The Wolfhole Lake Allotment has four general use areas, although there are no pasture division fences (other than for a small 150-acre pasture known as the Chaining Pasture) – see "Structural Range Improvements" section below for proposed pasture fencing. The vegetation treatments described below would occur in one of the proposed pastures at a time. This would allow adequate rest for the treated pasture (anticipated to be at least two years following treatment – see Section 2.4.1.3 below) while allowing continued rest and rotation of the remaining pastures.

Manual Treatments

Manual treatment involves the use of hand tools and hand-operated power tools to cut, clear, or prune vegetation. Treatments typically include cutting undesired plants and trees above ground level, and pulling, grubbing, or digging out root systems of undesired plants to prevent sprouting and regrowth below ground level. Manual treatments are highly selective and can be used in more sensitive areas. The 'lop and scatter' technique proposed under this alternative is a type of manual treatment in which small trees would be cut with chainsaws or hand saws (or other hand-held tools) and the resultant slash would be scattered on the ground in a manner that maximizes soil-biomass contact to the extent practicable to aid in water retention, promote herbaceous species growth, and reduce erosion – biomass would be lopped and scattered to a discontinuous, low depth of 24 inches or less in order to maintain biomass to soil contact and encourage decomposition of slash and eventual conversion to soil organic matter. Some of the harvested biomass (i.e., straight sections of "poles," log ends, and branches) would be retained for use as construction material for check dams to mitigate existing rill and gully erosion – there are several ephemeral drainages within the allotment, specifically but not limited to the Oak Springs Unit, that are incised and experiencing erosion. These drainages would benefit from placement of coarse woody debris in the drainages to provide stability and erosion control.

Mechanical Treatments

Mechanical treatments are designed to kill or reduce the cover of undesirable vegetation, and thus, encourage growth of desirable vegetation. Mechanical treatments involve the use of vehicles such as wheeled tractors, crawler-type tractors and specially designed vehicles with attached mulching/chipping implements that cut, uproot, or chop existing vegetation (i.e., trees and shrubs) over large areas of thick vegetation and scatter the debris (mulch) on site. The selection of a particular mechanical method would be based on the characteristics of the vegetation, seedbed preparation and revegetation needs, topography and terrain, soil characteristics, weather conditions, and availability by contractors.

Chemical Treatments

The proposed chemical treatments would include the use of Tebuthiuron, designed to specifically target sagebrush. Portions of the project area are shifting to a shrub-dominated system with little understory (i.e., grasses and forbs). Under this alternative, chemical treatments may be used to reduce sagebrush encroachment into historic perennial grasslands, as well as to reduce sagebrush density in areas where its density is resulting in loss of understory (grass and forb) species. Chemical treatments may be used if mechanical treatment is not feasible for up to 200 acres of sagebrush in the Oak Springs unit in order to remove a percentage of sagebrush (i.e., achieve sagebrush cover described in the NRCS ecological site

guides) and allow grass and forb composition to increase, which should increase plant cover, while reducing runoff and erosion and increasing infiltration during precipitation events. Up to 200 acres of chemical treatments could occur within the Oak Springs treatment unit, in areas with sagebrush overstory and little to no understory.

The BLM would use the Programmatic EIS on Vegetation Treatments Using Herbicides on BLM lands in 17 Western States (BLM 2007b) to guide actions for this project, including application rates. All standard operating procedures, including following herbicide product label instructions, would be strictly adhered to. Herbicide applications are designed to minimize potential for impacts to non-target plants and animals, while achieving project objectives. They can be applied using a variety of techniques (including aerial or hand application using backpack blowers) under carefully controlled rates of application. Herbicide use in treating invasive species was analyzed and approved on the Arizona Strip District in the *Arizona Strip District Herbicidal Application Plan for the Control and Eradication of Noxious and Invasive Species* (DOI-BLM-AZ-A000-2016-0001-EA); use proposed in this current EA would follow the methodology described in that EA.

Table 2.2. Wolfhole Lake Proposed Vegetation Treatments by Pasture/Treatment Area.

Treatment Area	Manual	Mechanical	Chemical*	Total Acres
Middle (includes small amount of Chaining Pasture)	150	1,379	0	1,529
South	0	1,659	0	1,659
Oak Spring	0	470	200*	470
Seegmiller	0	1,103	0	1,103
Total Treatment Acreage	**150**	**4,611**	**200***	**4,761**
Total Allotment Acreage				**12,590**[7]

*200 acres could be treated with spike if mechanical treatment is not feasible for up to 200 acres of sagebrush in the Oak Springs unit. If treated with chemical, 200 less acres would be mechanically treated in this unit. Total acres treated through the combination of mechanical and chemical would be 470 acres in this unit.

Seeding

Throughout most of the allotment, the understory, while sparse, is adequate to provide native seed and/or rhizome spread after treatment; additional seeding would not be required in these areas when implementing the proposed vegetation treatments. Site specific seeding, where deemed necessary, would be either broadcast by equipment on site or flown on to the site by aircraft. Seeding of the treatment areas would be with an approved seed mix. Seeding would be applied by a variety of methods, including manual or mechanical application, as well as aerial application. Seeding would be used in areas where the onsite seed source is inadequate to ensure successful revegetation of the site. Seed mixes would primarily be composed of native species, although non-native species may be used to meet restoration objectives. Seed selection would be based on site potential and RMP objectives in accordance with the Arizona Strip Field Office RMP (BLM 2008a). Based on ecological site description and what is present in the Wolfhole Lake Allotment, seed mixes may include but are not limited to the following: cliffrose, Nevada ephedra, blue

[7] This figure represents public land acres; there are also approximately 640 acres of private land within the allotment.

flax, Palmer's penstemon, bottlebrush squirreltail, blue grama, James galleta, needle and thread, Indian ricegrass.

Should implementation of treatments be delayed, woody vegetation would continue to encroach and increase in density, eventually outcompeting existing understory. Complete loss of understory would then require seeding of desirable understory plants. There are a few areas within the Wolfhole Lake Allotment where seeding would be beneficial in concurrence with treatments. These areas are within the proposed Oak Springs and South Pastures and Middle Pastures. The proposed seeding areas are a few localized areas encompassing less than 500 acres.

2.4.1.3 Long-Term Maintenance

Treatments within the project area would be periodically maintained in order to continue meeting project objectives. Maintenance of treatments would be accomplished using the same type of treatment method (manual and/or mechanical) as the original treatment.

2.4.1.4 Project Design Features

The following project design features would be implemented to ensure that risk to human health and the environment from treatments would be minimized. These project design features were developed to reduce or eliminate adverse impacts from specific project activities. Project design features are based upon standard practices and operating procedures that have been employed and proved effective in similar circumstances and conditions.

Cultural Resources

- No treatment, including vehicular travel to/from and the construction of erosion control features, would be undertaken until an appropriate level of cultural resources inventory (an intensive-level or Class III cultural resources inventory) for the proposed treatment location has been completed.
- When in the vicinity of known cultural resources (i.e., archaeological site(s)), treatment boundaries would be designed to avoid all cultural resources and to avoid making the archaeological site more visually obvious. No ground-disturbing treatments or associated activities, such as vehicular traffic or construction of erosion control features, are allowed within the boundaries of an archaeological site or within 15 meters (50 feet) from the boundary of an archaeological site.
- If in connection with this project any human remains, funerary objects, sacred objects, or objects of cultural patrimony, as defined in the Native American Graves Protection and Repatriation Act (Public Law 101-601; 104 Stat. 3048; 25 U.S.C. 3001), are discovered, operations in the immediate area of the discovery would stop, the remains and objects would be protected, and the Arizona Strip Field Office Manager (or their designee) would be immediately notified. The immediate area of the discovery would be protected until notified by the Arizona Strip Field Office Manager (or their designee) that operations may resume.

Livestock Grazing

Project scheduling and implementation would include consultation, cooperation, and coordination with affected grazing permittees. Annual operations of all permittees within the project area would be considered during project implementation to minimize impact on operations as much as possible, while

also ensuring treatment success. The BLM would consider the following when implementing treatments over time:

- Coordinate treatment areas in time and space within the allotment/pasture and season of use to reduce impact to livestock and permittee normal operations.
- Forage reserves may be used to mitigate allotment/pasture displacement due to treatments in the short term. Two forage reserves administered by Grand Canyon-Parashant National Monument are available if normal allotment/pasture rotations are not possible or practicable due to proposed vegetation treatments and subsequent reseeding efforts (if necessary).
- Ensure that livestock are not permitted to enter a treated unit for two growing seasons to ensure herbaceous growth establishment and soil stability; this may be reduced or increased in consultation with BLM resource staff based on the site-specific conditions within the particular unit treated.

Soil and Water

- In order to minimize soil compaction, treatment activities that involve use of vehicles or equipment off of designated routes would be limited to periods when the soil and ground surface are not excessively wet.
    - Mechanical work would not take place when ruts greater than 4 inches form on roadways adjacent to work areas.
- Wheeled/tracked vehicles used for project implementation would not operate or travel across slopes exceeding 30 percent.
- Lopped/scattered biomass should be placed in a manner that maximizes soil-biomass contact to the greatest extent practicable.
- Areas of dense biological soil crust coverage (determined by BLM Soil Scientist or their representative) would be avoided to the greatest extent practicable.
- Mastication residues (e.g. wood chips) would be spread as evenly as possible so that seed germination is not inhibited and soil nutrient balances are maintained.
- Lop and scatter biomass to a discontinuous, low depth of 24 inches or less in order to maintain biomass to soil contact and encourage decomposition of slash and eventual conversion to soil organic matter.

Vegetation (Including Noxious Weeds and Non-Native Invasive Species)

- All seed would be "state certified" free of weed seeds.
- All equipment and vehicles used to implement treatments would be cleaned (i.e., power washed off site) to remove any soil and potential weed seeds before entering the project area and checked for weed seeds after leaving the project area.

Visual Resources

- Treatment boundaries would be irregularly shaped (i.e., not straight lines, unless using roads and fences as a boundary) to minimize the level of change to the characteristic landscape, avoid

creating obvious lines of extreme visual contrast, and avoid attracting the attention of the casual observer.

Wildlife (Including BLM Sensitive Species, Species of Greatest Conservation Need, and Migratory Birds)

- Existing snags, up to two per acre, would be retained within the project area. Criteria for retention should be the larger juniper or pinyon snags, particularly any with cavities suitable for nesting (NRCS 2013). Pinyon and junipers growing in drainages with roots that may be stabilizing banks would be left.
- Surveys for nesting migratory birds would be conducted prior to treatment and identified nest sites would be protected during nesting season (April 15-July 31). Identified nest sites would be protected during treatment by a no-treatment buffer of 200 meters (650 feet)(Reynolds 1992).
- If treatments are proposed between February 1 and April 14, surveys for nesting raptors would be conducted prior to implementation and identified nest sites would be protected until nestlings have fledged (USFWS 2015).
- To avoid adverse impacts to nesting pinyon jays, the proposed treatment areas would be surveyed prior to implementation and any identified nest colonies would be delineated and protected from tree removal (Latta et al. 1999).

2.4.1.5 Monitoring

The BLM would monitor the vegetation treatments to ensure they are implemented as designed and to determine their effectiveness in achieving desired outcomes, and the effectiveness of project design features. In addition, monitoring of treatment implementation would occur to ensure that contractors/project workers adhere to project specifications. All monitoring would be in accordance with BLM monitoring protocols and would be subject to funding and staff availability.

2.4.2 Structural Range Improvements

2.4.2.1 Lizard Allotment

There is currently adequate water from the Mociac Well and pipeline. Livestock rotation is achieved because the allotment is divided into two pastures, the BLM Mociac Pasture, and the Arizona State Land Pasture. No structural range improvements are proposed for this allotment.

2.4.2.2 Wolfhole Lake Allotment

This allotment is approximately 13,230 acres in size (12,590 acres of public land and 640 acres of private land); other than a small 150-acre pasture known as the Chaining Pasture, it has no pasture division fences. It is proposed that three additional pastures would be created through construction of less than three miles of fence, coupled with utilizing existing natural features. This would amount to a total of five pastures in this allotment, including the existing South Pasture and the Chaining Pasture (although the Chaining is not an actual pasture since it has no water development, and is used as a holding pasture when gathering). These "new" pastures would aid in complete rest of areas after implementation of the proposed vegetation treatments, and would allow for a rest and rotation grazing system once treatments

are completed and understory vegetation restored (see Chapter 4, Proposed Action). The proposed fences would be permanent and would be maintained through a cooperative agreement with the permittee. To avoid impacts to wildlife movement, the fences would be designed to meet wildlife specifications. This includes spacing between the top two strands being at least 12 inches, the bottom strand being smooth (no barbed) wire, and the bottom strand being at least 16 inches above the ground.

There are currently very few water developments in this allotment. Proposed pastures would require adequate water developments for livestock. The following water developments are proposed by the permittee: one water catchment approximately 1.0 acre in size; one 150,000 gallon lined pond or storage tanks with a pipeline from the catchment apron to the storage tanks or pond; approximately two miles of pipeline, including short extensions from an existing pipeline to troughs to service the proposed pastures; four 500-1,000 gallon water troughs; and three 10,000 to 12,000 gallon storage tanks to service the proposed troughs. Oak Springs would be maintained and restored to a functional state. The Arizona Game and Fish Department is a cooperator on restoration of this spring for wildlife purposes. Once restored, proposed pipeline, tank, and trough (included in the tally above) would be constructed.

See Table 2.3 for a summary of number, types of range improvements, total miles of linear range improvement features, and associated acres of disturbance. A two track road (less than 0.2 miles long) would be constructed to haul materials for catchment construction and for catchment maintenance. This road would be added as a designated public route for Arizona Strip Field Office travel management purposes.

The catchment and storage tank would be within a 1 to 2 acre exclosure (see Figure 4 in Appendix A). The proposed pond or tanks would be fenced with eight foot high fencing to exclude deer. To run water from storage tanks to the troughs, a 1¼-1½ inch pipeline would be buried and run approximately one-quarter mile. At each pipeline terminus, a storage tank and water trough would be installed. The trench for the pipeline would be dug using either a backhoe, a trencher, or a ripper tooth on a bulldozer and lowered into the ground across the route of each pipeline. This would loosen the soil and allow for the pipe to be more easily installed as the tractor makes a second pass to install the pipeline. The pipeline would be installed along a 15-foot wide path; however, actual disturbance would only occur at the dozer tracks and a 12 to 16-inch point of impact from the ripper tooth. The pipe would be placed in the trench then covered using the blade on whichever piece of equipment was used to dig the trench. Three pipeline extensions less than two miles in length are proposed. These extensions would run water to four proposed 500-1,000 gallon troughs. Troughs placed along these pipelines would be constructed using heavy equipment sized tires and secured to the proposed location using concrete. These troughs would be available to wildlife, and would thus provide additional water sources for both wildlife and livestock.

The proposed action includes future maintenance activities for the life of the proposed range improvements, which is expected to be at least 20-50 years. The exact maintenance requirements are not known but are expected to include annual inspections using all-terrain vehicles or pick-up trucks along the pipeline routes for minor repairs, as well as digging to find and repair leaks or clogs in the pipes. The facilities would be monitored on a yearly basis by the grazing permittee to ensure they are functioning properly.

To reduce impacts to wildlife from construction of the water facilities, the following practices/design features would be implemented:

- Either lids or wildlife escape ramps and floating bird ladders would be installed to the storage tanks or pond.

- Troughs would be available to wildlife. Wildlife escape ramps would be secured in each trough before it is filled to reduce danger of drowning to small animals and birds.
- Construction would be limited to daylight hours to minimize impacts to wildlife.
- Open trenches have the potential to trap and injure wildlife. During pipeline construction these risks would be mitigated by minimizing the length of time trenches are left open, providing escape avenues (lateral trenches) for wildlife when left overnight, and inspecting the trenches prior to backfill activities.
- Any hollow metal and/or plastic (PVC) pipes and posts used or stored temporarily during construction or left permanently in place would be capped to prevent birds, small mammals, or reptiles from becoming entrapped.
- If an active bird nest is found during construction in a location that would be adversely affected by operations at the site, the BLM wildlife team lead would be contacted to determine an alternative action.

The additional water developments are critical for pasture rest in conjunction with the proposed vegetation treatments. After successful vegetation treatments and re-vegetation of treated areas, the proposed pastures would facilitate a rest/rotation system and better livestock distribution throughout the allotment (see Chapter 4, Proposed Action).

Appendix A includes photos of "typical" range improvements (water storage tank, water trough, and water catchment), such as what would be constructed/installed in this allotment.

Table 2.3. Wolfhole Lake Proposed Range Improvements

Improvement Type	Proposed number	Proposed miles	Acres of Potential Ground/Vegetation Disturbance
Catchment	1	N/A	1
Troughs	4	N/A	0.10
Storage Tanks	4	N/A	1
Cattleguard	1	N/A	0.005
Pipeline	N/A	2	5
Fencing	N/A	3	7.5
Two-track road	N/A	0.2	0.25
Total	**10**	**5.2**	**14.9**[8]

All range improvements would be funded by a combination of Grazing Advisory Board, NRCS grants, AGFD grants, in kind labor and funding by the livestock grazing permittee, and BLM range improvement funds.

2.4.3 Stocking Rates

Table 2.1 identifies current active AUMs for the two allotments addressed in this EA; Table 2.4 displays the proposed current (and continued) grazing use in the Wolfhole Lake Allotment where vegetation

[8] This figure represents temporary (construction) disturbance. The pipeline and fence areas would revegetate over time, resulting in permanent loss of vegetation on approximately 2.4 acres.

treatments are proposed. The operator would continue to run the current actual use in this allotment until BLM monitoring determines that the vegetation treatments are successful. Success would be determined in seeded pastures once 25% of perennial pioneer grasses and forbs are present, utilizing the ecological site description for the site as a guide. These species could include galleta, blue grama, squirreltail, needle and thread, three-awn, globemallow, lupine, *Astragalus*, and others (see reference ecological site descriptions, NRCS 2017). Non-seeded pastures would be evaluated after treatment and may not require additional rest based on understory presence. Treatment "success" would likely require a minimum of two years rest following treatment, although this may be reduced or increased based upon monitoring by BLM resource staff, based on the site-specific conditions within the particular unit treated.

Table 2.4. Current Actual Use on the Wolfhole Lake Allotment.

Year	Actual Use	Year	Actual Use
2009	122	2014	144
2010	236	2015	66
2011	189	2016	58
2012	158	2017	117
2013	340		
Average 2007-2017		**159**	

Since no vegetation treatments are proposed for the Lizard Allotment, the stocking rate for this allotment would be the same as that identified in Table 2.1. The renewed grazing permit would be for the same number of AUMs as the current permit (see Table 2.1). In addition, utilization levels and terms and conditions of the grazing permit would be the same as those for Alternative A.

Long term trend monitoring plots currently exist in the two allotments. Under this alternative, the number of pastures in Wolfhole Lake Allotment would be increased from 2 to 5; the number of long term trend monitoring plots (i.e., key areas) would be increased proportionately. As a mechanism for determining when treatment objectives have been met, as well as long term trend monitoring for each pasture, these additional monitoring plots would be established in each treatment area, as well as a few control plots in adjacent non-treated areas. These permanent plots would be established pre-treatment and serve as an indicator for when vegetative objectives have been met. Existing key areas would continue to be monitored, as well as establishment of new key areas for the additional pastures. These monitoring plots would meet BLM monitoring guidelines and include line-point intercept for measuring grass, forb, and shrub cover, as well as belt transects if needed, to capture shrub and tree stem densities.

2.5 Alternative C – Issue new 10 year grazing permit with Reduced Grazing (Actual Use)

The livestock grazing management practices proposed under this alternative would be similar to those proposed for Alternative B. However, there would be no proposed vegetation treatments or range improvements. A new grazing permit would be issued for the Lizard and Wolfhole Lake allotments for a period of ten years. However, Alternative C would reissue the ten-year term grazing permits based on the average actual use level of each allotment over the last 10 years (2007 -2016). The reduced active AUMs would be in effect for the 10 year duration of the permit. The active AUMs would be re-evaluated at the end of the term. Table 2.5 displays the current active preference as compared with the proposed active

preference based on actual use for the past ten years. Under this alternative, the proposed reduction in current active AUMs would be placed in suspension.

Table 2.5. Permitted Use Under Alternative C.

Allotment Name	Livestock			Active AUMs	Total Active AUMs by Allotment	% Current Active AUMs available in this alternative	Suspended AUMs	Public Land (acres)	% Federal Range
	No.	Kind	Season of Use						
Wolfhole Lake	7	Cattle	12/1 - 2/28	20	167	18	761	12,590	96
	15	Cattle	3/1 - 11/30	147					
Lizard	11	Cattle	3/1 - 6/15	28	76	36	134	4,198	100
	8	Cattle	10/16 - 2/28	23					
	1	Cattle	3/1 - 3/30	1					
	3	Horses	3/1 - 6/15	10					
	3	Horses	10/16 - 2/28	14					

Utilization levels and terms and conditions of the grazing permit would be the same as those for Alternative A. Consistent with Alternative A, any existing range improvements would be maintained as currently required. No new range improvements are proposed under this alternative; any new range improvements proposed in the future to assist in grazing practices and promote rangeland health would be considered through a separate NEPA process.

2.6 Alternative D – No Grazing

Under Alternative D, a ten-year term grazing permit would be issued for the Lizard and Wolfhole Lake allotments with 0 authorized AUMs for active preference – all AUMs would be suspended (i.e., livestock grazing would be deferred for the ten-year permit period). No new range improvement projects would be constructed and no modifications would be made to existing projects.

2.7 Alternatives Considered but Eliminated from Detailed Analysis

2.7.1 Use of Prescribed Fire to Reduce Pinyon-Juniper Overstory.

This option was considered but eliminated due the risk for introduction and proliferation of cheatgrass associated with prescribed fire, particular at lower elevations (which include portions of the treatment area). Based on experience with wildfire in pinyon-juniper communities, and literature regarding annual grass expansion associated with wildfire or prescribed fire, it was determined this treatment method would not meet the purpose and need of enhancing vegetation communities within the Wolfhole Lake Allotment. In addition, much of the pinyon-juniper overstory throughout the proposed treatment area has a canopy cover of 40 percent or greater. At this stage of canopy cover, understory may be sparse enough that it would not carry a prescribed fire. This alternative was therefore eliminated from detailed analysis.

Chapter 3

AFFECTED ENVIRONMENT

3.1 Introduction

This chapter provides information to assist the reader in understanding the existing situation and current grazing management on the Lizard and Wolfhole Lake allotments. The affected environment is tiered to the Arizona Strip Proposed Plan/Final EIS (BLM 2007a). This EA also incorporates by reference the Standards for Rangeland Health and Guidelines for Grazing Administration Implementation Project: Allotment Assessments for Lizard and Wolfhole Lake Allotments (BLM 2011 and BLM 2013). This assessment describes the resources and issues applicable to the allotments.

The affected environment of this EA was considered and analyzed by an interdisciplinary team. Table 3.2 addresses the elements and resources of concern considered in the development of this EA; this table indicates whether the element/resource is not present in the project area, present but not impacted to a degree that requires detailed analysis, or present and potentially impacted. The resources discussed in Section 3.4 are the relevant physical and biological conditions that may be impacted with implementation of the proposed action and/or alternatives to the proposed action, and provides the baseline for comparison of impacts described in Chapter 4.

3.2 General Setting

The Arizona Strip District is comprised of 2.8 million acres of BLM-administered land in the northwestern portion of Arizona. The Lizard and Wolfhole Lake allotments (see allotment maps in Appendix A of this EA) are located in Mohave County, Arizona on lands managed by the BLM's Arizona Strip Field Office.

3.2.1 Topography

Elevation within the two allotments varies greatly. Elevation in the Lizard Allotment is from 3,080 feet at Lizard Wash (2,680 feet on Arizona State Trust Lands) to 4,600 feet where the allotment intersects Mokaac Mountain. This allotment consists of rolling basaltic alluvium flats cut by numerous small drainages. Elevation in the Wolfhole Lake Allotment ranges from 4,960 feet at Quail Flat to over 6,200 feet at the southern end of Wolfhole Mountain, a basalt plateau. The Wolfhole Mountain Allotment also extends southwest of Seegmiller Mountain at the head of Wolf Hole Valley. The major topographical features of the allotment are Wolf Hole Lake and Wolf Hole Valley.

3.2.2 Climate

Average annual precipitation over the two allotments varies greatly. There is one rain gauge located within the Lizard Allotment, and one rain gauge located adjacent to Wolfhole Lake Allotment which represent similar elevations, topography, and precipitation. The average seasonal precipitation for the two allotments as well as annual average total precipitation are shown in Table 3.1 (below).

Precipitation and weather patterns affect the amount of vegetation produced on the allotments; fluctuating amounts and the seasonal distribution of precipitation results in varying amounts of forage from year to year. Normal grazing schedules and livestock management practices may have to be modified during periods of drought. BLM policy, as outlined in two instruction memoranda (WO IM No. 2002-120 and Arizona IM No. AZ-2002-025), outline guidance strategies when evaluating impacts to rangelands due to drought. The BLM works with livestock permittees to voluntarily reduce livestock numbers on public lands, or portions of or entire allotments may be temporarily closed. Livestock operators and the BLM jointly develop short and long-term strategies for modifying livestock use on public land to ensure the conservation and protection of soil and vegetation resources. For example, the BLM works cooperatively with livestock permittees to match available forage with appropriate livestock numbers. Historically, most livestock operators impacted by drought conditions have voluntarily reduced their numbers without issuance of formal livestock closure notices. However, if the BLM determines immediate protection of the range resource is merited, closures or modifications to an allotment may be issued that are effective upon issuance under the authority of 43 CFR 4110.3-3.

Temperatures in the region average 30 degrees in winter and 80+ degrees in summer, with an average annual precipitation between 8 and 15 inches. The geographical area covered by these two allotments is large, the elevation range is also large ranging from 3,000 feet on the Lizard Allotment (less on the State managed portion of the allotment) to over 6200 feet in the Wolfhole Lake Allotment (see Section 3.2.1 above). The climate at the Lizard and Wolfhole Lake allotments has an average frost-free period of 160 days with temperatures ranging from a high of over 100°F in summer to below 0°F in the winter.

Table 3.1. Precipitation Data for Lizard and Wolfhole Lake Allotments.

Rain Gauge	Fall Average		Winter Average		Spring Average		Summer Average		Annual Average
	Percent of total	Inches	Percent of total	Inches	Percent of total	Inches	Percent of total	Inches	Inches
Lizard	17	1.41	32	2.66	16	1.32	35	2.83	8
Mustang (nearest Wolfhole Lake gauge)	15	2.17	38	5.74	18	2.72	29	4.31	15

Precipitation in Arizona typically occurs in a bimodal fashion, with a very dry May and June. Winter moisture is influenced by Pacific oceanic temperatures and airstreams; summer moisture is influenced by the North American monsoon. Summer moisture generally occurs from July through September. It should be recognized that summer rainstorms exhibit considerable variability in their location and intensity (Sprinkle et al. 2007). Precipitation for the region in which the two allotments are located over the last four years (2013-2016) has been at or above normal[9]. 2007-2012 had below average precipitation for the region. It should be noted that departures from normal are not unusual – in fact, departures from normal are quite typical (Doswell 1997), and precipitation may very often well above or well below the seasonal average (National Drought Mitigation Center 2015).

[10] "At or above normal" for this analysis is considered 90% of average annual precipitation or greater.

3.2.3 Land Health Evaluation

The BLM regularly conducts inventories and assessments of natural resource conditions on public lands. The need for natural resource inventories was established in 1976 by Congress in Section 201(a) of FLPMA and reaffirmed in 1978 in Section 4 of PRIA. These Acts mandate that Federal agencies develop and maintain inventories of range conditions and trends on public rangelands and update inventories on a regular basis.

Rangeland landscapes are divided into ecological sites for the purposes of inventory, evaluation, and management. An ecological site is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation. It is the product of all the environmental factors responsible for its development. Within each precipitation zone, ecological sites are classified based on the differences in site factors (soil, slope, aspect, parent material, topographic potential, etc.) that affect the potential to produce vegetation.

Ecological sites have developed a characteristic composition and cover of vegetation. The natural plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in annual production (BLM 2001). While the natural plant community of a particular ecological site is recognized by characteristic *patterns* of species associations and community structure, the *specific species* present from one location to another may exhibit natural variability - the natural plant community is not a precise assemblage of species for which the proportions are the same from place to place, or even in the same place from year to year. Variability is the rule rather than the exception. The distinctive plant communities associated with each ecological site (including the variability which frequently occurs) can be identified and described, and are called ecological site descriptions. The ecological site that is specific to proposed treatments in the Wolfhole Lake Allotment is the Loamy Upland 10-14" p.z. Ecological Site (see Appendix D for details).

The BLM measures range condition, or ecological condition, by the degree to which the existing vegetation of a site is different from the Potential Natural Community (PNC) for the respective ecological site, as identified in the ecological site description. PNC is "the biotic community that would become established if all successful sequences were completed without interferences by humans under the present environmental conditions. It may include naturalized non-native species" (BLM 2005 and BLM 2001). This differs from "historic climax plant community" in that historic climax plant community is "the plant community that existed before European immigration and settlement" (BLM 2001). The BLM uses "potential natural community" terminology rather than "historic climax plant community" because PNC recognizes past influences by man. Knowing the PNC of the area, and using the ecological site descriptions as a guide, DPC objectives can be developed. The DPC then becomes the objectives by which management actions would be measured (see DPC objectives for the allotments in Appendix C).

The DPC objectives are partially being met in the Lizard Allotment. Ground cover and perennial grass both exceed the objectives. Shrub and forb composition do not meet the objectives. This site is a stable late seral shrub-dominated plant community. The ecological site guide lists few shrubs that may occur on this site, the most prominent being *Ambrosia dumosa*. However, in the 33 years of data that has been collected, *Ambrosia dumosa* has not been encountered. This leads us to believe the key area contains small inclusions within the site, which therefore change somewhat the overall plant composition found and expected at the site. It should be noted that the vegetative composition listed in the site guides is an average across the entire ecological site; variations in an ecological site (due to inclusions or transition zones) may result in an actual plant composition that is different from that listed in the site guide. While DPCs were established for

forbs, it should be noted that their composition is highly variable and is influenced by timing and amounts of precipitation (i.e., during normal or wet years, sufficient forbs would be present).

DPCs are a management objective, which may include managing for various seral stages to meet management objectives. This differs from rangeland health, which is an indicator of ecological status or functionality. The Lizard Allotment is meeting Rangeland Health Standards as it is ecologically stable and functional based on the vegetation communities and soil conditions throughout the allotment. However, the DPC objectives are not completely being met in this allotment, as more shrub or browse is desired than is currently present at this site. The DPCs are derived using the parameters of what a site is capable of producing ecologically. However, as described above, the scale of soil mapping for soil surveys leaves out inclusions, which may have attributes and capabilities different than the particular soil type or Ecological Site Description (ESD) describes.

The DPC objectives are partially being met in the Wolfhole Lake Allotment. The ecological site inventory and recent trend data (Appendix D) show that the vegetative communities are stable and ecological conditions are functional. However, the plant functional groups are shifting to a more shrub-dominated system with less understory. This situation will continue unless vegetation treatments are implemented to reduce the cover and competition from sagebrush and pinyon/juniper trees (see Section 2.4.1.2). In addition, site visits to the allotment determined that most soils are within normal parameters and functioning properly but are at risk of severe erosion if the understory is further reduced.

Ecological condition expresses the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the potential natural plant community for the site. Ecological site development associated with climatic conditions and normal range of disturbances (e.g., occurrence of fire, grazing, unusually wet periods, flooding) produce a plant community in dynamic equilibrium with these conditions. This plant community is referred to as the historic climax plant community. In some references, potential and historic are used interchangeably. Historic is often derived by the NRCS by using a reference or relic site that is thought to be representative of the potential of a site. NRCS ecological site description typically refer to historic climax plant communities, and so this term will be used when referring to data from NRCS. The maps and vegetation data derived from this data are located in Appendix A and Appendix D. Ecological condition for most of the sites in this area change slowly. Ecological condition is reported in the following four classes, or seral stages, which are the developmental stages of ecological succession:

- **Early Seral:** 0-25% of the expected potential natural community exists.
- **Mid Seral:** 26-50% of the expected potential natural community exists.
- **Late Seral:** 51-75% of the expected potential natural community exists.
- **Potential Natural Community or PNC:** 76-100% of the expected potential natural community exists.

The BLM conducted evaluations of rangeland health conditions on the Lizard Allotment in 2011 and the Wolfhole Lake Allotment in 2013. These evaluations were made in accordance with the Arizona Standards and Guidelines for the Fundamentals of Rangeland Health (BLM 1997a) standard BLM methods for estimating ecological condition and current trend. Attempting to monitor 100% of any given rangeland is not practical. Instead, representative study sites are selected based on their ability to represent range conditions over much larger areas (University of Arizona 2010). Evaluation sites, or key areas as defined in Technical Reference 1734-4 (BLM 1999b), were selected (location and amount) using professional judgment based upon terrain, past uses of the area, and location of waters. Specific locations of key areas are available in the project file. Existing trend studies, ecological condition data, actual use,

and utilization studies for the allotment was analyzed. The trend identified in the rangeland health assessment survey assessed erosion status, vegetative cover, vigor, species diversity, location of the most palatable plants in relation to access to a grazing animal, and general age classes.

Additional monitoring (pace-frequency, composition, and utilization) data has been collected since the land health evaluations were completed, as shown in Appendix D. Based on monitoring efforts, trend for the Lizard Allotment is upward; trend on the Wolfhole Lake Allotment is up at one key area, and static at the other key area. It is important to note that a static trend is not necessarily the desired future condition. For example, one of the Wolfhole Lake key areas had a high density of sagebrush and sparse understory at the time the trend was established, and this is still the case. See Appendix D for monitoring data and trend determinations for each allotment.

The ecological site descriptions are developed by the NRCS for a site based on soils, precipitation, aspect, elevation and other physical parameters. Trend data is compared to these ecological site descriptions to determine where the site is ecologically as far as composition and potential. Seral stage is a parameter of measuring where the site is in regards to the potential of a site. Seral stage for Lizard Allotment as of the most recent readings is late seral; seral stage for the Wolfhole Lake Allotment is mid-seral for the South Pasture and late seral for the Chaining Pasture.

Utilization data has been collected on a regular basis within the two allotments. This data has been documented since 1983 in the Lizard Allotment, and 1985 in the Wolfhole Lake Allotment. The two allotments are managed on a pasture rotation grazing system; allowable use by livestock is 50 percent on key species (see Appendix D for utilization data by allotment and year). Utilization on key species in the Lizard Allotment for all years since 1983 in which data was collected averaged 20% use for warm season grasses, 9% use for cool season grasses, and 17% for browse. Overall utilization in the Wolfhole Lake Allotment for all years since 1985 in which data was collected averaged 18% for both key areas and all key species.

Based on analysis of allotment monitoring data (including data collected since the land health evaluation was completed – see Appendix D) and supporting documentation contained in the land health evaluation report prepared for the Lizard Allotment (BLM 2011), it has been determined that the allotment is meeting the Arizona Rangeland Health Standards. Evaluations conducted in the Wolfhole Lake Allotment – including data collected since the land health evaluation was completed (see Appendix D) and supporting documentation contained in the land health evaluation report prepared for the allotment (BLM 2013) – concluded that this allotment is neither meeting nor making progress for Arizona Rangeland Health Standard 3 - Desired Resource Conditions. The reason for non-attainment of this Standard is due to encroachment of Wyoming big sagebrush. The primary cause of this encroachment is fire exclusion; livestock are not identified as the causal factor for this encroachment. See Appendix H for the land health determinations for both allotments.

3.3 Elements/Resources of the Human Environment

The BLM is required to consider many authorities when evaluating a Federal action. Those elements of the human environment that are subject to the requirements specified in statute, regulation, or executive order, and must be considered in all EAs (BLM 2008b), have been considered by BLM resource specialists to determine whether they would be potentially affected by the proposed action or alternatives. These elements are identified in Table 3.2, along with the rationale for determination on potential effects. If any element was determined to be potentially impacted, it was carried forward for detailed analysis in

this EA; if an element is not present or would not be affected, it was not carried forward for analysis. Table 3.2 also contains other resources and concerns that have been considered in this EA. As with the elements of the human environment, if these resources were determined to be potentially affected, they were carried forward for detailed analysis in this document.

Table 3.2. Elements/Resources of the Human Environment.
NP = Not present in the area impacted by the proposed action
NI = Present, but not affected to a degree that detailed analysis is required
PI = Present with potential for impact – analyzed in detail in the EA

Resource	Determination	Rationale for Determination
Air Quality	NI	The Lizard and Wolfhole Lake allotments are included in an area that is unclassified for all pollutants and has been designated as Prevention of Significant Deterioration Class II. Air quality in the area is generally good. Exceptions include short-term pollution (particulate matter) resulting from vehicular traffic on unpaved roads. Fugitive dust is also generated by winds blowing across the area, coming from roads and other disturbed areas. Vegetation treatments have the potential to impact air quality and visibility through the generation of dust due to increased vehicle and equipment use on dirt roads and in areas of treatment. Additionally, livestock congregating at waters can create fugitive dust. However, the dust created would be temporary in nature and Federal/State air quality standards would be maintained. Thus, none of the alternatives would cause Class II standards to be exceeded, and the alternatives would not measurably impact air quality. Cattle grazing on public land (and elsewhere) eat vegetation that potentially egetation treatments have the potential to impact air quality and visibility from the generation of emissions through vehicle and equipment use. The proposed action would be a minute source of carbon dioxide (CO_2) and other greenhouse gases (GHGs). This analysis is unable to identify the specific impacts of the proposed action's GHGs on global warming and climate change because there is insufficient information, and there are numerous models that produce widely divergent results. It is difficult to state with any certainty what impacts may result from GHG emissions, or to what extent the proposed action could contribute to those climate change impacts. It has therefore been determined that the proposed action would have a negligible effect on local, regional, and global climate change.
Areas of Critical Environmental Concern	NP	There are no Areas of Critical Environmental Concern within either of the grazing allotments addressed in this EA.
Environmental Justice	NI	The alternatives would have no disproportionately high or adverse human health or other environmental effects on minority or low income segments of the population. Also, continued livestock grazing would have no effect on low income and minority populations.
Farmlands (Prime or Unique)	NP	There are no prime or unique farmlands within either of the allotments based on a lack of irrigated pastures, a prerequisite condition to be considered under this resource.
Floodplains	NI	No actions are proposed that result in permanent fills or diversions, or placement of permanent facilities, in floodplains or special flood hazard areas.

Resource	Determination	Rationale for Determination
		Continued properly managed livestock grazing use would not affect the function of the floodplains within the allotments.
Native American Religious Concerns	NP	During consultations with the American Indian Tribes that claim cultural affiliation to northern Arizona, no Native American religious concerns have been identified in relation to livestock grazing within these allotments.
Threatened, Endangered or Candidate Plant Species	NP	Based upon a review of GIS data on habitat and professional knowledge of the area, it has been determined that no Threatened, Endangered, or Candidate plant species occur in these allotments.
Threatened, Endangered or Candidate Animal Species	NI	The California condor is the only known federally listed animal species that may occur within these allotments – condors may occasionally fly over or feed in the allotments at any time of year. California condors are federally listed as endangered and a population of these condors was reintroduced on the Arizona Strip in 1996. This population is designated as experimental non-essential under Section 10(j) of the Endangered Species Act. For Endangered Species Act Section 7 purposes, the species is treated as a proposed species on BLM lands in this portion of the Arizona Strip. Condors are strictly scavengers and prefer to eat large, dead animals such as mule deer, elk, pronghorn, bighorn sheep, cattle, and horses. Condors range widely, easily covering over 100 miles in a day, and their current range includes the entire Arizona Strip. Although condors may either fly over or feed within the allotments, they have not been observed doing so. There is no evidence that rangeland health on these allotments is limiting or restricting condor population growth. In addition, the alternatives would not alter nest sites, roost sites, or cause disturbance to these sites. Scavenging opportunities would not be impacted. Project design features are included to limit the potential effects to condors from disturbance or ingestion of micro trash. Thus, no effect to this species is expected from any of the alternatives.
Cultural Resources	NI	Livestock grazing has continued as an historic use of public lands for over 100 years in both allotments. The proposed renewal of grazing permits, in the absence of any construction of new range improvements (i.e., water developments, construction of new fence lines), would be within the scope of the historic livestock grazing use of the area and the impacts which have and are presently occurring and, therefore, would not constitute a potential adverse effect to cultural resources. Cultural resource inventories (intensive-level Class III inventories) have been and will be conducted prior to the implementation of any proposed ground disturbing treatment activities. All cultural resources would be avoided and treatment boundaries would be designed as such so as not to call out undue attention to these locations. In any of the alternatives described in this EA, the regulations found within the Native American Graves Protection and Repatriation Act (NAGPRA) would apply: *If in connection with allotment operations any human remains, funerary objects, sacred objects, or objects of cultural patrimony as defined in NAGPRA (P.L. 101-601, 104 Sat. 3048, 25 U.S.C. 3001) are discovered, the permittee shall stop use in the immediate area of the discovery, protect the remains and*

Resource	Determination	Rationale for Determination
		objects (see 43 CFR 10.4(b) and (c)), and immediately notify the Authorized Officer (see 43 CFR 10.4(g)). The permittee shall continue to protect the immediate area of the discovery until notified by the Authorized Officer that operations may resume. These regulations would not be waived and would be followed regardless of which alternative is selected, as this requirement would be included as a term and condition on the grazing permit.
Invasive, Non-native Species	NI	The two allotments are meeting Rangeland Health Standard 3 in regards to invasive and noxious weeds. Proper grazing use, which maintains stable plant communities, can help reduce invasive and noxious weed establishment. The majority of the public lands within the Lizard and Wolfhole Lake allotments are in a late seral stage, which is a stable condition. Scotch thistle, a noxious weed, is known to occur in the Wolfhole Lake Allotment. Halogeton, also a noxious weed, is known to the Lizard Allotment, but currently known only to occur in the Arizona State managed portion of the allotment. Known sites are monitored and treated to reduce spread; inspections and monitoring will continue, regardless of which alternative is selected, which will reveal any need to retreat and control as necessary. Cheatgrass is present in some areas across both of the allotments. Cheatgrass is not on the Arizona Noxious Weed list. However it can be a very invasive non-native grass species. Research by Douglas et al. (1990) and Hunter (1991) shows that cheatgrass readily invades areas that have not been disturbed and do not have livestock influence. Young and Evans (1978) speculated that removal of livestock would actually accelerate conversion to cheatgrass because of increased fuel accumulations and more frequent wildfires. Proper range practices can help prevent the spread of undesirable plant species (Sheley 1995). Sprinkle et al (2007) found that grazing exclusion does not make vegetation more resistant to invasion by exotic annuals. Reasons for this may include: 1) grazing may result in a more diverse age classification of plants due to seed dispersal and seed implementation by grazing herbivores, and 2) grazing removes senescent plant material, and if not extreme, helps open up the plant basal area to increase photosynthesis and rainfall harvesting (Holechek 1981). Loeser et al. (2007) reported that moderate grazing was superior to both grazing exclusion and high-impact grazing in maintaining plant diversity and in reducing exotic plant recruitment in a semiarid Arizona grassland. It is also important to note that removal of grazing by domestic livestock does not automatically lead to disappearance of cheatgrass (Young and Clements 2007). Proper grazing use which maintains stable plant communities (as is the case in the Lizard and Wolfhole Lake allotments) should minimize or have no effect on the spread of invasive non-native species. The renewal of the grazing permit and continued livestock grazing are therefore not anticipated to increase the rate at which invasive species are spread throughout the area. The combination of proper grazing management to reduce invasive and noxious weed establishment coupled with the ongoing treatment efforts, should minimize or have no effect on the spread of invasive non-native species in the two allotments.

Resource	Determination	Rationale for Determination
		As described in Sections 3.2.3 and 3.4.3, some portions of the Wolfhole Lake Allotment have overly dense overstories (either pinyon-juniper or sagebrush). These areas could be at a higher risk of invasion by noxious weeds and invasive species. Proposed treatments would open the canopies, which would result in more sunlight reaching the understory and an increase in soil moisture. This would allow understory vegetation (perennial grasses and forbs) to re-establish in these areas, thereby likely outcompeting cheatgrass over time since perennial native vegetation communities are a primary determinant of site resilience to disturbance and management treatments and/or resistance to cheatgrass and annual exotic forbs (Chambers, et al 2007; McGlone et al. 2010; Miller and Pellant 2014).
Wastes (hazardous or solid)	NP	No known hazardous or solid waste issues occur in these allotments, and the alternatives would not produce hazardous or solid waste. While motorized vehicles (which would be used to implement the vegetation treatments, and are used by the permittee for grazing management activities) involve use of petroleum products, which are classified as hazardous materials, there is nothing unique about the actions associated with the alternatives which could affect their use or risks associated with their use. No chemicals subject to reporting under Superfund Amendments and Reauthorization Act, Title III in an amount equal to or greater than 10,000 pounds would be used, produced, stored, transported, or disposed of annually in association with any of the alternatives. Furthermore, no extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities, would be used, produced, stored, transported, or disposed of in association with any of the alternatives.
Water Quality (drinking / ground)	NI	Site visits to the allotments (during rangeland health evaluations and subsequent monitoring) did not indicate that current livestock use is altering water quality – no surface water within the allotments is used for domestic drinking water. Thus, no effect to water quality is expected from the alternatives.
Wetlands / Riparian Zones	NP	Oak Spring and Wolfhole Spring are located within the Wolfhole Lake Allotment. Both springs are developed and designed to collect water – they are the primary water source for the allotment, and the associated water rights belong to the permittee. Development and use of surface water (including springs such as these) are regulated and permitted by the state of Arizona. Permittees constructed the water collection areas – the Arizona Standards and Guidelines provide an exemption to Standard 2 (Riparian/Wetland Sites) for "water facilities constructed or placed at a location for the purpose of providing water for livestock … and which have not been determined through local planning efforts to provide for riparian or wetland habitat." There is no riparian-obligate vegetation (such as willows, sedges, or cattails). Thus, these areas are not by definition wetland/riparian areas, and there are no other wetland/riparian areas within the allotment. No known seeps or springs occur within the Lizard Allotment.
Wild and Scenic Rivers	NP	There are no river segments within the allotments that are designated, eligible, or suitable as wild, scenic, or recreational under the Wild and Scenic Rivers Act.

Resource	Determination	Rationale for Determination
Wilderness	NP	There is no designated wilderness within the Lizard and Wolfhole Lake allotments.
Livestock Grazing	PI	Permit renewal is required to allow continued livestock use on the allotment; this issue is therefore analyzed in detail in this EA.
Woodland / Forestry	NI	There is a greenwood cutting area within the allotment – this area was delineated to provide an area close to St. George where people could cut firewood. Continued livestock use and the proposed vegetation treatments would not affect the availability of, or access to, these resources as the greenwood cutting area would remain. An economic assessment of the value of woodland/forestry products (fuel wood, timber, posts, etc.) within the treatment units has not been conducted. However, it is likely that the economic value of these resources is limited based on the remoteness of the area (i.e., distance from populated areas). For detailed discussion/analysis on impacts to pinyon-juniper woodlands, see the Vegetation sections of this EA.
Vegetation	PI	Grazing has a direct impact on vegetation resulting from the practice of grazing in which livestock eat and trample plants within the allotments. In addition, the shift in species composition from grass dominated sites to shrub or tree dominated ones in the Wolfhole Lake Allotment would continue unless vegetation treatments occur to reduce the sagebrush and pinyon-juniper dominance. Vegetation treatments have the potential to impact sagebrush and pinyon-juniper woodland communities through: (1) changes in productivity and species diversity; and (2) changes in overall ecological health. This issue is therefore analyzed in detail in this EA.
BLM or State Sensitive Plant Species	NP	There are no known BLM or State sensitive plant species present in these allotments based on a review of GIS data and professional knowledge of the allotments.
Wildlife (including sensitive species and migratory birds)	PI	Multiple sensitive animal species and migratory birds may occur within the Lizard and Wolfhole Lake allotments. Mule deer are known to occur in the allotments. Interactions with livestock and competition for forage could occur; this issue is therefore analyzed in detail in this EA. Pronghorn habitat occurs only at the southern end of the Wolfhole Lake Allotment (20 percent of the allotment) – this habitat is categorized as poor quality or low quality for the species. Pronghorn are not known to make more than minimal use of this allotment. No suitable habitat for pronghorn occurs within the Lizard Allotment. The southern end of the Lizard Allotment (the northeastern edge of Lizard Point) is considered suitable habitat for desert bighorn sheep (*Ovis Canadensis nelsoni*), although it is likely used on an infrequent basis. Consequently, the habitat within the Lizard Allotment was not included in the Virgin Mountains Wildlife Habitat Area. The only documented sightings of bighorn sheep in this area are near Lizard Spring (AGFD 2011), which is adjacent to (but outside of) the allotment. These species (pronghorn and bighorn sheep) are therefore not analyzed further in this EA.
Soil Resources	PI	Some soil disturbance occurs around water sites where livestock gather and trail. In addition, small bottom land areas of the allotment have soils that are sensitive to compaction. The potential for soil disturbance during vegetation treatments also exists. This issue is therefore analyzed in detail in this EA.
Recreation	NI	The Lizard and Wolfhole Lake allotments are within the Arizona Strip Extensive Recreation Management Area and receive custodial management for dispersed, unstructured recreation opportunities that focus only on

Resource	Determination	Rationale for Determination
		visitor health and safety, user conflict, and resource protection issues while maintaining the area's naturalness/remoteness. The Lizard and Wolfhole Lake allotments are considered to have recreation values for their geology, scenic viewsheds, and remoteness. Visitors to the allotments engage in a variety of recreation activities including sightseeing, horseback riding, hiking, camping, backpacking, canyoneering, hunting, rock collecting, photography, bird watching, nature study, and vehicle exploring. Recreational users are not known to be displaced by the presence of livestock on these allotments. While some users may be temporarily displaced during implementation of vegetation treatments and construction of water developments, these activities would be temporary. In addition, the size of the water developments would be very small when considering the large amount of similar landscape in the area. Thus, the alternatives are not expected to impact the availability of recreational opportunities within these allotments.
Visual Resources	NI	The Lizard and Wolfhole Lake allotments are designated as Visual Resource Management (VRM) Class III (with the exception of one small area – less than one acre – around a sand and gravel pit, which is VRM Class IV). The objective for Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. The objective for Class IV is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape in these areas can be high. Continuing livestock grazing as proposed would not affect visual resources. The proposed new range improvements may attract attention but would not dominate the view of the casual observer, so the existing character of the landscape would not substantially change. In addition, treatment boundaries would be irregularly shaped to minimize the level of change to the characteristic landscape, avoid creating obvious lines of extreme visual contrast, and avoid attracting the attention of the casual observer, resulting in the vegetation treatments meeting VRM objectives.
Geology / Mineral Resources / Energy Production	NI	Continuing livestock grazing would not alter geological features or mineral resources. Mineral exploration and mining occur in the Arizona Strip Field Office, but livestock grazing would not alter or impair the opportunities to explore for and develop mineral resources. There is no energy production on the Arizona Strip District.
Paleontology	NP	No paleontological resources are known to occur in the allotments.
Lands / Access	NI	A review of LR2000 and the Master Title Plats showed that the alternatives are compatible with existing land uses and authorized rights-of-way. There are no conflicts with other land use authorizations, and access to public lands would not be altered or impaired by implementation of the alternatives.
Fuels / Fire Management	NI	Vegetation treatments are proposed on approximately 38 percent of the Wolfhole Lake Allotment, which would reduce fuels (at least to some degree) in those areas. However, this effect would be minimal across the allotment as a whole. There are no vegetation treatments proposed in the Lizard Allotment,

Resource	Determination	Rationale for Determination
		which would not affect fire and fuels. Continued livestock use would not affect fire management, other than the continued reduction of some light fuels through livestock grazing. See vegetation section for further discussion on the effects to vegetation from livestock grazing and vegetation treatments.
Socio-economic Values	NI	The economic base of the Arizona Strip is mainly ranching with a few gypsum/selenite and uranium mines. Nearby communities are supported by tourism (including outdoor recreation), construction, mining activities, and light industry. The social aspect involves remote, unpopulated settings with moderate to high opportunities for solitude. Issuance of the grazing permit would allow the permittee to continue his grazing operation with some degree of predictability during the 10-year period of the term permit and would allow an historical and traditional use of the land to be maintained. The proposed action and alternatives would have no overall effect on the economy of the county since other industries and tourism/recreational uses are contributing increasing amounts to the economy of the region and cattle ranching is no longer a significant contributor. While there is the potential for periodic local job creation due to possible contracting of the vegetation treatments, this impact is not expected to result in more than a negligible to minor influence on local income or to the economy overall.
Wild Horses and Burros	NP	There are no wild horses or burros, or herd management areas, within either of the allotments.
Wilderness characteristics	NP	There are no areas managed to maintain the wilderness characteristics of naturalness, opportunities for solitude, and opportunities for primitive and unconfined recreation within either allotment.

3.4 Resources/Issues Brought Forward for Analysis

3.4.1 Livestock grazing

A grazing permit is issued for livestock forage produced annually on the public lands and is allotted on an AUM basis. An AUM is a unit of measurement indicating how much forage is eaten by a cow/calf pair in one month. The BLM does not control adjacent private lands owned by the permit holder. The livestock operator assumes grazing management responsibility with the intent to maintain or improve existing resources. Livestock are to be grazed on public lands only during the established season of use. If private land is used during different periods, it is the permittee's responsibility to keep livestock off the public land during non-grazing periods. The BLM retains the right to manage the public lands for multiple uses and to make periodic inspections to ensure that inappropriate grazing does not occur. If inappropriate grazing should occur, then the BLM would work with affected permittee to identify and prescribe actions to be taken that would return the allotment to compliance.

The Lizard Allotment is categorized as a management status "maintain" (M) allotment. The Arizona Strip Field Office RMP (BLM 2008a) defines maintain allotments as those in which:

a) Present range condition is satisfactory;
b) The allotment has high or moderate resource potential and is producing near its potential (or trend is moving in that direction);
c) No serious resource-use conflicts/controversy exists;
d) Opportunities may exist for positive economic return from public investments; and

e) Present management is satisfactory.

The Wolfhole Lake Allotment is categorized as a management status "improve" (I) allotment. The Arizona Strip Field Office RMP (BLM 2008a) defines improve allotments as those in which:

a) Present range condition is unsatisfactory;
b) Allotments have high to moderate resource production potential and are producing at low to moderate levels;
c) Serious resource-use conflicts/controversy exists;
d) Opportunities exist for positive economic return from public investments; and
e) Present management appears unsatisfactory.

As shown in Table 3.3, land ownership in the Lizard and Wolfhole Lake allotments consists primarily of Federal land with some State and private land also included.

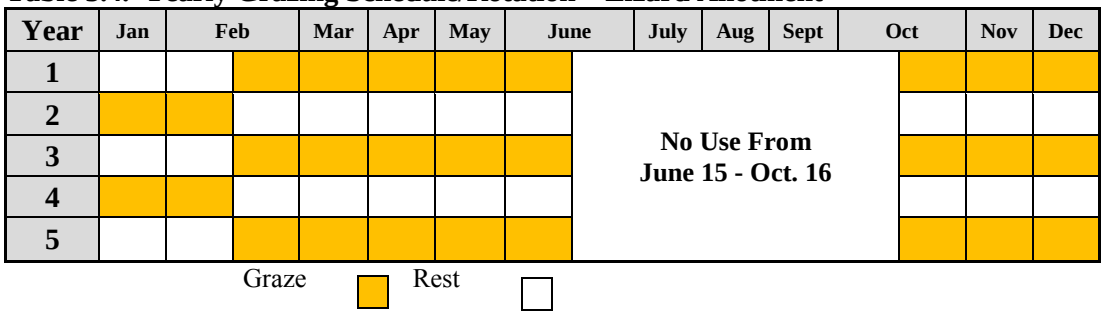
Table 3.3. Land Ownership

Ownership	Lizard Allotment	Wolfhole Lake Allotment*
Federal	4,198 acres	12,590 acres
State	9,248 acres[10]	0 acres
Private	0 acres	640 acres
Total	13,446 acres	13,230 acres

*These acres are from the Rangeland Administration System (RAS) database. Analysis throughout this document utilizes GIS and the acreage depicted in GIS differs slightly from RAS.

The Lizard Allotment is located in Arizona, immediately adjacent to the Utah state line, approximately six miles south of St. George, Utah (see Figure 1 in Appendix A). The allotment is made up of two pastures – one on Arizona State land and one on BLM-administered land. The BLM-administered pasture is fenced separate from the pasture on State land. The allotment is used in a two pasture deferred rotation system (see Table 3.4). The state land pasture (northern) is fenced for separation from the federal pasture (southern). Under this system, the federal pasture is grazed eight months out of each 24 month cycle. During each cycle it receives one 12-month period of rest and one 4-month period of rest. This system provides summer deferment every year and ensures one spring deferment every other year.

Table 3.4. Yearly Grazing Schedule/Rotation – Lizard Allotment



[10] This acreage figure is different than that listed in the Arizona Strip Field Office RMP, Appendix D, and is based on updated acreages generated from Global Information system (GIS) data.

The Wolfhole Lake Allotment is located approximately 20 miles south of St. George, Utah (see Appendix A, Figure 1). This allotment is approved for yearlong grazing use. However, the allotment has been incorporated as a pasture within the Lizard AMP area, which combines grazing use on the Wolfhole Lake, Lizard, and Blake Pond Allotments (all the same permittee). This system has been in place for the past 29 years. The Wolfhole Lake Allotment is used as a stopover for the herd if they are trailing to the Blake Pond Allotment (typically used for 1 to 1½ months in May and June). At the end of the summer grazing season, cattle trailing from the upper pastures of Blake Pond again use Wolfhole Lake (the Wolfhole Lake Chaining Pasture) as a stopover during the return trip to the lower pastures of Blake Pond and Lizard Allotments. This use normally occurs in December (see Table 3.5). Wolfhole Lake can be used at other times as well since it is approved for yearlong use. For example, if drought conditions have affected water availability on Blake Pond Allotment, then Wolfhole Lake is used during the summer grazing season.

Table 3.5. Yearly Grazing Schedule/Rotation – Wolfhole Lake Allotment

Year	Jan	Feb		Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
South Pasture								Typical Non Use From June 15 – Nov. 30					
Chaining Pasture													

Graze Rest

Actual use is submitted by the permittee annually to reflect the number of livestock, pasture rotation, and season of use for that grazing year. AUMs are calculated from the actual use reports, as well as billing for grazing on public lands. Actual use within the Lizard Allotment has varied between 20 percent and 47 percent in the past decade (2007-2016) with an average for that time period of 35 percent; Wolfhole Lake Allotment for the same period has varied between 4 and 37 percent with an average actual use of 18 percent. Non-use reflects seasonally dry periods, drought years, or other factors which in the Wolfhole Lake includes pinyon-juniper and sagebrush encroachment discussed in the Vegetation section (below). Actual use tables for each allotment can be found in Appendix D. Utilization as well as compliance checks are conducted throughout the grazing season.

3.4.1.1 Range Improvements

The Lizard and Wolfhole Lake allotments contain a number of structural range improvements, as shown in Appendix A, Figure 2 and Figure 3 (respective) for locations. These range improvements consist of fences, water troughs, reservoirs, and a corral.

3.4.2 Vegetation

Plants live in ecosystems full of herbivores that range from small insects to large grazing animals. Losing leaves or stems to herbivores is a common event in the life of a rangeland plant. For rangeland plants to remain healthy and productive, enough vegetation must remain after grazing so that plants can photo-synthesize and manufacture energy to produce more leaves, stems, and seeds. Plants also need to produce and store energy as starches and sugars in roots and crowns to successfully start the next season of growth. Only when too much of the plant is removed does the plant suffer in a way that yields lasting detrimental effects. Substantial damage to rangeland plants generally only occurs under repeated and heavy grazing.

The impact of grazing on plant growth depends greatly on when the grazing occurs during the growing season and at what stage of the plant's life cycle. Plants are generally less damaged by grazing early in the

season when time, soil moisture, and nutrients needed for regrowth are abundant. Plants are most likely to be damaged by grazing when the plant is beginning to produce flowers and seeds. At this time, the plant has high energy demands to produce seeds, complete growth for the season, and store energy to get through the dormant season. Plus, this generally occurs at the peak of summer when the environment is hot and dry and not favorable for regrowth. Once the plant produces seeds and turns brown (i.e., begins to senesce and becomes dormant), it is no longer sensitive to grazing. At this time, the leaves are not photosynthesizing and are no longer being used by the plant (University of Idaho 2011).

Healthy diverse plant communities exist on the allotments. Endemic plant species, including native grasses (such as squirreltail, galleta, blue grama, dropseed, Indian ricegrass, and needle-and-thread) and native shrubs (such as creosote, sagebrush, wolfberry, cliffrose, bursage, Mormon tea, and fourwing) are present. Current dominant vegetation types were determined and mapped during an ecological site inventory of the allotments.

The Lizard and Wolfhole Lake allotments have two distinct ecological zones and vegetation types. As stated previously, the Lizard Allotment is lower elevation ranging from approximately 3,000 feet to 4,600 feet. The allotment is within the Mojave Desert Ecological Zone; vegetation consists of a desert shrub grass land type. The major current dominant vegetation types within this allotment include creosote/bursage and Mojave mixed shrub (see Table 3.6).

Table 3.6. Lizard Allotment Dominant Vegetation Types

Vegetation Type	Total Acreage	Percent of Allotment
Creosote/Bursage	10,818	80
Mojave Mixed Shrub	2,627	20
Great Basin Blackbrush	1	<1

The majority of the Wolfhole Lake Allotment is higher elevation and typical of the Great Basin and Colorado Plateau physiographic provinces with elevations ranging from 4,960 feet to over 6,200 feet. The allotment contains scattered sagebrush hills and draws, with the majority of the allotment containing thick pinyon/juniper stands and scattered cliffrose. Dominant vegetation within the Wolfhole Lake Allotment primarily consists of pinyon-juniper, Wyoming big sagebrush, and blackbrush. For more information on vegetation communities in the Wolfhole Lake Allotment, see Table 3.7 (below) and Figure 8 in Appendix A.

As described in Section 3.2.3, the ecological site inventory and trend data show that the vegetative communities in the Wolfhole Lake Allotment are stable and ecological conditions are functional. However, based on the ESD, the plant functional groups are shifting to a more shrub-dominated system with less understory. An ecological site is distinctive kind of land with specific soil and physical characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation, and in its ability to respond similarly to management actions and natural disturbances. Unlike vegetation classification, ecological site classification uses climate, soil, geomorphology, hydrology, and vegetation information to describe the ecological potential of land areas. A particular ecological site may feature several plant communities (described by vegetation classification) that occur over time and/or in response to management actions. The ESD describes site potential, as well as state and transition models. These models take in to account disturbance, which may include wildfire or fire exclusion, and other land practices including grazing. The shrub dominance is described as one of the state and transition models for this ESD and is primarily attributed to fire exclusion. As these areas have a

potential for spread of cheatgrass under prescribed fire or wildfire introduction, mechanical vegetation treatments are favored to mimic historic wildfire. The shrub and tree dominance will likely continue at these sites unless vegetation treatments are implemented to reduce the cover and competition from sagebrush and pinyon/juniper trees. Vegetation treatments would be focused in primarily the Loamy Upland 10-14" p.z. Ecological Site, which is the dominant site by acreage in the allotment. The dominant cover of this site historically would be a mixture of warm and cool season perennial grasses (70-80 percent) with a small amount of shrubs including Wyoming big sagebrush (5-15 percent), small amount of perennial forbs (5-10 percent) with occasional pinyon and juniper (5 percent or less) (NRCS 2019).

Table 3.7. Wolfhole Lake Allotment Current Dominant Vegetation Types*

Vegetation Type	Total Acreage	Percent of Allotment
Sagebrush	560	4
Pinyon-Juniper (PJ)	6,862	51
PJ-Sagebrush	5,905	44

* Analysis throughout this EA is conducted with GIS acreage; this may differ slightly with Rangeland Administration System (RAS) acreage, such as shown in Table 3.3.

Management of the allotments is based on a selection of key species. These species are selected for their similarity to other grasses and browse species that occur in the allotment. The definition of key species is: (1) forage species of sufficient abundance and palatability to justify its use as an indicator to the *degree of use* of associated species; and (2) those species which must, because of their importance, be considered in the management program. Key species for the allotments are:

Lizard Allotment

Warm season grasses
Big galleta — *Pleuraphis rigida*
Sand dropseed — *Sprorobolus cryptandrus*

Cool season grasses
Indian ricegrass — *Achnatherum hymenoides*

Browse
Mormon tea — *Ephedra nevadensis*
Winterfat — *Krascheninnikovia lanata*

Wolfhole Lake Allotment

Cool season grasses
Indian ricegrass — *Achnatherum hymenoides*
Squirreltail — *Elymus elymoides ssp. elymoides*
Needle and thread — *Stipa comata*
Wheatgrass — *Agropyron spp.*

Warm season grasses
Galleta — *Pleuraphis jamesii*
Sand dropseed — *Sporobolos cryptandrus*

Browse

Mormon tea	*Ephedra nevadensis*
Cliffrose	*Purshia mexicana*

Table 3.8. Phenological Development of Key Species for the Lizard and Wolfhole Lake Allotments

Key Species	Begin Growth	Flowering	Seed Ripe	Seed Dissemination
Fourwing saltbush	3/15-4/01	6/01 – 6/15	10/15 – 11/01	11/15 – 12/01
Winterfat	3/01-4/15	3/15 – 6/15	8/01-9/15	10/01 – 12/01
Mormon tea	3/1-5/01	5/15-7/15	7/15-9/15	10/01 – 12/01
Cliffrose	4/01	5/15	7/01	8/01
Wheatgrass	3/15	5/15 – 6/15	7/01 – 7/15	8/01 – 8/15
Needle and thread	03/1-03/15	5/15	07/01	08/01
Prairie junegrass	3/15	5/15 – 6/15	7/01 – 7/15	8/01 – 8/15
Indian ricegrass	2/15-3/15	5/01 – 6/15	7/01 – 7/15	8/01 – 8/15
Squirreltail	2/15-3/01	5/15 – 6/01	6/15 – 7/01	7/15 – 8/01
Sand dropseed	4/15	5/20	7/15	8/30
Black grama	5/01-6/01	8/01	9/15	10/15
Blue grama	5/01-6/01	8/01	9/15	10/15
Galleta	3/15-5/01	5/01-6/01	7/15 – 9/01	8/15 – 10/15

*Dates vary based upon yearly fluctuations in specific climatic conditions and elevation

3.4.3 Wildlife, Including Big Game, Migratory Birds, and Sensitive Species

3.4.3.1 Big Game

Mule Deer (*Odocoileus hemionus*)

Mule deer can be found throughout most of the Arizona Strip, and they occur in a wide variety of habitat types. Although vegetative communities vary throughout the range of mule deer, habitat is nearly always characterized by areas of thick brush or trees interspersed with small openings. The thick brush and trees are used for escape cover whereas the openings provide forage and feeding areas. Mule deer often bed in juniper thickets, Gambel oak stands, or other shrubby areas. Mule deer inhabit several habitat types on the Arizona Strip including ponderosa pine, pinyon-juniper, sagebrush, chaparral, riparian corridors, and steep canyons. They are rarely found in low-elevation desert scrub habitats.

Concentrations of mule deer on the Arizona Strip occur on Black Rock and Poverty Mountains, on Mt. Trumbull, in the Buckskin Mountains, and in the Kanab Creek area. The allotment occurs within AGFD Game Management Unit (GMU) 13B. The mule deer population in this unit exists at low densities: in some areas less than 1 per square mile. The population, while not at levels attained in the 1970s, has shown signs of growth in recent years. The Black Rock Mountain area and southern portions of GCPNM have historically contained the highest densities of mule deer in 13B (AGFD & BLM 2015). The mule deer population in 13B is estimated to be at 2,064 after the most recent surveys conducted in 2017.

GMU 13B contains few perennial water sources. Natural springs do exist and many have been developed for livestock use. The Virgin River (outside the boundaries of these two allotments) provides a perennial source of water in most years, but because of its low elevation and isolation in the extreme northwest portion of the unit, provides limited benefit to mule deer. Much of the water availability in the unit is from stock tanks, livestock developments, and water catchment facilities. Currently there are 2 wildlife catchments and 10 livestock water sources in the Wolfhole Lake Allotment and 7 livestock waters on the Lizard Allotment (see Figures 3 and 4 in Appendix A).

The AGFD has categorized habitat characteristics for mule deer on the Arizona Strip. Habitat categories are based on several factors such as topography, forage and cover, availability of water, and limiting factors such as prohibitive fencing. Habitat categories for the allotment are listed in Table 3.9. AGFD considers the mule deer population across the Arizona Strip to be stable and increasing. Mule deer are present in both allotments year-round, although they exist in the Lizard Allotment in low densities due to its location in the Mojave Desert Ecological Zone.

Table 3.9. Mule Deer Habitat Categories

Habitat Category	Wolfhole Lake Acres (Percentage)	Lizard Acres (Percentage)
Summer Crucial	50 (0.4%)	0
Summer	8,894 (67.2%)	0
Yearlong	4,384 (33.1%)	1,242 (9.2%)
Winter crucial	0	0
Limited	0	12,204 (90.8%)

3.4.3.2 Migratory Birds

The Migratory Bird Treaty Act of 1918 protects against the take of migratory birds, their nests, and eggs, except as permitted. An MOU between the BLM and USFWS states that the BLM shall: "At the project level, evaluate the effects of the BLM's actions on migratory birds during the NEPA process, if any, and identify where take reasonably attributable to agency actions may have a measurable negative effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors. In such situations, BLM will implement approaches lessening such take." (BLM and USFWS 2010)

The USFWS is mandated to identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act. The USFWS *Birds of Conservation Concern 2008* (USFWS 2008) is the most recent effort to carry out this mandate. Bird species considered for the Birds of Conservation Concern include nongame birds, gamebirds without hunting seasons, subsistence-hunted nongame birds in Alaska, ESA candidate, proposed, and recently delisted species. Birds of Conservation Concern found on the Arizona Strip within the habitat types of the Lizard and Wolfhole Lake allotments is summarized in Table 3.10.

Table 3.10. Birds of Conservation Concern Associated with Lizard and Wolfhole Lake Allotments

Species	Habitat Type
Prairie Falcon	Typically occupy drier and more open country than peregrine falcons, but there is some overlap in habitat. Cliff faces are used for nesting. Found year-round on the Arizona Strip in low numbers.
Gray Vireo	Considered a pinyon-juniper obligate and found in pinyon-juniper forest during the breeding season. Often associated with a low woody shrub layer. Fairly common on the Arizona Strip.
Juniper Titmouse	Considered a pinyon-juniper obligate and a year-round resident of pinyon-juniper forests. Typically nests in cavities found in juniper trees. Common on the Arizona Strip.
Brewer's Sparrow	Breeds in sagebrush shrublands, but typically only nests on the Arizona Strip during years of high winter precipitation, otherwise breeding occurs further north. Fairly common in large migrating flocks in spring and fall, otherwise uncommon on the Arizona Strip.
Cassin's Finch	Small flocks sporadically occur in pinyon-juniper woodlands during the non-breeding season. Found in higher elevation habitat types such as ponderosa pine during the breeding season. Uncommon on the Arizona Strip.
Black-chinned Sparrow	Breeds in the chaparral habitat type within rocky canyons, especially where tall shrubs are present. Fairly common on the west side of the Arizona Strip within its habitat type.
Bendire's Thrasher	Favors open habitat with scattered yucca, cholla cactus, or cliffrose. An uncommon breeder on the Arizona Strip.
Costa's Hummingbird	Found in Mojave desert scrub and associated xeroriparian drainages, usually below 3,300 feet in elevation.
Ferruginous Hawk Golden Eagle Peregrine Falcon Burrowing Owl Pinyon Jay	These species are also designated as BLM Sensitive Species and are addressed in Section 3.4.4.3

3.4.3.3 Sensitive Species

Sensitive species are usually rare within at least a portion of their range. Many are protected under certain state and/or federal laws. Species designated as sensitive by the BLM must be native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either:

1. There is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range; or

2. The species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk.

All federally-designated candidate species, proposed species, and delisted species in the 5 years following delisting are included as BLM sensitive species. Based on occurrence records and monitoring data, the sensitive species that may occur within the allotments and that may be affected by actions proposed in one of the alternatives are displayed in Table 3.11.

Table 3.11. Sensitive Species Associated with the Lizard and Wolfhole Lake Allotments

Species	Potential for Occurrence Wolfhole Lake	Potential for Occurrence Lizard
Allen's Big-eared Bat (*Idionycteris phyllotis*)	Potential	Potential
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	Potential	Potential
Greater Western Mastiff Bat (*Eumops perotis californicus*)	Potential	Potential
Spotted Bat (*Euderma maculatum*)	Potential	Potential
American Peregrine Falcon (*Falco peregrinus*)	Verified	Potential
Golden Eagle (*Aquila chrysaetos*)	Verified	Verified
Ferruginous Hawk (*Buteo regalis*)	Verified	Potential
Northern Goshawk (*Accipiter gentilis*)	Potential	Not present
Western Burrowing Owl (*Athene cunicularia hypugea*)	Verified	Potential
Pinyon Jay (*Gymnorhinus cyanocephalus*)	Verified	Not present
Monarch Butterfly (*Danaus plexippus*)	Potential	Potential

Additional sensitive species may also occur within the allotments. However, it has been determined that these species would not be affected by actions proposed in this EA. These species are therefore not addressed further in this document. Table 5.1, in Appendix E, lists the sensitive species that will not be discussed in further detail, along with the rationale for their exclusion from further analysis. Additionally, impacts to sensitive species found outside the allotments were not analyzed.

Allen's Big-eared Bat (*Idionycteris phyllotis*)

Allen's big-eared bat usually inhabits forested areas of the mountainous southwest and is relatively common in pine-oak forested canyons and coniferous forests; however, it also may occur in non-forested, arid habitats. At most sites where this species occurs, cliffs, outcroppings, boulder piles, or lava flows are found nearby. Day roosts may include rock shelters, caves, trees and mines. Their elevational distribution ranges from 1,320 to 9,800 feet, and their main food source is small moths gleaned from surfaces or in flight (AGFD 2001). These bats are known to use stock ponds as water and food sources but are theorized as too large-bodied to drink from water catchments (Herder 1996).

The allotments contain pinyon-juniper woodlands and semi-arid habitats that occur near lava flows, cliffs, and outcroppings. Allen's big-eared bats are found throughout the Arizona Strip and likely occupy the allotments. The presence of livestock reservoirs in the allotments may attract Allen's big-eared bats for drinking and foraging opportunities.

Townsend's Big-eared Bat (*Corynorhinus townsendii*)

In Arizona, summer day roosts are found in caves and mines from desert scrub up to woodlands and coniferous forests. Night roosts may often be in abandoned buildings. In winter, they hibernate in cold caves, lava tubes and mines mostly in uplands and mountains from the vicinity of the Grand Canyon to the southeastern part of the state (AGFD 2003a). These bats prefer to hang from open ceilings in caves or mines and do not use crevices.

Townsend's big-eared bats are found throughout the Arizona Strip and likely occupy the allotments, especially those areas that are located in pinyon-juniper woodlands (Sherwin et al. 2000). The presence of livestock reservoirs may attract Townsend's big-eared bats for drinking and foraging opportunities.

Greater Western Mastiff Bat (*Eumops perotis californicus*)

These bats are found in desert scrub near cliffs, preferring rugged rocky canyons with abundant crevices. They prefer crowding into tight crevices a foot or more deep and two inches or more wide. Colonies prefer crevices even deeper, to ten or more feet. These bats prefer to wedge themselves in the backs of cracks or crevices where they narrow down considerably. Entrances to roosting crevices are usually horizontal but facing downward which facilitates entry and exit (AGFD 2002b). They are known to forage at least 15 miles from the nearest likely roosting sites.

Potential suitable roosting sites may be found within the allotments within cliff faces and rocky outcrops. The presence of livestock reservoirs may attract greater western mastiff bats for drinking and foraging opportunities, especially given the long distances they travel from roost sites.

Spotted Bat (*Euderma maculatum*)

Spotted bats are found from low desert in southwestern Arizona to high desert and riparian habitats in northwestern Arizona and Utah to conifer forests in northern Arizona and other western states. They are found in desert scrub, riparian, pinyon-juniper, and montane coniferous forests at elevations up to 8,670 feet. They roost in small cracks found in cliffs and stony outcrops. They forage on large flying insects, primarily moths (AGFD 2003b).

The Wolfhole Lake Allotment contains extensive pinyon-juniper woodlands as well as numerous high cliffs and rocky outcrops which may provide suitable roosting habitat. Spotted bats have been captured within 3 miles of the Lizard Allotment. The presence of livestock reservoirs may attract spotted bats for drinking and foraging opportunities.

American Peregrine Falcon (*Falco peregrinus anatum*)

Peregrine falcons utilize areas that range in elevation from sea level to 9,000 feet and breed wherever sufficient prey is available near cliffs. Preferred habitat for peregrine falcons consists of steep, sheer cliffs that overlook woodlands, riparian areas, and other habitats that support a high density of prey species. Nest sites are usually associated with water. In Arizona, peregrine falcons now occur in areas that had previously been considered marginal habitat, suggesting that populations in optimal habitats are approaching saturation (AGFD 2002a). Nesting sites, also called eyries, usually consist of a shallow depression scraped into a ledge on the side of a cliff. Peregrine falcons are aerial predators that usually kill their prey in the air. Birds comprise the most common prey item, but bats are also taken (AGFD 2002a). Potential nesting habitat is found along the steep cliff faces and canyons found within both allotments.

Golden Eagle (*Aquila chrysaetos*)

Golden eagles are typically found in open country, prairies, arctic and alpine tundra, open wooded country and barren areas, especially in hilly or mountainous regions. Black-tailed jackrabbits and rock squirrels are the main prey species taken (Eakle and Grubb 1986). Carrion also provides an important food source, especially during the winter months. Nesting occurs on rock ledges, cliffs, or in large trees. Several alternate nests may be used by one pair and the same nests may be used in consecutive years or the pair may shift to an alternate nest site in different years. In Arizona they occur in mountainous areas and vacate desert areas after breeding. Nests were observed at elevations between 4,000 and 10,000 feet. Nests are commonly found on cliff ledges; however, ponderosa pine, junipers, and rock outcrops are also used as nest sites. Golden eagles forage over a large area and utilize the allotment for hunting and scavenging. Potential nesting sites are found along the steep cliff faces found within both allotments.

Ferruginous Hawk (*Buteo regalis*)

Ferruginous hawks are large hawks that inhabit the grasslands, deserts, and open areas of western North America – they are the largest North American hawk and are often mistaken for eagles due to their size. Ferruginous means "rusty color" and refers to the bird's colored wings and legs. During the breeding season, they prefer grasslands, sagebrush, and other arid shrub country. Nesting occurs in trees or utility poles surrounded by open areas. Mammals generally comprise 80 to 90 percent of the prey items or biomass in the diet with birds being the next most common mass component.

Ferruginous hawks are known to use open areas within the allotments, especially during the winter when they are fairly common. Nesting habitat is available but limited to areas within the Wolfhole Lake Allotment where lone trees are located among wide areas of open country.

Northern Goshawk (*Accipiter gentilis*)

In Arizona, northern goshawks are found in coniferous forests in the northern, north-central, and eastern parts of the state at elevations ranging between 4,750 to 9,120 feet (AGFD 2003c). Goshawks in montane areas may winter on or near their home ranges or descend to lower elevations in woodlands, riparian areas, or scrublands (Reynolds et al. 1992). Northern goshawks generally nest in stands of mature trees with a home range of up to 6,000 acres which includes a nest area of 30 acres, a post-fledgling family area of 420 acres (also considered the defended territory), and a foraging area of 5,400 acres (Reynolds et al. 1992). On the Arizona Strip, goshawks most frequently occupy ponderosa pine forests. Their nest sites are typically located on northerly slopes with canopy cover of 50% or greater (Reynolds et al. 1992). Goshawks are opportunistic hunters that prey on a variety of birds and small mammals. Their main prey habitat attributes include snags, downed logs, woody debris, large trees, openings, and herbaceous and woody understories. While ponderosa pine stands may be preferred, nests have been documented in pinyon-juniper woodlands with high canopy cover on the Dixie National Forest in Utah (Johansson et al. 1994) and in northwestern Colorado (Slater and Smith 2010). The pinyon-juniper woodlands in the Wolfhole Lake Allotment may contain suitable nest sites for goshawks as well as components desirable for foraging or winter use, although surveys for this species across the Arizona Strip have identified no goshawks in or near this allotment.

Western Burrowing Owl (*Athene cunicularia hypugea*)

Burrowing owls occupy a wide variety of open habitats including grasslands, deserts, or open shrublands. Burrowing owls do not dig their own burrows and must rely on existing burrows dug by prairie dogs, ground squirrels, badgers, skunks, coyotes, and foxes but will also use manmade and other natural

openings. Nest-site fidelity is high and burrows are often reused for several years if not destroyed (Haug et al. 1993). Moderate grazing can have a beneficial impact on burrowing owl habitat by keeping grasses and forbs low (MacCracken 1985) but the control of burrowing rodent colonies in grazed areas is believed to be an important factor in the burrowing owl's decline (Desmond and Savidge 1996). Burrowing owls can be generally tolerant of some human presence, often nesting in close proximity to urban or suburban areas in agricultural fields, vacant lots, golf courses, or areas cleared for construction (AGFD 2009). Burrowing owls are infrequently encountered on the Arizona Strip, likely due to the lack of prairie dog or other large rodent colonies. Burrowing owl habitat is present in the allotments, but nesting attempts have not been documented.

Pinyon Jay (*Gymnorhinus cyanocephalus*)

The pinyon jay is a medium-sized corvid that inhabits much of the intermountain west and is particularly associated with pinyon-juniper ecosystems. Pinyon jays are highly social birds that nest communally and form large flocks that may number into the hundreds. Pinyon jays harvest seeds of pinyon pine, and to a lesser extent ponderosa and limber pine, during the fall and cache these seeds for use in late winter and early spring when other food sources are scarce (Balda & Bateman 1971). Caches are often located in areas that receive little snow, such as under pine and juniper tree crowns or on south slopes where snow melts early, allowing the caches to be accessible during late winter and early spring (Wiggins 2005). Spatial memory is highly developed in pinyon jays and cache relocation is efficient and reliable (Stotz & Balda 1995). Seeds that are not relocated and consumed will often germinate and contribute to pinyon pine regeneration.

Pinyon jay habitat preferences include mosaics of large tracts of pinyon-juniper woodlands especially those areas that contain large, mature, seed-producing pinyon pines, and relatively open structure with mixed shrubs (especially sagebrush) and grasses (Gabaldon 1979, Latta et al. 1999). One nesting colony of pinyon jays typically requires an area of about 230 acres for nesting and about 5,120 acres for total home range (Balda & Bateman 1971). Pinyon jays place nests in roughly equal proportions in pinyon and juniper trees and usually select trees that are substantially taller and larger in diameter when compared to random plots (Johnson et al. 2015). Pinyon-juniper woodlands are extensive in the Wolfhole Lake Allotment and likely support multiple nesting colonies of pinyon jays. Although nests have not been documented, the presence of fledglings in large flocks seen in the allotment indicate that successful breeding does occur.

Monarch Butterfly (*Danaus plexippus*)

Monarch butterflies breed throughout the United States, absent only from the forests of the Pacific Northwest. Breeding densities are highest from the east coast to the Great Plains, with typically low densities in the western states. Migration corridors are found east of the Rocky Mountains, in the Great Basin, and within California. Wintering areas are located along the California coast and in Mexico (Jepsen et al. 2015). Over the past 20 years a 90% decline in wintering monarchs has been detected in Mexico along with a 50% decline noted in California, leading to a petition for listing under the Endangered Species Act. The USFWS found that the petition presented substantial scientific or commercial information indicating that the petitioned actions may be warranted and is currently reviewing the status of the species (USFWS 2014).

Monarch larvae feed exclusively on 27 species of milkweed which can be found in a variety of habitats such as rangelands, agricultural areas, riparian zones, wetlands, deserts, and woodlands. In the western U.S. the two most important larval food sources are narrow-leaved milkweed (*Asclepias fascicularis*) and

showy milkweed (*A. speciosa*). Adult monarchs forage on a wide variety of flowering plants for nectar during migration periods (Brower et al. 2006). Monarchs may breed in low numbers within the allotments, although documentation is lacking. Milkweed species are present, including showy milkweed. Migrating monarchs have been observed on the Arizona Strip in the fall in areas outside of the allotments.

3.4.4 Soils

Lizard Allotment

Except for the floodplains, most of the soils on the allotment are shallow gravelly sandy loams over caliche hardpans, shale or basalt. The dominant soil type within this allotment is Sandy Loam Upland 6-9" average annual precipitation. The shallow soils have slight to moderate compaction, but most are well below root restricting bulk density. A silty floodplain (Atkinville Wash) on the east side of the allotment has moderate to strong compaction in some areas and has a few old gullies and rills, some of which are due to channeling on trails. The floodplains are occasionally scoured by intense thunder storm runoff. Very little unnatural sheet or rill erosion is evident on the rest of the soils, likely due to mostly gentle and undulating slopes, low precipitation, high infiltration rates of the sandy soils, some litter, and surface gravels of 25 to 60 percent. Cryptogamic cover is common, especially on the gypsic soils. Field assessments have not indicated any significant areas of impacts detrimental to soils or vegetation. Detailed information on soils in the Lizard Allotment can be found in the land health evaluation report (BLM 2011).

Wolfhole Lake Allotment

Two soil types dominate this allotment, the first is Loamy Upland 10-14" annual average precipitation. Soils grouped into this ecological site are generally deep to very deep, but may be moderately deep to any plant root restricting layer. The soil surface texture ranges from very fine sandy loam to light sandy clay loam. Subsurface horizon textures are generally loam or clay loam, but range from sandy loam to clay. The soil surface may be slightly effervescent[11]. Subsurface horizons range from slightly to strongly effervescent. Soil reaction is neutral to moderately alkaline (pH 7.0-8.4). Water erosion hazard is moderate to severe. The second dominant soil type is Basalt Slopes 13-17" average annual precipitation. This type typically supports a grass dominated plant community, but with fire exclusion may degrade to shrub dominated community (NRCS 2017).

Platy, physical surface crusts have reduced the infiltration rates and have increased runoff from the stream terrace Radnik soil. The physical properties of this soil make it highly susceptible to compaction. Soil samples were taken from the structurally altered (platy or subangular blocky to massive), compacted, near surface layers in this area and tested for texture and bulk density (Db). Percent change from normal near-surface bulk density for those textures and the differences in porosity were noted. Erosion is minimal to moderate in most drainages, but the soils are at risk of severe erosion if ground cover is lessened. Excessive runoff from the surrounding tree dominated fan terraces is exacerbating the erosion problems along the drainages. Soils data (sampling and testing) shows that the Radnik floodplain soils have slight to moderate compaction, but well below root restricting levels. Runoff would be increased if current ground cover is not maintained (BLM 2013).

[11] Effervescence is the reaction of the soil to 10% hydrochloric acid (out of a dropper bottle). This is a way to quantify the alkalinity properties of a soil for seed mixes (you would want species that can tolerate alkaline/higher pH soils).

Chapter 4

ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

The potential consequences or effects of each alternative are discussed in this chapter. Only the impacts that may result from implementing the alternatives are described in this EA. If an ecological component is not discussed, it is because BLM resource specialists have considered effects to the component and found the alternatives would have minimal or no effects (see Table 3.2). The intent of this analysis is to provide the scientific and analytical basis for the environmental consequences. General effects from projects similar to the proposed action are also described in the Arizona Strip Proposed Plan/Final EIS (BLM 2007a).

4.2 Livestock Grazing

4.2.1 Impacts of Alternative A – No Action

The no action alternative would affect the livestock grazing permittee on the Lizard and Wolfhole Lake allotments by renewing the term grazing permit. This action would maintain the current level of livestock grazing authorized for the permittee for an additional ten years, which would result in a continued viable ranching operation for the livestock operator, and provide some degree of stability for the permittee's livestock operation. Permit renewal would partially meet the purpose and need for action identified in Chapter 1 of this EA – to provide for livestock grazing opportunities on public lands where consistent with meeting management objectives, and to respond to applications to fully process and renew permits to graze livestock on public land.

However, management objectives of meeting Arizona Rangeland Health Standards in the Wolfhole Lake Allotment, particularly Standard 3, would be at risk (Lizard Allotment is meeting Rangeland Health Standards). Wyoming big sagebrush and pinyon-juniper would continue to encroach into sites where historically they did not persist due to natural disturbance such as wildfire. This would continue to impede and eliminate understory vegetation including perennial grasses and forbs (see Section 4.3 for more detailed discussion on impacts to vegetation). The Wolfhole Lake Allotment would continue to not meet Arizona Rangeland Health Standard 3 due to loss of understory. Forage quantity and quality for livestock would continue to diminish as increasing shrub and tree canopy closure decreases understory vegetation biomass, diversity, and vigor.

4.2.2 Impacts of Alternative B – Proposed Action

This alternative would directly affect the livestock grazing permittee on the Lizard and Wolfhole Lake allotments. A new term grazing permit would be issued for a ten year term. However, implementation of this alternative could have a short-term effect on the permittee due to a mandatory rest period of the treatment areas. Treatments in this allotment would occur on a per pasture basis, so the entire pasture would be unavailable for approximately two years once treatment is implemented. The rest period is necessary to ensure the establishment, protection and long-term viability of the vegetation treatment projects. The required rest period would vary, depending on the method of treatment. All treatments would generally require a minimum two growing season rest period. The rest period may be shortened if

BLM monitoring indicates that site restoration objectives are achieved in a shorter period of time, or it may be extended pending the rate of progress toward vegetative establishment. Seed germination, drought-related influences, wildland fire, or other natural unforeseen events could affect the rate of vegetative establishment. This would disrupt the permittee's typical rotation and require further trailing or trucking to available pastures or private pasture land. However, under this alternative, three additional pastures would be created in the Wolfhole Lake Allotment, for a total of four functional pastures[12] with available water. The additional pastures would allow for treatments without complete non-use of the allotment, which could reduce the impacts to the permittee. The new term grazing permit would authorize the same number of AUMs as the current permit, although the permittee would continue to run the current actual use in this allotment until BLM monitoring determines that the vegetation treatments are successful (see Section 2.4.2). Since this is how the permittee is currently operating, there should be no short-term impact on the permittee.

The proposed construction of three additional pastures with reliable water in each pasture would allow for a rest-rotation or deferred rotation system that has previously been unavailable (due to lack of pastures). The general rotation would allow for spring and fall use in the Oak Springs, Middle, and South pastures. The Middle and South may also serve as seasonal transition pastures. The Seegmiller pasture would be used primarily during summer due to its higher elevation. Winter use for the permittee's cattle is either the Lizard Allotment or another allotment leased by the permittee. Rest-rotation grazing would occur through use of three of the pastures while resting one pasture per year. Deferred grazing would be accomplished by allowing seed set (grasses, forbs, and shrubs) to occur in one of the pastures prior to use. Deferment would occur in each of the pasture over a four year cycle. During restoration efforts, rotation may deviate from this in order to allow for two years rest in treated pastures.

Under this alternative, ecological conditions would be expected to improve following implementation of the proposed vegetation treatments. Removing the dense overstory of sagebrush and pinyon-juniper trees would promote the health, vigor, recruitment, and production of perennial grasses, forbs and shrubs by opening the canopy. There would also be less competition with the trees and shrubs for soil moisture and nutrients. The rejuvenation of decadent, even-aged stands of sagebrush and invading pinyon pine and juniper trees would protect soil resources and associated watershed values, and would assist in improving the ecological condition of sites within the Wolfhole Lake Allotment. Implementation of this alternative would assist those portions of allotment that are not meeting Rangeland Health Standards 3[13] of the Arizona Standards for Rangeland Health and the Fundamentals of Rangeland Health (Title 43 CFR 4180) by increasing the quantity and quality of herbaceous vegetation (see Section 4.3.2 for a full discussion of impacts to vegetation from this alternative).

Implementation of this alternative would therefore improve quantity and quality of forage for livestock over time, and would increase the production and vigor of herbaceous plant communities. The forage base would more adequately sustain the existing grazing preference of the Wolfhole Lake Allotment (including increasing actual use to full preference), and would improve overall livestock performance (e.g., increased cow weight, increased calf crops, increased weaning weights).

No vegetation treatments are proposed for Lizard Allotment, so no direct effects on the permittee's use and operations in this allotment would occur. This allotment is, however, used in combination with use

[12] As described in Section 2.4.2.2, the fifth "pasture on the allotment, the Chaining Pasture, is used as a holding pasture when gathering, and is not considered an actual pasture since it has no water development.
[13] Standard No. 3: Productive and diverse … exist and are maintained, as indicated by (a) composition; (b) structure; and (c) distribution.

on the Wolfhole Lake Allotment, so the permittee's overall grazing rotation system could be affected (as described above) from treatments on that allotment.

4.2.3 Impacts of Alternative C – Actual Use

Under this alternative, a new ten-year term grazing permit would be issued with decreased grazing preference; no vegetation treatments would occur. The Lizard Allotment active AUMs would be reduced by 134, or 36 percent of current total; Wolfhole Lake Allotment active AUMs would be reduced by 164, or 82 percent of current total. This alternative could have a substantial impact on the grazing operator. This actual use assessment is based on the average use over the past ten years. This takes into account permittee voluntary reductions due to drought. The tree and shrub encroachment has resulted in annual gradual reductions by the permittee over the past 30 years. These reductions in available forage have adversely affected the permittee's operation and the economic viability of the family ranch. The values of private land adjacent to the permitted rangeland would likely decrease in value as permit value is directly related to the number of AUMs available. Although the grazing preference proposed in this alternative is based upon what the permittee has actually been using, the new permit would not allow any flexibility to increase actual use should conditions result in good forage production in a given year.

Even when available AUMs are not used annually, the flexibility of having them available adds value to a ranching operation. It is likely that this alternative would not provide the grazing operator a viable economic business plan going forward. As buying or leasing private grazing lands is expensive, it is likely this would not be a viable option for the permittee, which could lead to the permittee selling his operation and leaving the cattle business. It is possible that the permit could be transferred to a smaller operator and continue as a small viable operation. Under this smaller operation, this alternative could meet the purpose and need for action identified in Chapter 1 of this EA – to provide for livestock grazing opportunities on public lands where consistent with meeting management objectives, including the Arizona Standards for Rangeland Health and Guidelines for Livestock Grazing Management, as well as the Arizona Strip Field Office RMP (BLM 2008a), and to respond to applications to fully process and renew permits to graze livestock on public land.

However, as described for Alternative A, management objectives of meeting Arizona Rangeland Health Standards, particularly Standard 3, would be at risk for the Wolfhole Lake Allotment (as noted previously, the Lizard Allotment is meeting all Rangeland Health Standards). Wyoming big sagebrush and pinyon-juniper would continue to encroach into sites where historically they did not persist due to natural disturbance such as wildfire. This would continue to impede and eliminate understory vegetation including perennial grasses and forbs. The Wolfhole Lake Allotment would continue to not meet Arizona Rangeland Health Standard 3 due to loss of understory. Forage quantity and quality for livestock would continue to diminish as increasing shrub and tree canopy closure decreases understory vegetation biomass, diversity, and vigor.

4.2.4 Impacts of Alternative D – No Grazing

This alternative would drastically affect the livestock grazing permittee on the Lizard and Wolfhole Lake allotments by not authorizing any active preference under the term grazing permit. The action would cancel the current level of livestock grazing numbers and seasons of use authorized. This would not provide current or future use, stability and compatibility for the permittee's livestock operation because he would not be authorized to use the allotments. This would force him to seek alternate arrangements for his herds, such as leasing private pasture or obtaining federal grazing permits on a different allotment

(which, as described in Section 4.2.3, could be challenging). It would most likely put him out of business. This alternative would not meet the purpose and need for action identified in Chapter 1– to provide for livestock grazing opportunities on public lands where consistent with meeting management objectives, including the Arizona Standards for Rangeland Health and Guidelines for Livestock Grazing Management, as well as the Arizona Strip Field Office RMP (BLM 2008a), and to respond to applications to fully process and renew permits to graze livestock on public land.

It is important to note that the Rangeland Health Standards are "goals for the desired condition of the biological and physical components and characteristics of rangelands" (BLM 2007b), and are not tied directly to livestock grazing. Thus, the management objectives of meeting or continuing to meet Arizona Rangeland Health Standards, particularly Standard 3, would still apply to the two allotments, and would continue to be at risk for the Wolfhole Lake Allotment (as noted previously, the Lizard is meeting all Rangeland Health Standards). Wyoming big sagebrush and pinyon-juniper would continue to encroach into sites where historically they did not persist due to natural disturbance such as wildfire. This would continue to impede and eliminate understory vegetation including perennial grasses and forbs. The Wolfhole Lake Allotment would continue to not meet Arizona Rangeland Health Standard 3. Forage quantity and quality for wildlife species would continue to diminish as increasing shrub and tree canopy closure decreases understory vegetation biomass, diversity, and vigor.

4.3 Vegetation

4.3.1 Impacts of Alternative A – No Action

Livestock can directly affect vegetation by reducing plant vigor, decreasing or eliminating desirable forage species, increasing soil instability and erosion, reducing water quantity and quality, and causing loss of, or injury to, individual plants from trampling, particularly near water developments. Long-term changes in vegetation may result if livestock use consistently exceeds established allocations, or drought or other environmental factors reduce range carrying capacity. Improper grazing practices (such as excessive utilization which removes vegetative cover) may lead to soil compaction, reduced infiltration rates, increased runoff and erosion, and declines in watershed condition. Grazing impacts on vegetation are mitigated by timing of use, adjustment of stocking rates, limiting utilization rates, and complying with the Arizona Standards for Rangeland Health and Guidelines for Grazing Management (BLM 1997a).

Livestock grazing in the Lizard Allotment is managed under a deferred grazing system. Deferment allows the use of pastures at alternating times of the year. Under this system, both pastures receive periodic rest, but may not receive complete season long rest. Pastures are used at different seasons to allow for growth, seed set and shatter, and seedling establishment in alternating years. The Wolfhole Lake Allotment has one small fenced 150 acre Chaining Pasture. This pasture has no water development, so this is used more as a temporary holding pasture rather than a true developed pasture. The rest of the allotment is available for use, but has poor water developments, and sparse understory due to increasing overstory density of pinyon-juniper and sagebrush. The consequences of this is sparse forage for wildlife and livestock, and poor livestock distribution. The permittee makes minimal use in the allotment in its current state. The permittee is able to use another neighboring allotment, which he is permitted for, in conjunction with the Lizard and Wolfhole Lake allotments. The current grazing system, using the neighboring allotments, allows flexibility and deferment for the two allotments.

Grazing vegetation during the non-growing (or dormant) season allows plants to fix carbon, reproduce and set seed as the growing season progresses into the summer. Dormant season grazing would have

neutral to negligible effects on plant communities because plants would be able to fix a significant amount of carbon prior to biomass removal and would be able to set seed. Perennial grasses would have increased capability to produce seed because grazing would occur after they have produced much of their above-ground biomass. Overall plant vigor would be maintained by dormant season grazing because plants would be grazed only after senesce (the plant growth phase from full maturity to death or dormancy). After the grasses go dormant they are affected little by grazing (University of Idaho 2011). Late winter/spring grazing defers use during the growing season for warm season plants, while summer grazing defers use during the growing season for cool season plants. Warm season grass growth coincides with cool season seed reproduction. Because livestock seek out the warm season new growth, the cool season grasses may get a natural deferment during this period. In addition, utilization in each pasture has been light-moderate in recent years (see Chapter 3 and Appendix D), which leaves ample foliage of palatable plants to produce and store carbohydrates (Trlica 2013). This grazing system allows plants to rest and replenish root reserves before they are grazed again, which would maintain plant vigor and therefore vegetative condition. See Table 3.9 for average phenological stages for plants within the two allotments and Table 2.1 for permitted season of use.

Range plants evolved to withstand grazing and can withstand a heavy grazing event if done in the right season and if plants are given enough time to recover after grazing. Thus, plants can withstand removal of a part of their current year's growth and still achieve normal growth the following year. Most rangeland grasses and forbs can have 40-50% of their leaves and stems removed every year and still remain healthy and productive. In general, light use is considered less than 40%, moderate 41-60%, and heavy greater than 60% of biomass removed. The season during which the grazing occurs, and periodic rest from grazing, are very important (University of Idaho 2011). Properly managed livestock grazing is designed to cause minimal impacts to rangeland resources. The deferred grazing system developed for these allotments provides for the physiological needs of the key species – the scheduled graze and rest periods benefit key species and other vegetation by increasing plant vigor, aiding in seed dissemination, and providing periodic rest during critical growing periods (compare phenological stage with permitted season of use referenced in above paragraph) (Trlica 2013).

When considering effects of grazing on shrub species, one must look at the amount of usage of current year's growth – these include the leaves and young stems that are important for photosynthesis. The current year's growth of shrubs is the most digestible part of the plant and is the portion generally removed by browsing animals such as deer. The buds are especially important to protect from grazing because they will be the source of new stems and leaves for continued growth after grazing. In winter, shrubs survive by using energy compounds (i.e., starches and sugars) stored in the stems. Thus, although the shrub is dormant, it is important to watch browsing of these stems. An indicator of "overgrazing" of shrubs is moderate or heavy hedging (i.e., growth of lateral stems just below a grazed point) and a lack of new or juvenile plants (University of Idaho 2011). Utilization tables in Appendix D show recent and past utilization on shrubs, based on current year's growth by weight, during the grazing season. As shown by this data, utilization has typically been well below the allowed 50% at all key areas.

The permittee proposes to substitute up to three horses for three cattle in the Lizard Allotment. While horse and cattle AUMs are equivalent, the anatomy of a horse's mouth and cow's mouth are different, resulting in different potential impacts on vegetation. Cattle have large muzzles and a relatively immobile upper lip which limits their ability to select among plants and plant parts. They have long and dexterous tongues that allow them to grasp taller grass clumps then pull them off, usually not closer than two inches from the ground (Oregon State University 2019; University of California 2015). By contrast, horses have upper and lower incisors that allow them to bite vegetation close to the ground (University of California 2015). However, managing for 50% or less utilization of current year's growth on key vegetation species

(as proposed in this alternative) would result in vegetation remaining healthy and productive, whether grazed by horses or cattle.

Understory plant species in the Wolfhole Lake Allotment, without some type of disturbance such as wildland fire or vegetation treatment, would continue to decline due to pinyon, juniper, and sagebrush encroachment. Effective ground cover, where the pinyon-juniper and sagebrush canopies are dense and out-compete understory species (native grasses and forbs), would continue to be greatly reduced; these areas would therefore be at increased risk for soil erosion. The Wolfhole Lake Allotment would continue to not meet Arizona Rangeland Health Standard 3 due to loss of understory. Ecological condition of the vegetation communities in this allotment would continue to decline as increasing shrub and tree canopy closure decreases understory vegetation biomass, diversity, and vigor.

4.3.2 Impacts of Alternative B – Proposed Action

Under this alternative, a variety of vegetation treatments including manual (lop and scatter), mechanical, chemical, and site-specific seeding would occur within the Wolfhole Lake Allotment. Up to 4,761 acres (or 36 percent) of the Wolfhole Lake Allotment is proposed for vegetation treatments. All of the proposed treatment methods would be effective at removing encroaching pinyon-juniper and decadent sagebrush, which would open the canopies and result in more sunlight reaching the understory and an increase in soil moisture. This would allow understory vegetation (perennial grasses and forbs) to re-establish in these areas.

Proposed structural range improvements associated with this alternative would disturb approximately 15 acres of vegetation (see Table 2.3). Some of this (approximately 2.4 acres) would be a permanent loss of vegetation including catchment area, storage tanks, water troughs, and two-track access road. Other areas including the pipelines and fence lines would revegetate over time. If deemed necessary, these areas could be seeded to facilitate revegetation success.

Plant communities which have overly dense overstories, either pinyon-juniper or sagebrush, do not provide a diverse perennial understory, which in turn may limit wildlife diversity and numbers. These communities are also at a higher risk of invasion by noxious weeds and invasive species and increased soil erosion. This alternative offers the greatest benefit to vegetation from treatment of the various vegetation communities within the allotments (University of Arizona 2018).

Compared to other methods, manual treatments (i.e., lop and scatter) would minimize effects to specific vegetation species and plant communities by retaining more vegetation of non-target species. Manual treatments would result in a lower likelihood of soil erosion, soil instability, soil compaction, sedimentation, and increased surface temperatures, all of which affect vegetation.

Use of mechanical equipment would reduce overstory canopy cover, increase plant diversity, and increase soil moisture due to the reduced evapotranspiration. These impacts would be direct, both short and long term. Mechanical treatment methods could also result in localized, short-term impacts to air quality from fugitive dust, equipment emission/exhaust, and chemical fumes, which in turn could lead to reduced plant vigor and fitness. Long-term impacts would result from changes in plant community composition and structure due to changes in overstory density and canopy cover. Understory plants, including perennial grasses and forbs, would have less competition for resources such as light, water, and soil nutrients. This would allow an increase in composition diversity and increased vigor of understory plants that in many of

these stands is lacking or greatly reduced. Mechanical treatments would also be effective at providing a diverse age class in both the pinyon-juniper and sagebrush communities.

Chemical treatments would cause target and some non-target species to experience direct, short-term impacts, depending on the chemical used and the application rate. Short-term indirect effects could include reduced soil infiltration, increased erosion and sedimentation, and increased soil surface temperatures until understory species (grasses and forbs) re-establish. Once they do, plant diversity and community structure (frequency and composition) should increase, resulting in long-term benefits to soils (see Section 4.5.2) and associated vegetation. Chemical treatments would also be effective at providing a diverse age class in sagebrush communities. As stated in Section 2.4.1.2, the BLM would use the Programmatic EIS on Vegetation Treatments Using Herbicides on BLM lands in 17 Western States (BLM 2007b) to guide actions for this project, including application rates. All standard operating procedures including following herbicide product label instructions for each herbicide proposed for use as part of this project would be strictly adhered to. Thus, the proposed herbicide applications would minimize potential for impacts to non-target plants and animals, while achieving project objectives. The use of Tebuthiuron would be confined to areas with little or no non-target species.

Under this alternative, livestock grazing would be authorized for the Lizard and Wolfhole Lake allotments with the same grazing season as that described for Alternative A (see Chapter 2). Active AUMs would not change in the Lizard Allotment, and actual use would not change in the short-term in the Wolfhole Lake Allotment. Current actual use, as well as rest after treatment, would continue until implementation of vegetation treatments and successful revegetation occur. It is likely that the treatments would take numerous years to implement and for the vegetation communities to successfully be restored.

Complete rest in a treatment area would typically be required for two years, but could be extended if necessary (or reduced if monitoring indicates restoration is successful in less than two years). Rest in treatment areas would allow growth of existing understory vegetation as well as encourage recruitment and growth of seedlings in these treated areas. Additional foliage would remain on palatable plants (both grasses and shrubs) within the allotment, which would maximize their herbage producing ability as well as build some feed reserves (Holecheck et al. 1999) by contributing to root growth and biomass.

Under this alternative, three additional pastures would be created in the Wolfhole Lake Allotment. Including the existing South Pasture this would total four functional pastures (i.e., pastures with available water, which would be accomplished by the proposed water developments). The additional pastures would allow for treatments without complete non-use of the allotment and, long-term, the pastures would allow for a more effective rotation system allowing for periodic rest and deferment. As described in Section 4.3.1 (above), the deferred grazing system developed for these allotments provides for the physiological needs of the key species – the scheduled graze and rest periods benefit key species and other vegetation by increasing plant vigor, aiding in seed dissemination, and providing periodic rest during critical growing periods. This would allow expansion and re-establishment of perennial grasses and forbs in the understory. This understory would add diversity to the ecological site, as well as provide wildlife and livestock with greater quantity and quality of forage. However, the "success" of the grazing systems relies on the presence of reliable water sources – water must be present in and across each pasture in order for the rotation system to be fully implemented. The proposed action would result in reliable water sources across the allotment, which would benefit vegetation throughout the allotment.

Proposed vegetation treatments and associated understory expansion would restore ecological processes in the currently sagebrush and pinyon/juniper dominated plant communities. These treatments would restore historic dominated grasslands while retaining a mosaic of sagebrush and trees. Openings and

reduction in competition would also allow for an increase in forb composition in the understories. Perennial understory vegetation would help stabilize soils and reduce erosion potentials. With greater grass and forb groundcover, runoff and erosion potential would be reduced. The proposed treatments would therefore result in the Wolfhole Lake Allotment making progress toward meeting Arizona Rangeland Health Standard 3.

Treatments in the Wolfhole Lake Allotment would be focused in primarily the Loamy Upland 10-14" p.z. Ecological Site. This is the dominant site by acreage in this allotment. The dominant cover of this site historically would be a mixture of warm and cool season perennial grasses (70-80 percent) with a small amount of shrubs including Wyoming big sagebrush (5-15 percent), small amount of perennial forbs (5-10 percent) with occasional pinyon and juniper (5 percent or less) (see Table 3.7, and Appendix D, Tables D.10 and D.11). In the absence of fire or other disturbance, this site can "deteriorate" to a Wyoming big sagebrush dominated site with a sparse to non-existent understory. Treatments should restore the site to a perennial grass dominated site (NRCS 2017).

As stated in Section 3.2.3, allotment-monitoring data indicates that resource conditions on the Lizard Allotment currently meet all applicable standards for rangeland health. Livestock grazing as proposed under this alternative would minimally affect vegetation (see Section 4.3.1 above).

4.3.3 Impacts of Alternative C – Actual Use

Under this alternative, grazing would be authorized for the Lizard and Wolfhole Lake allotments, with the same grazing system as that described for Alternative A (see Chapter 2). Seasons of use for each of the allotments would be the same as for Alternative A; however, there would be reduced AUMs available in the Lizard and Wolfhole Lake allotments. Impacts to vegetation would be similar to those described for Alternative A. However, since fewer livestock would be authorized under this alternative, grazing intensity would be less (i.e., lighter utilization) and less total foliage would be removed from existing plants (grasses, forbs, and palatable shrubs). Lower grazing intensity would increase the plants' herbage producing ability as well as root biomass (Holechek et al. 1999).

Under this alternative, no vegetation treatments would be implemented. Impacts to vegetation from not implementing vegetation treatments would the same as those described for Alternative A (see Section 4.3.1 above).

4.3.4 Impacts of Alternative D – No Grazing

Under this alternative, no livestock grazing would occur so plants would only be minimally grazed by wildlife. Vegetation would therefore have the most rest and recovery as compared to the other alternatives. All plant species would benefit from no grazing. This alternative would therefore result in the least grazing on vegetation, meaning the plants would have the maximum amount of energy compounds in their stems for survival and reproduction.

Under this alternative, no vegetation treatments would be implemented. Impacts to vegetation from not implementing vegetation treatments would the same as those described for Alternative A (see Section 4.3.1 above).

4.4 Wildlife, Including Big Game, Migratory Birds, and Sensitive Species

Herbaceous vegetation provides forage and concealment cover for wildlife species, particularly during the spring breeding period when calving, fawning, nesting, and rearing of young occurs. Livestock grazing reduces the height and amount of herbaceous vegetation. The presence of livestock and the movement of livestock between areas of use could result in the direct disturbance or displacement of some wildlife from preferred habitats, nesting/birthing sites, or water sources. Both the disturbance and displacement of wildlife and the reduction of herbaceous forage and cover could limit the productivity and reproductive success of some species.

4.4.1 Impacts of Alternative A – No Action

4.4.1.1 Big Game

Mule deer

As stated in Chapter 3, mule deer are present year-round in the allotments (although numbers are low in the Lizard Allotment). The presence of livestock and the trailing of livestock between use areas could displace small numbers of mule deer from preferred habitats and/or water sources. However, given that deer on the allotments are likely habituated to the presence of livestock, this displacement would only be temporary. Properly managed livestock grazing is designed to cause minimal impacts to rangeland resources. Rotating the season of use among pastures provides periodic rest for vegetation to help maintain plant vigor. The current livestock management regime on the allotments has been in place for many years; it is therefore expected that continuing the current grazing management, as proposed under this alternative, would result in the same effects to habitat (i.e., plant communities) as has been occurring (see vegetation discussion in Section 4.3.1), thus minimally affecting habitat for mule deer. Since utilization on vegetation has been light in recent years (2007-2016), averaging 23% on the Wolfhole Lake Allotment and 18% on the Lizard Allotment, competition for forage between livestock and deer should remain minimal.

The DPC objectives developed for the allotments (see Appendix C) are used as indicators of ecosystem function and rangeland health, including habitat for mule deer that provides the necessary forage and shelter components for healthy, self-sustaining populations within the range of natural variability. The DPC objectives are also used to help determine whether Arizona Rangeland Health Standard 3 is being met. The Wolfhole Lake Allotment is meeting Standard 1; however it is neither meeting nor making progress towards meeting Arizona Rangeland Health Standard 3-Desired Resource Conditions. Vegetation treatments were therefore recommended in the land health evaluation to address pinyon and juniper encroachment and increasing density of sagebrush in the Wolfhole Lake Allotment.

Forage quality and availability are critical factors when evaluating habitat quality for mule deer. Sagebrush and juniper contain volatile oils that inhibit digestion to varying degrees. Other browse species, grasses, and forbs are critical components of mule deer diets (Watkins et al. 2007). Under this alternative the Wolfhole Lake Allotment would continue to not meet Arizona Rangeland Health Standard 3 due to loss of understory. Understory plant species, without some type of disturbance (such as wildland fire or vegetation treatment), would continue to decline due to pinyon, juniper, and sagebrush encroachment. Effective ground cover, where the pinyon-juniper and sagebrush canopies are dense and out-compete understory species (native grasses and forbs), would continue to be greatly reduced. Ecological condition of the vegetation communities in this allotment (i.e., quality of habitat for mule deer)

would therefore continue to decline under this alternative as increasing sagebrush and tree canopy closure decreases understory vegetation biomass, diversity, and vigor.

4.4.1.2 Migratory Birds

The current livestock management regime on the allotments has been in place for many years; it is therefore expected that livestock grazing proposed under this alternative would minimally affect habitat for migratory birds (see vegetation discussion in Section 4.3.1). Since utilization on vegetation has been light in recent years, competition for forage between livestock and seed-eating migratory birds should be minimal, and adequate resources for insect prey populations would be left.

4.4.1.3 Sensitive Species

Bats

Properly managed livestock grazing is designed to cause minimal impacts to rangeland resources, including vegetation that serves as habitat for the insects that bats prey upon. Utilization on vegetation has been light in recent years on the allotments, and composition of palatable shrubs is high, both of which would leave adequate resources for insect populations. Livestock grazing also would not affect roost sites or hibernacula since these sites tend to be inaccessible to livestock. This alternative is therefore unlikely to measurably impact any sensitive bat species that occurs within the allotments.

Peregrine Falcon and Golden Eagle

Nesting sites for peregrine falcons or golden eagles would not be impacted by livestock within the allotments because these sites are located on ledges in cliff faces that are inaccessible to livestock. Prey species for peregrine falcons, such as mourning doves, generally do well in human altered environments including grazed areas. Habitat for golden eagle prey species, such as black-tailed jackrabbits, could be adversely impacted if overutilization occurs. However, the effects of moderate grazing (such as that proposed under this alternative) can be negligible to slightly beneficial for many prey species (Olendorff 1993). Vegetation in the allotment is sufficient to provide food and shelter requirements for populations of prey species. Habitat for prey species would be minimally affected because grazing under this alternative provides periodic rest for the plant communities (see "Vegetation" discussion above). Disturbance to nest sites from livestock management operations is unlikely given the remote and inaccessible locations these species choose for nesting. Implementation of this alternative is not likely to impact peregrine falcon or golden eagle habitat or nesting success.

Ferruginous hawk

Nesting sites and habitat for ferruginous hawk prey species have the potential to be impacted by livestock grazing within the Wolfhole Lake Allotment. Isolated nest trees used by this species could be impacted through rubbing of the trunk and girdling the trees through abrasion, or by damaging the root system from congregations of cattle seeking shade. The likelihood of this occurring in the Wolfhole Lake Allotment is minimal since the trees where nests would occur are larger in girth and would not be readily affected by an animal rubbing against them (Olendorff 1993 acknowledged that this situation is not prevalent in pinyon-juniper woodlands), and no documented nests occur within the allotment. Habitat for prey species, such as black-tailed jackrabbits, could be adversely impacted if overutilization occurs. However, the effects of moderate grazing (such as proposed under this alternative) can be negligible to slightly beneficial for many prey species (Olendorff 1993). Vegetation in the Wolfhole Lake Allotment is

sufficient to provide food and shelter requirements for populations of prey species for the ferruginous hawk. Ferruginous hawks are sensitive to human disturbance near the nest site; however, no documented nests occur within the allotment so disturbance at nest sites would be sporadic and would not lead to a trend toward listing. Nesting habitat is not present on the Lizard Allotment.

Northern Goshawk

Properly managed grazing has not been identified as having potential adverse impacts on the northern goshawk or its prey base (Kennedy 2003). Continued utilization below 50% would not measurably impact the variety of bird and mammal species that goshawks prey upon.

Burrowing owl

Nesting burrows for burrowing owls could potentially be impacted by livestock within the allotments through trampling. However, burrowing owls prefer open country with sparse vegetation and often do well in moderately grazed areas.

Prey species are numerous in the allotments and include small mammals, insects, and reptiles. Vegetation in the Lizard Allotment is sufficient to provide food and shelter requirements for populations of prey species; understory vegetation in the Wolfhole Lake Allotment is declining as shrub and tree canopy closure decreases understory vegetation biomass, diversity, and vigor (see Section 4.3.1). However, burrowing owls do not tend to occupy these areas since they prefer open habitats. Disturbance to nest sites from livestock management operations may occur but this species is known to tolerate moderate levels of human disturbance (Klute et al. 2003). Occupied burrows in other allotments on the Arizona Strip frequently have cows nearby during monitoring visits (Langston, personal obs.). Implementation of grazing under this alternative would result in relatively minor impacts to burrowing owl habitat or potential nesting success in the allotment.

Pinyon Jay

The potential effects of livestock grazing on pinyon jays are unclear. The primary threat to the species is widespread die-off of pinyon pine in the southwestern United States, together with large-scale thinning of pinyon-juniper woodlands in an attempt to reduce fuel loads (Wiggins 2005). No pinyon-juniper removals are proposed under this alternative, so impacts to nesting areas, tree canopy, or food sources would be negligible and similar to those described above for migratory birds.

Monarch Butterfly

Livestock grazing can alter the structure, diversity, and growth pattern of vegetation, which can affect the associated insect community. Grazing during a time when flowers are already scarce may result in insufficient forage for the monarch butterfly. Recommended grazing BMPs (USDA 2015) for monarch butterflies and other pollinators include:

- Protect the current season's growth in grazed areas by striving to retain at least 50% of the annual vegetative growth on all plants.
- Minimize livestock concentrations in one area by rotating livestock grazing timing and location to help maintain open, herbaceous plant communities that are capable of supporting a wide diversity of butterflies and other pollinators.

These actions are incorporated into the proposed grazing system for the allotments under this alternative. Implementation of grazing under this alternative would therefore result in relatively minor impacts to monarch butterflies and their habitat in the allotment.

4.4.2 Impacts of Alternative B – Proposed Action

Effects of Grazing on all Wildlife Species

Grazing impacts on the Wolfhole Lake and Lizard allotments would be similar to those described for Alternative A, as livestock grazing would be authorized for the allotments with the same grazing season as that described for Alternative A (see Chapter 2). Active AUMs would not change in the allotments, although rest would be required on the Wolfhole Lake Allotment following proposed treatments.

Properly managed livestock grazing is designed to cause minimal impacts to rangeland resources (see Section 4.3.1). Rotating the season of use among pastures would provide periodic rest for vegetation to help maintain plant vigor. The current livestock management regime on the allotments has been in place for many years; it is therefore expected that livestock grazing proposed under this alternative would minimally affect wildlife habitat. Since utilization on vegetation has been light in recent years, competition for forage between livestock and wildlife should remain minimal.

Effects of Structural Range Improvements on all Wildlife Species

Wildlife may be displaced or adversely affected during construction and maintenance of range improvement projects. This includes water development, vegetation treatments, and fence construction. These effects are likely short term. Availability of long term reliable water sources as well as improved forage may compensate for these effects.

4.4.2.1 Big Game

Mule deer

Effects of Vegetation Treatments

Five treatment units are proposed for the Wolfhole Lake Allotment. Mule deer habitat categories for the proposed treatments consist of summer and yearlong habitat (Table 4.1). Tree and shrub density on these proposed treatment units would be reduced using one of several treatment techniques. Seed mixes may be applied to these areas and would primarily be composed of native species, although non-native species may be used to meet restoration objectives. Seed selection would be based on site potential and RMP objectives.

Table 4.1. Mule Deer Habitat Categories

Treatment Unit	Acres	Mule Deer Habitat	Pinyon-juniper (Acres)	PJ-Sagebrush (Acres)	Sagebrush (Acres)
Seegmiller	1,103	100% Summer	8	1,095	0
Oak Spring	470	100% Summer	267	200	3
Middle	1,529	60% Summer, 40% Yearlong	55	1,412	62

South	1,659	60% Yearlong, 40% Summer	980	626	53
Total	**4,761**	66% Summer, 34% Yearlong	**1,310.4**	**3,333.2**	**118**

These treatments are designed to use mastication or lop-and-scatter methods to reduce overstory cover to below 15% on 1/4 of the acres, to 15-30% on 1/2 of the acres, and leave approximately 1/4 of the treatment units untreated. This treatment design would result in approximately 4,644 acres receiving some level of pinyon-juniper overstory reduction, representing 36% of the pinyon-juniper woodlands[14] in the allotment (or approximately 64% of the pinyon-juniper woodlands untreated). The treated pinyon-juniper woodlands acres, including sagebrush treatment, totals 4,761 acres (see Table 2.2).

This project design was developed to benefit mule deer by using guidelines for wildlife habitat treatments presented in several publications (Short 1977, Fairchild 1999, BLM 2007a, Watkins et al 2007, and Bender 2012), as opposed to large-scale pinyon-juniper removal treatments with low edge to treatment ratio, which have shown low efficacy for mule deer habitat improvement (Watkins et al 2007). Treatments would result in more structural diversity (i.e., a mosaic of trees and openings) by retaining a mix of tree canopy cover with a variety of different tree height structures and age classes. Open areas would be created that would see an increase in forage plants through seeding or natural establishment. The health, vigor, recruitment, age class, diversity and production of perennial grasses, forbs, and shrubs (including those preferred by mule deer) should improve since removal of pinyon and juniper would allow grasses, forbs, and shrubs to establish and compete for sunlight, nutrients and water, resulting in improved vegetative conditions across the project area (see Section 4.3.2). In addition, treatments are designed with irregularly shaped boundaries to increase edge effect, which is beneficial to mule deer (Watkins et al., 2007). The proposed treatments should benefit mule deer by increasing the composition of palatable shrubs, as outlined in the Arizona Strip Field Office RMP (BLM 2008a) for crucial winter deer habitat objectives. Shrubs occur mostly in early successional habitats; that is, those recently disturbed and going through the natural processes of maturing to a climax state. This means disturbance is a key element to maintaining high quality deer habitat (Watkins et al., 2007), as would occur with the proposed treatments.

Adverse effects to mule deer common to all treatment methods include noise and other disruptions associated with treatment applications. Hand-held equipment, including chainsaws, and transport vehicles create noise that can disturb animals and cause them to flee or alter their behavior or habitat use. These effects would be short-term and would not likely have much effect on the long-term health and habitat use of mule deer in the treatment areas. Habitat treatment would increase the abundance of desirable plants, increasing the quality of habitat. This benefit to mule deer would be long-term and would mitigate short-term adverse effects from treatment implementation.

Effects of Structural Range Improvements

Fences have become a predominant feature on the landscape throughout the West, including on the Arizona Strip. Most fences are built to contain livestock within pastures or range allotments or exclude them from roadways and residential areas. Although these fences are not usually intended to restrict deer, they can impede seasonal migration or daily movements, especially if fawns cannot negotiate them. Both

[14] Pinyon-juniper woodlands referred to here are equal to the pinyon-juniper and PJ-sagebrush vegetation types listed in Table 3.7 of this EA.

fawns and adults can get caught in wire fences and die because they cannot free themselves or from injuries sustained in getting free.

Fences can cause a substantial amount of mule deer mortality if they are not adequately designed to exclude all ungulates (Harrington and Conover 2006). Many fence designs are especially dangerous to mule deer because they entrap or entangle their legs when a deer attempts to jump over a fence. Harrington and Conover (2006) documented the majority of mule deer mortalities were caused by animals getting entangled in wire fences, particularly within the top two wires. Most lethal were woven wire fences (short enough to jump over) with a single top wire. They observed the highest mortality during August when fawns were being weaned and were far more likely than adults to die in or near a fence. Substantial mortality in this study resulted presumably when fawns were separated from maternal care because the fawn was incapable of negotiating a fence crossing after the maternal doe had. Fences should be of sufficient height and structure to exclude all ungulates or short enough to permit unfettered crossing. Bottom strands placed at least 16 inches above the ground allow crossing beneath the fence (Mule Deer Working Group 2015).

Under this alternative, the range fences would be designed to meet wildlife specifications. This includes spacing between the top two strands being at least 12 inches, the bottom strand being smooth (no barbed) wire, and the bottom strand being at least 16 inches above the ground. This would reduce deer mortality and reduce impacts to deer movement.

One catchment/trough and three new troughs are also proposed in the Wolfhole Lake Allotment. As described in the *Effects of Vegetation Treatments* section above, construction activities would result in some short-term disturbance and displacement of mule deer. Construction activities and human presence would result in a localized and temporary increase in noise that would likely cause mule deer to temporarily avoid the vicinity. Once construction is complete, use of these sites (including visitation by the public) would be minimal due to their remote locations, resulting in minimal ongoing disturbance to mule deer. In addition, construction of the all proposed range improvements (water developments, fencing, two-track road, and a cattleguard) would result in disturbance of approximately 15 acres of habitat (see Table 2.3). Some of this (2.4 acres) would be a permanent loss of habitat including catchment area, storage tanks, water troughs, and the access road. Other areas including the pipelines and fence lines would revegetate over time. If deemed necessary, these areas could be seeded to facilitate revegetation success. While there would be more impact to vegetation (i.e., habitat) close to water due to concentration of livestock, and long-term loss of habitat from construction of the water facilities, the scope of these impacts would be negligible compared with the relative amount of habitat available in the surrounding landscape.

The proposed new water sources would meet the objectives stated in the *Arizona Strip Interdisciplinary Mule deer Management Plan 2015-2019* (AGFD and BLM 2015) pertaining to water availability and distribution – yearlong water availability and distribution would be increased, which would improve distribution and use in the area. Increased availability of surface water has increased the distribution and/or abundance of mule deer, and has increased opportunities for wildlife observation and harvest. Perceived negative impacts of water developments on wildlife resulting from predation, competition, direct mortality, and disease are not supported by data and remain largely speculative. DeStafano et al (2000) found that predators were probably attracted to water developments to drink rather than to hunt; without water developments, predators may be even more concentrated around the fewer natural water sites. They found very little evidence of kills at water sites despite the abundance of predator sign. However, the ecological effects of water developments are poorly understood (Rosenstock et al. 1999).

The long-term benefits of more consistent water sources for mule deer would outweigh any short-term adverse impacts that could result from construction and long-term loss of 2.4 acres of habitat.

4.4.2.2 Migratory Birds

Effects of Vegetation Treatments

As discussed for mule deer, vegetation treatments are proposed on 4,761 acres of the Wolfhole Lake Allotment. These treatments would consist of reducing tree and shrub density within pinyon-juniper forests and sagebrush shrublands. Adverse effects to migratory birds common to all treatment methods include possible injury or loss of life as well as noise and other disruptions associated with treatment applications. In addition, the use of vehicles and heavy equipment for tree removal poses a risk of injury or death by crushing animals or their nests or roosts. However, treatments would be deferred during nesting season (see Section 2.4.1), so impacts to most breeding migratory birds would be avoided.

Pinyon-juniper forests provide important habitat components for many Birds of Conservation Concern including the gray vireo, juniper titmouse, and pinyon jay. Paulin et al. (1997) concluded that mature pinyon-juniper sites (200-400 years old) with few understory plants ranked second in total individual birds and third in diversity of seven upland forest types. Pinyon-juniper also had the highest percentage of obligate and semi-obligate species in the same study. O'Meara et al. (1981) also found that breeding bird densities were more than double in unchained vs. chained areas in northwest Colorado pinyon-juniper woodlands.

Although cone-producing pinyon pines have long been recognized for their benefit to wildlife, more recent studies have focused on the importance of junipers as a habitat component. Francis et al. (2011) found that 86% of nest trees used by birds in northwestern New Mexico pinyon-juniper forests were located in junipers, even though the ratio of pinyon to juniper was 1:1.06. Likewise, Johnson et al. (2015) found that in northwestern New Mexico, 82% of gray vireo nests were in juniper trees and that these birds showed a preference for nest sites with higher tree density and taller trees. Juniper titmice have also been reported as nesting in junipers 61% of the time in Arizona (Corman and Gervais 2005).

Most studies of treatment effects on wildlife in pinyon-juniper habitat have focused on chaining (O'Meara et al. 1981, Bombaci and Pejchar 2016), a method not proposed in this EA. However, one study (Crow and Van Riper 2010) showed that thinned pinyon-juniper units in Grand Staircase-Escalante National Monument led to a reduction in the presence of pinyon-juniper obligate species, including the elimination of gray vireos. It should be noted that the level of thinning on the treatment units in this study was very high (92% average reduction in tree density), which is not what is proposed in this alternative (see Section 2.4.1).

Bird species that prefer more open habitat should benefit from the proposed treatments. Rosenstock and Van Riper (2001) found that ground-nesters in grassland communities of northern Arizona decreased as juniper increased, as expected. Treatments would result in more structural diversity (i.e., a mosaic of trees and openings), by retaining a mix of tree canopy cover with a variety of different tree height structures and age classes. Open areas would be created that would see an increase in forage plants through seeding or natural establishment. The health, vigor, recruitment, age class, diversity and production of perennial grasses, forbs, and shrubs should improve since removal of pinyon and juniper would allow grasses, forbs, and shrubs to establish and compete for sunlight, nutrients and water, resulting in improved vegetative conditions across the project area.

The proposed vegetation treatments on the Wolfhole Lake Allotment would reduce tree density and canopy cover on 4,644 acres of pinyon-juniper woodlands, which represents 36% of this habitat type in the allotment, meaning 64% of the pinyon-juniper woodlands on the allotment would remain untreated. Treatments would increase vegetative and structural diversity within the units and allow opportunities for a variety of nesting and foraging habitat. Adequate untreated habitat on the allotment would remain to allow for successful breeding and foraging for species dependent on persistent pinyon-juniper woodlands.

Effects of Structural Range Improvements

Migratory birds would likely avoid the construction areas and be temporarily displaced during work periods. Construction activities and human presence would result in a localized and temporary increase in noise that would likely cause migratory birds to temporarily avoid the vicinity. If construction occurs in early spring, short-term impacts to migratory birds could impact individual birds that arrive early to breeding sites and could lead to abandonment of early breeding and/or nesting attempts. Equipment associated with construction may also generally affect migratory birds as a result of noise. The increased noise and construction activity would occur only in the short term. In the long term, occasional maintenance would have a negligible impact to migratory birds since these activities would only be occasional and intermittent. Impacts to migratory birds would be minimized by implementing the management practices/design features listed in Section 2.4.2.2.

Water developments benefit nongame wildlife, including migratory birds, and has increased opportunities for wildlife observation and harvest. Either lids or wildlife escape ramps and floating bird ladders would be installed to the storage tanks or pond to prevent birds from getting trapped in these water facilities. Perceived negative impacts of water developments on wildlife resulting from predation are not supported by data and remain largely speculative (Rosenstock et al. 1999). DeStafano et al (2000) found that predators were probably attracted to water developments to drink rather than to hunt; without water developments, predators may be even more concentrated around the fewer natural water sites. They found very little evidence of kills at water sites despite the abundance of predator sign. The proposed water developments would benefit migratory birds in the long-term by having reliable water sources for drinking and bathing.

4.4.2.3 Sensitive Species

Bats

Effects of Vegetation Treatments

Adverse effects to sensitive bats common to all treatment methods include injury and loss of life, noise and other disruptions associated with treatment applications, and short- and long-term habitat effects. In addition, the use of vehicles and heavy equipment for tree removal poses a risk of injury or death by crushing animals or their roosts.

The proposed vegetation treatments may have slight impacts to insect prey species, with some benefiting from treatments and others losing habitat. Thinning of trees would open up foraging habitat for bats but may reduce roost site availability. Allen's big-eared bats are known to roost under exfoliating bark of pine trees (Rabe et al. 1998) and may be the most impacted of the sensitive bat species. The *Arizona Bat Conservation Strategic Plan* states that "Logging and forestry practices that leave mixed-aged stands and/or preserve older trees and snags should be encouraged. Snags that are, or could be, used as roosts

should be preserved" (AGFD 2003). Retaining existing large snags, up to two per acre as proposed, in vegetation treatment units would help avoid adverse impacts to bat species.

Peregrine Falcon, Golden Eagle, Ferruginous Hawk, and Burrowing Owl

Effects of Vegetation Treatments

None of these species nest within dense forest or woodlands, therefore nest sites would not be impacted by vegetation treatments. Thinning of pinyon-juniper forests could open up more foraging habitat for peregrine falcons, ferruginous hawks, and golden eagles since these species prefer to hunt in open terrain. In addition, surveys for nesting raptors would be conducted prior to project implementation and identified nest sites protected until nestlings have fledged (see Section 2.4.1.4), which would help avoid adverse impacts to these nesting raptors. Burrowing owls would likely not be affected by vegetation treatments since they do not occupy woodland areas and prefer habitats that are more sparsely vegetated than those sites proposed for vegetation treatments.

Northern Goshawk

Effects of Vegetation Treatments

While this species prefers ponderosa pine habitat, none exists within the project area. Nesting in pinyon-juniper woodlands has been documented in other locations, although surveys on the Arizona Strip have not identified any goshawks in or near the Wolfhole Lake Allotment. Canopy cover would be reduced on up to 4,644 acres of pinyon-juniper woodlands, reducing the suitability of these areas as nesting or post-fledgling habitat for northern goshawks, although no goshawks are known to occur in or near this allotment. Opening up the canopy in pinyon-juniper stands, and allowing grasses and forbs to consequently increase, would provide a benefit to at least some goshawk prey species. Thus, some prey species would likely increase, while others could decrease, which overall should result in negligible impacts to foraging habitat for goshawks. Human disturbances from work crews and machinery can also displace goshawks from otherwise appropriate habitat (Morrison et al. 2011).

Pinyon Jay

Effects of Vegetation Treatments

The proposed vegetation treatments would consist of reducing tree density within pinyon-juniper woodlands. Recent studies of pinyon jay nest-scale habitat use in persistent pinyon-juniper woodlands of New Mexico have found that the birds nest in larger-than-average trees in areas of relatively high canopy cover (Johnson et al. 2014, 2015) and high tree density (Johnson et al. 2018). In one study, they abandoned parts of a traditional colony site when it was thinned for fuels reduction (Johnson et al. 2018). Pinyon jay flocks need very large areas (approximately 8,600 acres) of productive pinyon pines for harvesting and caching of pinyon seeds, and these areas should contain large trees for maximum cone productivity (Johnson et al. 2015). Likewise, Latta et al. (1999) called for maintaining large, cone-bearing pinyon pines in mature pinyon-juniper woodlands and Johnson et al. (2011) recommended that when managing habitat for pinyon jays, clearing of juniper and pinyon trees should be avoided when possible.

The proposed vegetation treatments would reduce tree density and canopy cover on approximately 4,644 acres of pinyon-juniper habitat, which represents 36% of the total pinyon-juniper woodlands within the allotment, meaning 64% of the woodlands in the allotment would remain untreated. Small scale openings may provide additional cache sites or attract alternate food sources such as insects or lizards. Pinyon jays

tend to return year after year to traditional colony sites. Strong site fidelity could limit the ability of a pinyon jay flock to pioneer new, available habitat (Johnson et al. 2011). However, treatments are designed to protect roost colonies for this species.

Monarch Butterfly

Specific guidelines regarding the impacts to monarch butterflies from pinyon-juniper or sagebrush removal have yet to be developed. In general, forest thinning projects that result in increased forb production in the understory are thought to benefit this species (USFS 2015). The proposed seed mix to be applied after treatments contains two native forb species that may provide nectar for adult monarch butterflies: blue flax and Palmer's penstemon. Additional seed mixes specific to pollinators may also be applied to treatment areas. Thus, any impacts to Monarch butterfly are anticipated to be beneficial.

Effects of Structural Range Improvements

All Sensitive Species

Sensitive species would likely avoid the construction areas and be temporarily displaced during work periods. Construction activities and human presence would result in a localized and temporary increase in noise that would likely cause these species to temporarily avoid the vicinity. Equipment associated with construction may also generally affect sensitive species as a result of noise. The increased noise and construction activity would occur only in the short term. In the long term, occasional maintenance would have a negligible impact since these activities would only be occasional and intermittent. Impacts to sensitive species would be minimized by implementing the management practices/design features listed in Section 2.4.2.2. Water developments benefit nongame wildlife, particularly birds, bats, and amphibians, and has increased opportunities for wildlife observation and harvest. Perceived negative impacts of water developments on wildlife resulting from predation are not supported by data and remain largely speculative (Rosenstock et al. 1999). The proposed water developments would benefit sensitive species in the long-term by having reliable water sources for drinking and bathing and by providing reliable water sources to prey species.

4.4.3 Impacts of Alternative C – Actual Use

4.4.3.1 All Wildlife

Under this alternative, grazing would be authorized for the Lizard and Wolfhole Lake allotments, with the same grazing system as that described for Alternative A, resulting in similar impacts to wildlife species. However, Alternative C would reissue the ten-year term grazing permit based on the average actual use level of the allotment over the last 10 years (2007 -2016). Fewer livestock would be authorized under this alternative so grazing intensity would be less, and less total foliage would be removed from existing plants (grasses, forbs, and palatable shrubs). Livestock grazing as proposed under this alternative is therefore not anticipated to substantially affect vegetation (i.e., wildlife habitat).

Understory plant species in the Wolfhole Lake Allotment, without some type of disturbance such as wildland fire or vegetation treatment, would continue to decline due to pinyon, juniper, and sagebrush encroachment. Under this alternative, no vegetation treatments would be implemented. Impacts to vegetation (wildlife habitat) from not implementing vegetation treatments would the same as those described for Alternative A (see Section 4.4.1 above).

4.4.4 Impacts of Alternative D – No Grazing

4.4.4.1 All Wildlife

Under this alternative, no livestock grazing would occur so plants would only be minimally grazed by wildlife. Vegetation would therefore have the most rest and recovery as compared to the other alternatives. All plant species would benefit from no grazing. This alternative would therefore result in the least grazing on vegetation, meaning the plants would have the maximum amount of energy compounds in their stems for survival and reproduction. Plant communities would continue to provide sufficient forage for mule deer, prey species, and habitat components for migratory birds. In addition, since no livestock would be present on the allotment, no potential for displacement of wildlife from preferred habitats and/or water sources would occur. Existing livestock water improvements would not be maintained and would deteriorate over time, leaving fewer water sources available to wildlife within the allotment.

Under this alternative, no vegetation treatments would be implemented. Impacts to vegetation from not implementing vegetation treatments would the same as those described for Alternative A (see Section 4.4.1 above).

4.5 Soils

4.5.1 Impacts of Alternative A – No Action

Under this alternative, livestock grazing would continue with the current level of active preference in the Lizard and Wolfhole Lake allotments. Rotational grazing would continue in the Lizard Allotment. Limited rotation would continue in the Wolfhole Lake as there is one main allotment pasture, and one additional small pasture with no water developments. Impacts to soils from livestock grazing can occur from trampling and vegetation removal, resulting in compaction and erosion. As described in Section 3.4.5, erosion in this allotment is minimal to moderate in most drainages, but the soils are at risk of severe erosion if ground cover is lessened. Excessive runoff from the surrounding tree dominated fan terraces is exacerbating the erosion problems along the drainages.

Lizard Allotment

As stated in Chapter 3, soils within this allotment are stable and do not deviate from what is expected for this site relative to erosion or compaction layers that would detrimentally affect plant or root growth. The land health evaluation (BLM 2011) stated that there are well developed microbiotic crusts common throughout the allotment. Microbiotic crust are an indicator of stable soils, with reduced erosion potential. This allotment is meeting land health standards relative to soil conditions. These conditions are reflected in the trend monitoring which was established in the 1980s on this allotment. The trend is upward throughout this allotment. This includes adequate ground cover in the form of plants, litter or rock, which is present in pattern, kind, and amount sufficient to prevent accelerated erosion for the ecological site; or ground cover is increasing as determined by monitoring over an established period of time. This allotment currently has multiple pastures and a rotation grazing system in place. Livestock grazing as proposed under this alternative would minimally affect vegetation, and overall plant vigor would be maintained, which would minimize impacts to soils in this allotment. The Lizard Allotment would continue to meet land health standards.

Wolfhole Lake Allotment

The protective canopy formed by vegetation reduces the impact of rain drops on the soil surface, thereby decreasing the breakdown of soil aggregates. It also slows the velocity of runoff from rainfall and snowmelt, reducing soil loss due to sheet and rill erosion (NRCS 2015). This allotment is meeting Standard 1 but is not meeting Rangeland Health Standard 3 due to pinyon-juniper and sagebrush densities and encroachment. These conditions are primarily due to fire exclusion efforts. As there are no proposed vegetation treatments associated with this alternative, these conditions would continue or worsen. Erosion, due primarily to lack of understory vegetation, would likely continue or potentially increase as canopies continue to close. Soils would continue to be at risk, and continued attainment of land health standards for soils may be jeopardized.

4.5.2 Impacts of Alternative B – Proposed Action

Lizard Allotment

Impacts to soils in the Lizard Allotment under this alternative are the same as those described above for Alternative A.

Wolfhole Lake Allotment

This alternative includes vegetation treatments in the Wolfhole Lake Allotment. The proposed vegetation treatments would thin overstory pinyon-juniper, and sagebrush. As discussed above, excessive erosion exists in some portions of the allotment, with varying degrees of groundcover. Successful treatments (i.e., replacement of pinyon-juniper and sagebrush with grass and other understory species) would likely improve soil productivity and stability. Mechanical treatments would increase mulch/organic matter in the project area and would thereby improve soil moisture-holding capacity and infiltration rates.

Mechanical treatments would disturb soil surfaces, especially where sharp turns are made by the vehicles and when soils are saturated. Project design features would mitigate most impacts to soils and biological soil crusts. A project design feature for biological soil crusts includes avoiding areas of dense soil crusts to the greatest extent possible. No mechanical treatments would take place when soil moisture is excessive (when ruts greater than 4 inches form on roadways adjacent to work areas), and treatment biomass would be placed in a manner that maximizes soil-biomass contact. Establishment of a more robust and diverse vegetative cover in treatment areas (i.e., more native grasses and forbs) should lead to a net improvement for soil resources as a whole from this alternative.

This alternative also includes structural range improvement projects within the Wolfhole Lake Allotment. These improvements include division fences to create pastures for rest during vegetation treatments, and then for use of a rotational grazing system designed to give periodic complete rest to pastures within the allotment. Also included are some water developments for pastures that would be created by the division fences. A rotational grazing system would allow periodic rest, and allow perennial understory to reach the potentials of the site, thus reducing erosion. Having multiple pastures would allow flexibility to rest pastures during the season when they are more prone to compaction, such as when they are saturated. The Wolfhole Lake Allotment would benefit from vegetation treatments and would make progress towards meeting rangeland health standards.

4.5.3 Impacts of Alternative C – Actual Use

Lizard Allotment

Impacts to soils in the Lizard Allotment under this alternative would be similar to those described above for Alternative A. However, AUMs would be reduced to current actual use levels for the new 10 year term permit. The percent of current AUMs that would be available to the permittee under this alternative is 36 percent in the Lizard Allotment. This level of reduced use would result in additional foliage remaining on vegetation, and would lessen direct impacts to soil resources including less trampling and compaction, particularly around developed water resources. The Lizard Allotment would continue to meet rangeland health standards.

Wolfhole Lake Allotment

Impacts to soils in the Wolfhole Lake Allotment under this alternative would be similar to those described above for Alternative A – the allotment lacks a rotational grazing system; this would not change. However, AUMs would be reduced to current actual use levels for the new 10 year term permit. The percent of current AUMs that would be available to the permittee under this alternative are 18 percent in the Wolfhole Lake Allotment. This level of reduced use would result in additional foliage remaining on vegetation, and would lessen direct impacts to soil resources including less trampling and compaction, particularly around developed water resources. However, since no vegetation treatments are proposed under this alternative, erosion potentials in the allotment would likely continue to increase as canopies continue to close, and understory is reduced. Soils in regards to continued land health standards would be at risk in this allotment.

4.5.4 Impacts of Alternative D – No Grazing

Impacts under this alternative would be similar to those described for Alternative A except that no livestock grazing would occur. Vegetation, which provides a protective canopy for soils, would have the most rest and recovery as compared to the other alternatives. Removing all livestock from the allotments may result in surface compaction being reduced, which would increase infiltration rates, root space, available water holding capacity, and aeration. The Lizard Allotment would continue to meet land health standards. However, pinyon, juniper, and sagebrush would continue to increase in the Wolfhole Lake Allotment. This would likely continue to diminish understory, which would increase erosion potential. Increased pinyon, juniper, and sagebrush in the Wolfhole Lake Allotment would continue to jeopardize Rangeland Health Standard 3 in this allotment, which directly affects soil stability.

4.6 Cumulative Impacts

"Cumulative impacts" are those impacts resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable actions regardless of what agency or person undertakes such other actions. This EA attempts to qualify and quantify the impacts to the environment that would result from the incremental impact of the proposed action or alternatives when added to other past, present, and reasonably foreseeable future actions. These impacts can result from individually minor but collectively important actions taking place over a period of time.

There are a wide variety of uses and activities occurring on the lands within and adjacent to the Lizard and Wolfhole Lake allotments, including livestock grazing, vehicle touring, mining, etc. Specific actions that are occurring, or are likely to occur in the reasonably foreseeable future are:

- *Livestock grazing* – The Lizard and Wolfhole Lake allotments and the adjacent BLM-administered land are active grazing allotments. Each of these allotments is managed under a grazing system that is documented and described in an AMP. Livestock grazing has occurred in the area for 150+ years.

- *Mining and Mineral Resources* – Public lands within and adjacent to the Lizard and Wolfhole Lake allotments are open to mineral development. The primary economic mineral resource in the areas of the two allotments consists of locatable mineral deposits, including breccia pipe deposits (i.e., vertical collapse features formed from the collapse of karst solution caverns in the underlying Redwall limestone). Other potential mineral resources in the area are salable minerals (consisting primarily of sand, stone and gravel but also clay) and uranium. The potential for gravel is high. Several existing mineral material pits occur in the area.

- *Recreation* – Recreation activities occurring throughout the area involve a broad spectrum of pursuits ranging from dispersed and casual recreation to organized, BLM-permitted group uses. Typical recreation in the area consists primarily of activities such as vehicle touring, wildlife viewing, camping, and hunting. The Arizona Strip is known for its large-scale undeveloped areas and remoteness, which provides an array of recreational opportunities for users who wish to experience primitive and undeveloped recreation, as well as those seeking more organized or packaged recreation experiences

- *Vegetation Treatments* – There are three recorded vegetation treatments that have occurred on the Wolfhole Lake Allotment, totaling over 2,300 acres. There are no recorded vegetation treatments on the Lizard Allotment. The specific treatments are as follows (see Appendix A, Figure 9):

    1. East and West Seegmiller Brush Control: Combination of mechanical and Tebuthiuron treatment. Occurred in 1963 in the northeast corner of the allotment and treated approximately 1,084 acres. The purpose of the project was hazardous fuels reduction and improving biodiversity in sagebrush to help achieve desired plant community objectives.
    2. Wolfhole Exclosure Seeding: Occurred in 1965 in what became the Exclosure or Chaining Pasture and treated approximately 70 acres. The purpose of the project was improving biodiversity in sagebrush to help achieve desired plant community objectives.
    3. Wolfhole Vegetation Treatment and Seeding: Occurred in 1948 and reseeded approximately 1,151 acres. The purpose of this project was to plow big sagebrush and seed understory with desirable perennial grasses to protect soils that were eroding and starting to form channels. Seeding was performed by a rangeland drill.

- *Wildland fire* – Since the early to mid-1900s, wildland fire has effectively been excluded from the allotments, particularly the Wolfhole Lake Allotment. Fire exclusion in these areas is due to aggressive fire suppression policies, domestic livestock grazing (removal of fine fuels), and other land-use practices. BLM fire occurrence records for the allotments indicate that between 1980 and 2015, wildland fires accounted for the following fires and associated acreage (see Table 4.2 below, and Appendix A, Figure 10):

Table 4.2. Fire History in Project Allotments

Allotment	Fire Name	Fire Year	Acreage Burned within Allotment
Lizard	Plateau	2011	1,037
	Low	2006	43
	Lizard	2006	9
	approximately 31 small fires	various past 35 years	each less than 2 acres
Wolfhole Lake	approximately 76 small fires	various in past 35 years	each less than 2 acres

4.6.1 Cumulative Impacts to Livestock Grazing

Livestock grazing in the region has evolved and changed considerably since it began in the 1860s, and is one factor that has created the current environment. At the turn of the century, large herds of livestock grazed on unreserved public domain in uncontrolled open range. Eventually, the range was stocked beyond its capacity, causing changes in plant, soil, and water relationships. Some speculate that the changes were permanent and irreversible, turning plant communities from grass and herbaceous species to brush and trees. Protective vegetative cover was reduced, and more runoff brought erosion, rills, and gullies.

In response to these problems, livestock grazing reform began in 1934 with the passage of the Taylor Grazing Act. Subsequent laws, regulations, and policy changes have resulted in adjustments in livestock numbers, season-of-use changes, and other management changes. Given the past experiences with livestock impacts on public land resources, as well as the cumulative impacts that could occur on the larger ecosystem from grazing on various public and private lands in the region, management of livestock grazing is an important factor in ensuring the protection of public land resources. Past, present, and reasonably foreseeable actions within the analysis area would continue to influence range resources, watershed conditions and trends. The impact of vegetation treatments, voluntary livestock reductions during dry periods, and implementation of a grazing system have improved range conditions. The net result has been greater species diversity, improved plant vigor, and increased ground cover from grasses and forbs.

In the long-term, as the population of the surrounding area increases (which would increase the use of public lands), conflicts between livestock grazing and these other uses could arise. Resolving conflicts may require adjustments and/or restrictions placed on livestock grazing management. Other factors also influence livestock grazing operations, such as climatic and market fluctuations. A six-year drought in the region occurred between 1998 and 2004, which dramatically affected livestock grazing operations on the Arizona Strip, resulting in virtually all cattle being pulled from the public lands in 2004. Similar fluctuations in livestock numbers would likely occur in the future.

The effects on livestock grazing in the allotments have been analyzed in Chapter 4. Since livestock grazing occurs throughout the area and on adjacent private lands, it is reasonable to assume that impacts similar to those identified earlier in this chapter would occur elsewhere in the area. Another action not mentioned above that may affect livestock grazing is listing a species as threatened or endangered under the Endangered Species Act, including designating critical habitat. Making areas unavailable for livestock grazing, placing restrictions on season of use, reducing access, or applying other restrictions meant to protect special status species may impact livestock grazing operations through the loss of forage, increased difficulty of access, increased costs of operation, and reduced livestock numbers (BLM 2007a). While several species have recently been added to the endangered and threatened species list and had

critical habitat designated (including Fickeisen plains cactus, Gierisch mallow, and yellow-billed cuckoo), none of these species are known to occur within the Lizard or Wolfhole Lake Allotments. It is therefore anticipated that none of the alternatives would result in cumulative impacts to livestock grazing when added to other past, present, and reasonably foreseeable activities in the area. There would, however, be varying degrees of short-term disruption to livestock operations should vegetation treatments be approved (see Section 4.2.2).

4.6.2 Cumulative Impacts to Vegetation

Vegetation on the Arizona Strip has gone through significant changes since the 1870s due to historic land use practices and the introduction of non-native species. Livestock grazing would continue across the area on BLM-administered lands. The land health evaluation and permit renewal processes would help ensure grazing practices are conducted in a manner to maintain or improve the ecological health of the area. Rangeland management practices would act to prevent and control the spread of invasive plant species, maintain diverse and natural plant communities, improve wildlife habitat, reduce erosion, and improve water quality. The objectives developed to manage for healthy rangelands have a goal of keeping the entire ecosystem healthy and productive in order to ensure that it yields both usable products and intrinsic values.

There is an active gypsum mine within the Lizard Allotment. Most of the area in and adjacent to the Lizard and Wolfhole Lake allotments is open to locatable mineral claims including brecca pipe minerals and bentonite. Gypsum mining in the region, as well as use of mineral material sites in the area, would cumulatively affect vegetation through the loss of vegetation, higher rates of erosion and sedimentation in drainages/waterways, increased deposition of dust on vegetation adjacent to roadways (i.e., haul routes), and introduction and spread of invasive plants. Reclamation activities would counter some of the reduction in vegetative cover, and preventative measures to inhibit the spread of invasive species could curtail infestation by species such as Scotch thistle.

The effects of livestock grazing on vegetation in the Lizard and Wolfhole Lake allotments have been analyzed under the "Direct and Indirect Effects" section of this chapter. Past, present, and reasonably foreseeable actions within the analysis area would continue to affect this resource, as described above. However, continuing to monitor plant communities and to implement the Arizona Standards for Rangeland Health should help ensure the long-term health of rangeland resources, including vegetation. None of the alternatives are anticipated to change the land health determination for either allotment (see Section 3.2.3); it is anticipated that the alternatives would not result in cumulative impacts to vegetation resources when added to other past, present, and reasonably foreseeable activities in the area.

4.6.3 Cumulative Impacts to Wildlife, Including Big Game, Migratory Birds, and Sensitive Species

The cumulative impacts analysis area for wildlife includes areas outside of the allotment boundaries since impacts may be relevant to many species over a broader area. Watershed boundaries offer a logical containment area for analysis and are often an accepted spatial unit for conducting effects analysis, especially for cumulative effects (BLM 2008b). Multiple level 6 hydrologic unit code (HUC) polygons were selected to represent an appropriate spatial scale for analysis. A hydrologic unit describes the area of land upstream from a specific point on the stream (generally the mouth or outlet) that contributes surface water runoff directly to this outlet point. The Wolfhole Lake cumulative impacts analysis area covers 122,446 acres and consists of six 6th-level HUCs. Similar to vegetation in the Wolfhole Lake Allotment,

vegetation in the analysis area primarily consists of pinyon-juniper and sagebrush. Other types include mixed desert scrub and saltbush shrubland. The Lizard cumulative impacts analysis area consists of the Lizard Allotment boundary (12,513 acres). The allotment boundary was chosen because no vegetation treatments are proposed for this allotment and the proposed grazing would be limited to within the boundary fence. Vegetation consists of Mojave Desert scrub and mid-elevation mixed desert scrub. Approximately 68% of the analysis area consists of land managed by the state of Arizona.

Grazing occurs throughout the analysis area on numerous allotments with similar effects as those outlined in the direct and indirect impacts sections of this chapter. Utilization is limited to 50% on all allotments with a rotational grazing system (or 45% on allotments without a rotational grazing system), providing for enough forage resources for wildlife populations to persist throughout the analysis area.

Several past actions within the analysis area contribute to the overall effects to wildlife (Table 4.3). Vegetation treatments completed over the past 60 years have occurred in the Wolfhole Lake analysis area (see above). These past treatments had a wide array of effects, with some projects having long-lasting impacts to mule deer, migratory birds, and sensitive species such as setting plant communities back to early seral stages, and some areas being dominated by non-native plant species. Wildlife species throughout the analysis area have also been affected by the development of roads, power lines, water developments, fences, mines, and other structures. The BLM, in cooperation with grazing permittees and AGFD, have been installing lids or wildlife escape ramps and floating bird ladders in water developments in these and all allotments across the Arizona Strip to minimize mortality to wildlife.

Construction of one new livestock catchment is anticipated within the Wolfhole Lake analysis area. This small-scale project represents the only reasonably foreseeable action with potential effects such as (minimal) vegetation removal, disturbance, and water availability – only about one acre would be contributed to the cumulatively impacted area.

Table 4.3 Summary of Cumulative Effects to Wildlife.

	Wolfhole Lake Cumulative Impacts Analysis Area	**Lizard Allotment Cumulative Impacts Analysis Area**
Past Mechanical and Chemical Vegetation Treatments	30,312	0
Past Impacts (roads, power lines, range developments, mines, structures)	854	96
Proposed Vegetation Treatments (this EA)	**4,761**	**0**
Other Reasonably Foreseeable Projects (catchments)	1	0
Total Area Cumulatively Impacted	35,927	96
Proportion of Analysis Area Cumulatively Impacted	29.3%	0.7%
Proportion of Pinyon-Juniper & Sagebrush Habitat Cumulatively Impacted	44.2%	0

Recreational pursuits, including off-highway vehicle (OHV) use, camping, and target shooting can cause disturbance to wildlife species and their habitats. Disturbance can come from noise, wildlife collisions, or the mere presence of humans. Different species, and individuals within species, react differently to disturbances. The type of reaction also differs with the time of year, location of disturbance in relation to

breeding sites, type of disturbance, and duration of disturbance. With the increase in local populations has come a dramatic increase in the level of OHV use, resulting in increased disturbance, injury, and mortality to wildlife, particularly ground dwelling species with low mobility. Transportation corridors exist through the habitat of virtually all species found within the analysis areas discussed in this EA.

The effects of livestock grazing and proposed vegetation treatments/structural range improvements on wildlife in the Wolfhole Lake and Lizard Allotments have been analyzed under the "Direct and Indirect Effects" section of this chapter. In addition to livestock grazing, there are a wide variety of uses and activities occurring on the lands within and adjacent to the allotments, as described above. This additive impact may affect wildlife habitat or corridors and the greater ecosystems by altering vegetation associations. These systems and the health of the region as a whole are important for the survival of many native species. Consultation with AGFD in regard to the actions proposed in this EA did not identify any issues directly related to wildlife beyond those already discussed above. AGFD issues hunting permits, including permits for predator species. The BLM has no specific information concerning permits or additional predator control in the areas addressed in this EA.

4.6.4 Cumulative Impacts to Soils

Soils in the area formed under conditions that had no vehicles or large numbers of large animals to impact them. Population growth, grazing, and developments over the past 150 years have resulted in soil disturbance on hundreds of thousands of acres at and near homesteads, communities, roads, and waters across the Arizona Strip. Continued population growth and the resulting growth in vehicle and OHV use and visitation in the region would continue to add to the acreage of soil disturbance. Continued AMP implementation, watershed plans, and the land health evaluation process would continue to examine areas on an allotment or watershed scale for impacts and would apply remedies to decrease compaction and erosion. Continued and/or additional mining would increase disturbance to soils, although reclamation would stabilize the replaced soils. Droughts would reduce overall vegetative cover making soils more susceptible to erosion, especially where there is surface disturbance. Wildfire would continue to make soils more susceptible to erosion.

The effects of livestock grazing on soils in the Lizard and Wolfhole Lake Allotments have been analyzed under the "Direct and Indirect Effects" section of this chapter. In addition to livestock grazing, there are a wide variety of uses and activities occurring on the lands within and adjacent to the Lizard and Wolfhole Lake allotments, as described above. However, continuing to monitor soils and to implement the Arizona Standards for Rangeland Health should help ensure that soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and ecological site. Both allotments are meeting or making progress towards meeting Standard #1 which addresses soil condition. Three of the alternatives would continue the current condition, with soils continuing to be at risk (as described in Section 4.5). It is likely that the proposed alternative with vegetation treatments to enhance understory would see the greatest potential for an upward trend in vegetation and soil resources. It is anticipated that the alternatives would not result in cumulative impacts to soils when added to other past, present, and reasonably foreseeable activities in the area.

4.7 Monitoring

Dry weight ranking (DWR) studies would continue to be used to measure attainment of the key area DPC objectives. In addition, pace frequency studies would continue to be used at each key area to detect changes of individual species which determines a trend or change in vegetation composition. Pace frequency and DWR would be completed on each key area. DWR and pace frequency study methodologies are described

in *Sampling Vegetation Attributes*, Interagency Technical Reference 1734-4 (BLM 1999b). Additional trend studies would be established for each new proposed pasture. Existing trend studies provide years of baseline data for comparisons to pre- and post-treatment. Livestock use on forage plants is determined by conducting grazing utilization studies using the Grazed-Class Method as described in the *Utilization Studies and Residual Measurements* Interagency Technical Reference 1734-3 (BLM 1999a). Utilization studies would be completed by the BLM when livestock are removed from the pasture. Study data would be compiled each year. Other information to be collected and compiled includes precipitation and actual use. All monitoring data would be used to evaluate current management of the allotment and assist the BLM in making management decisions that help achieve vegetation objectives.

The monitoring addressed above is sufficient to identify changes in vegetation as a result of livestock grazing activities. In addition to those methods described, there are efforts in place to inventory for noxious weed establishment.

Chapter 5

CONSULTATION AND COORDINATION

5.1 Summary of Public Participation

Public involvement for the Lizard and Wolfhole Lake allotments permit renewal process began with a scoping meeting for the Lizard Allotment's land health evaluation on November 10, 2005 and a scoping meeting for Wolfhole Lake Allotment on November 10, 2005, followed by a field visit on September 5, 2006 for Wolfhole Lake Allotment. The evaluations were conducted by an interdisciplinary assessment team of BLM resource specialists assisted by the Rangeland Resources Team appointed by the Arizona Resource Advisory Council. Draft evaluations were sent out for public review and comment to individuals, groups, and agencies. Comments were incorporated into the final Lizard and Wolfhole Lake land health evaluation reports. The BLM completed evaluations of rangeland health conditions on the Lizard Allotment in 2011; and the Wolfhole Lake Allotment in 2013. Comments were received in response to the completion of these evaluations and incorporated into the EA process as scoping comments. The EA reflects the analysis of the proposed grazing permit renewal and vegetation treatments/structural range improvements.

A preliminary EA was posted on the BLM ePlanning web page on November 14, 2018 for review; a notice of public comment period letter was sent to those persons and groups listed on the Arizona Strip interested publics mailing list notifying them of the availability of the EA for a 30-day review and comment period. All comments received during development of the EA are summarized in Appendix G along with a response to each comment.

It should be noted that there are slight changes in the overstory acreages that were reported in the preliminary EA that was available for public comment. These changes are due to a more detailed analysis of the cover types. The treatment boundaries and polygons did not change substantially from the preliminary EA. Areas that are proposed for exclusion from treatment due to protection of sensitive resources were analyzed as treatment areas in the preliminary EA. The analysis has been revised to reflect that these areas would not be treated.

A second revision to the preliminary EA involves the cover types and associated acreage of each cover type. Portions of the original analysis were conducted with South West Regional Gap Analysis (SWReGap), which is a vegetation mapping and modeling software. In some areas, this tool may overestimate tree cover, and may neglect scattered shrub overstory, including sagebrush. Upon further analysis, the cover types were re-mapped utilizing a combination of NRCS soil mapping and cover data, coupled with National Agriculture Imagery Program for greater accuracy in distinguishing overstory. All pertinent tables and narrative have been updated in this EA to reflect these minor changes.

One last revision to the preliminary EA is the addition of an analysis on the differences between how cattle and horses graze plants, due to differences in the anatomy of their mouths (see Section 4.3.1). This addition did not change the overall analysis of impacts to vegetation from what was presented in the preliminary EA.

5.2 List of Preparers and Contributors

Table 5.1 lists BLM preparers/reviewers who contributed to preparation of this EA. Table 5.2 lists additional agencies and personnel involved in preparation of this EA.

Table 5.1. List of BLM Preparers/Reviewers.

Name	Title	Responsible for the Following Program(s)
Gloria Benson	Tribal Liaison	Native American Religious Concerns
Michael Cutler	Rangeland Management Specialist	Invasive, Non-Native Species, Range
Lorraine Christian	Arizona Strip Field Manager	Project Oversight
Jeff Young and Shawn Langston	Wildlife Biologist	Special Status Animals, Wildlife
Jace Lambeth	Rangeland Management Specialist	Special Status Plants
Sarah Page	Archaeologist	Cultural Resources
Amanda Harrington	Realty Specialist	Lands/Realty/Minerals
Michael Cutler	Rangeland Management Specialist	Range/Vegetation/Weeds/S&G
John Sims	Supervisory Law Enforcement	Law Enforcement
Brian McMullen	Soil Scientist	Soils, Water, Air
Jon Jasper	Recreation Planner	Recreation/Wilderness/VRM
Amber Hughes	Planning & Environmental Coordinator	NEPA Compliance

Table 5.2. List of Persons, Agencies and Organizations Consulted.

Name	Agency/Organization	Consulted for the Following Program(s)
Luke Thompson	Arizona Game and Fish Department	Wildlife and Vegetation
Daniel Bulletts	Kaibab Paiute Tribe	Cultural Resources, Native American Religious Concerns
Dawn Hubbs	Hualapai Tribe	Cultural Resources, Native American Religious Concerns

Chapter 6

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Acronyms and Abbreviations

AGFD	Arizona Game and Fish Department
AMP	Allotment Management Plan
AMSL	Above Mean Sea Level
AUM	Animal Unit Month
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
CBW	Composition by Weight
DFC	Desired Future Condition
DPC	Desired Plant Community
DR	Decision Record
DWR	Dry Weight Rank
EA	Environmental Assessment
EIS	Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
GMU	Game Management Unit
IBLA	Interior Board of Land Appeals
LHE	Land Health Evaluation
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NOFD	Notice of Final Decision
NOPD	Notice of Proposed Decision
NRCS	Natural Resources Conservation Service
OHV	Off-Highway Vehicle
PL	Public Law
PNC	Potential Natural Community
PRIA	Public Rangelands Improvement Act
p.z.	Precipitation Zone
RMP	Resource Management Plan
S&G	Standards and Guidelines
SWIFL	Southwestern Willow Flycatcher
UBWR	Utah Board of Water Resources
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VRM	Visual Resource Management

7.0 APPENDICES

Appendix A – Allotment Maps (Figures) and Range Improvement Example Photos.

Appendix B – Applicable Resource Management Plan Decisions (for Plan Conformance Determination)

Appendix C – Desired Plant Community Objectives for Lizard and Wolfhole Lake Allotments.

Appendix D – Allotment Monitoring Data.

Appendix E – Sensitive Species Excluded From Detailed Analysis

Appendix F – Ecological Site Description Loamy Upland 10-14" R035XC313AZ and Ecological Site Description System Cobbly Gypsum Hills 6-9" R030XB223AZ.

Appendix G – Comments Received and Response to Comments

Appendix H – Rangeland Health Determinations Wolfhole Lake and Lizard Allotments.

Appendix A. Lizard and Wolfhole Lake Allotment Maps and Range Improvement Examples

Figure 1. Lizard and Wolfhole Lake Allotment Grazing Permit Renewal - Vicinity Map
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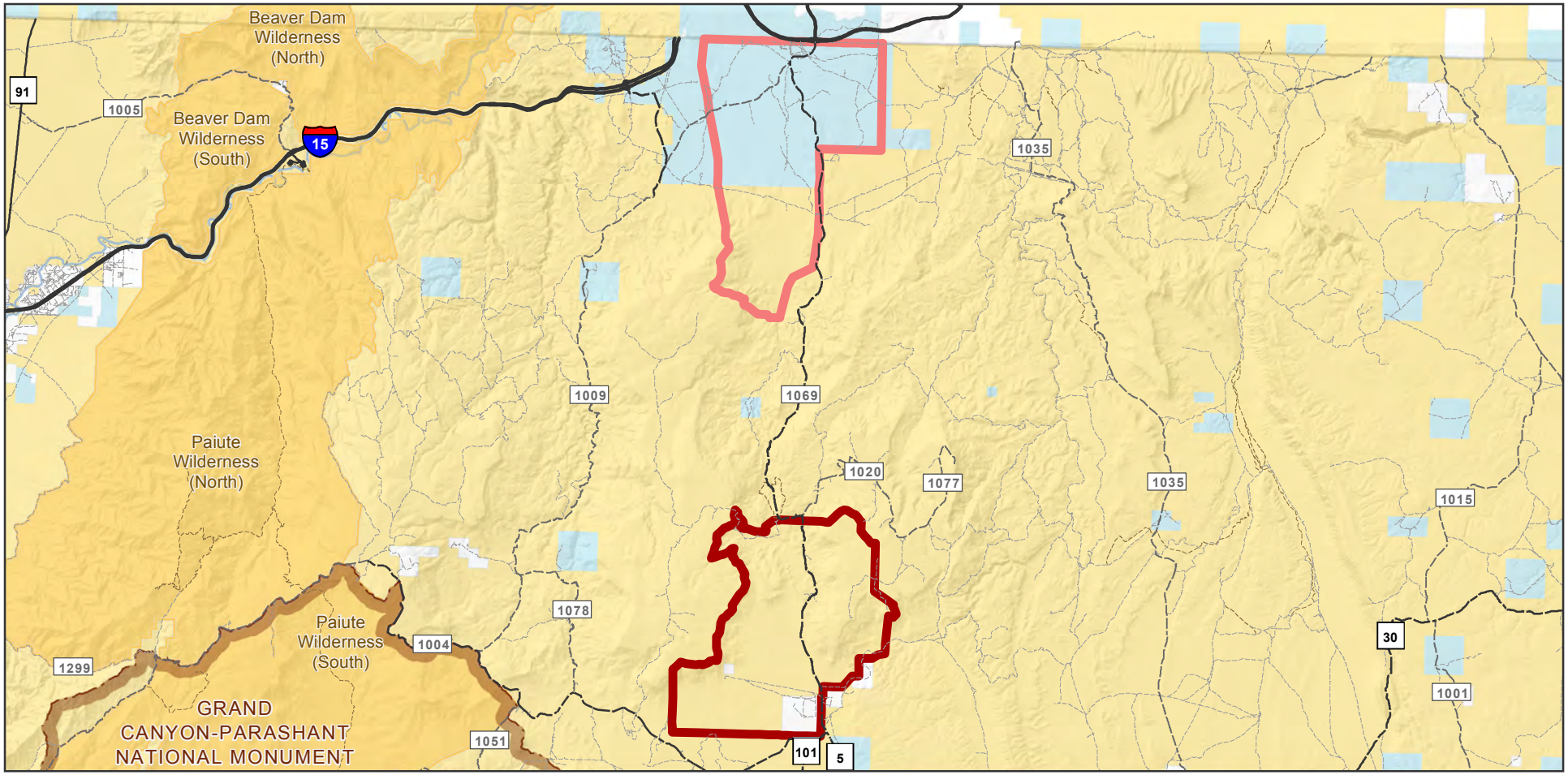
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Arizona Strip District
BLM National Monument
BLM Designated Wilderness
Lizard_Allot
Wolfhole_Lake_Allot

Surface Management Agency
Bureau of Land Management
State
Private

Arizona Strip Routes
Primary Road Paved
Secondary Road Paved
Primary Road Unpaved
Secondary Road Unpaved
Tertiary Road Unpaved
Single Track

0 5 10 Miles
0 5 10 Kilometers

Map Produced by BLM Arizona Strip District
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Reference System: U.S. PLSS GSRB&B
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Date: 9/25/2018

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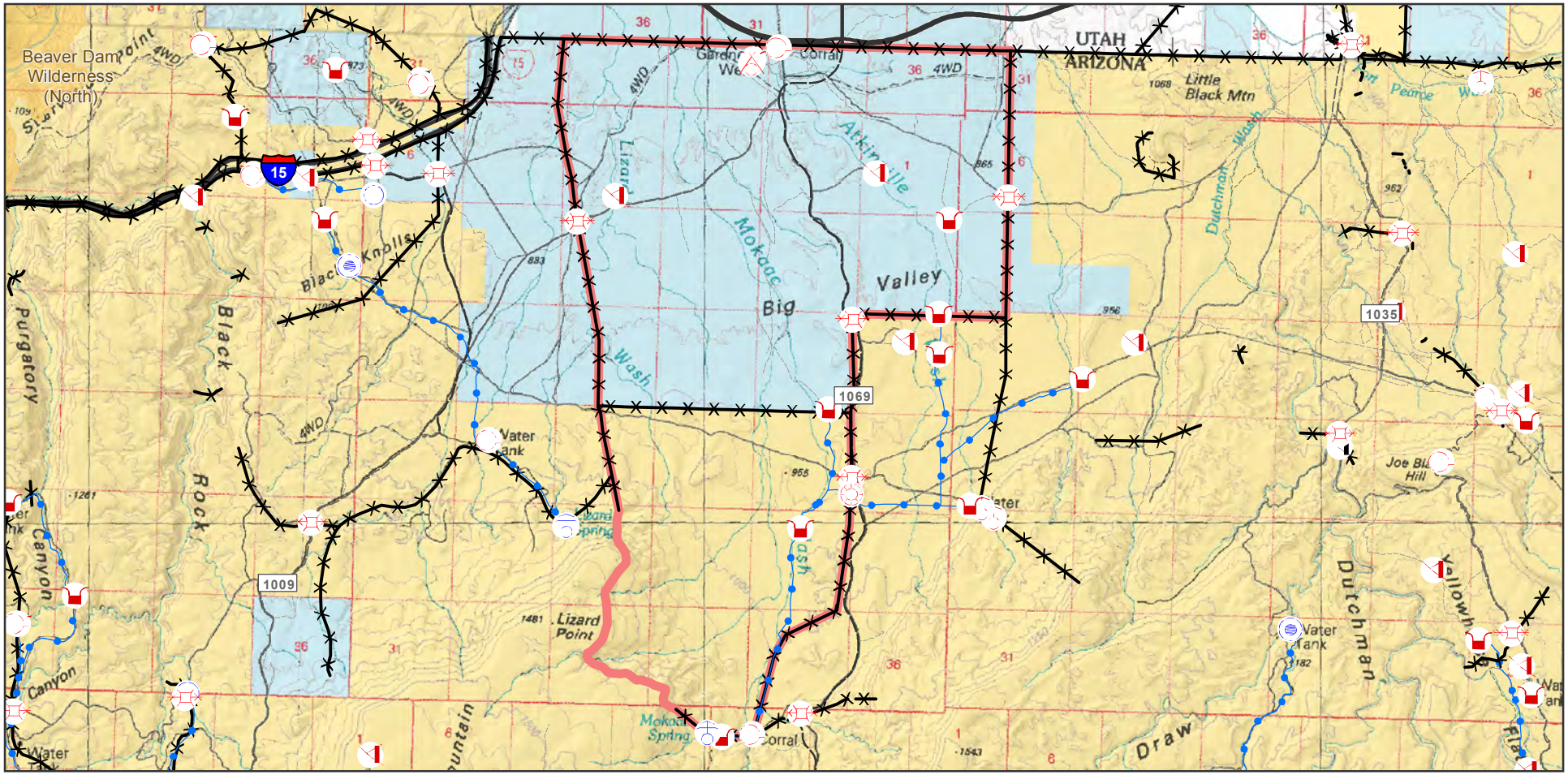
Figure 2. Lizard Allotment Existing Range Improvements.

DOI-BLM-AZ-A010-2018-0032-EA

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



- Bucket Precip Gauge
- Cattleguard
- Corral
- Windmill
- Developed Spring
- Fenced Reservoir
- Livestock Trough
- Undeveloped Spring
- Unfenced Reservoir
- Water Storage Tank
- Well
- Fence
- Pipeline

Arizona Strip Routes

- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track

- Arizona Strip District
- BLM Designated Wilderness
- USFS Designated Wilderness

Surface Management Agency

- Bureau of Land Management
- State
- Private
- Lizard_Allot

0 100 200 400 600 800 1,000 1,200 1,400 Miles

0 200 400 800 1,200 1,600 2,000 Kilometers

Map Produced by BLM Arizona Strip District
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Date: 9/25/2018

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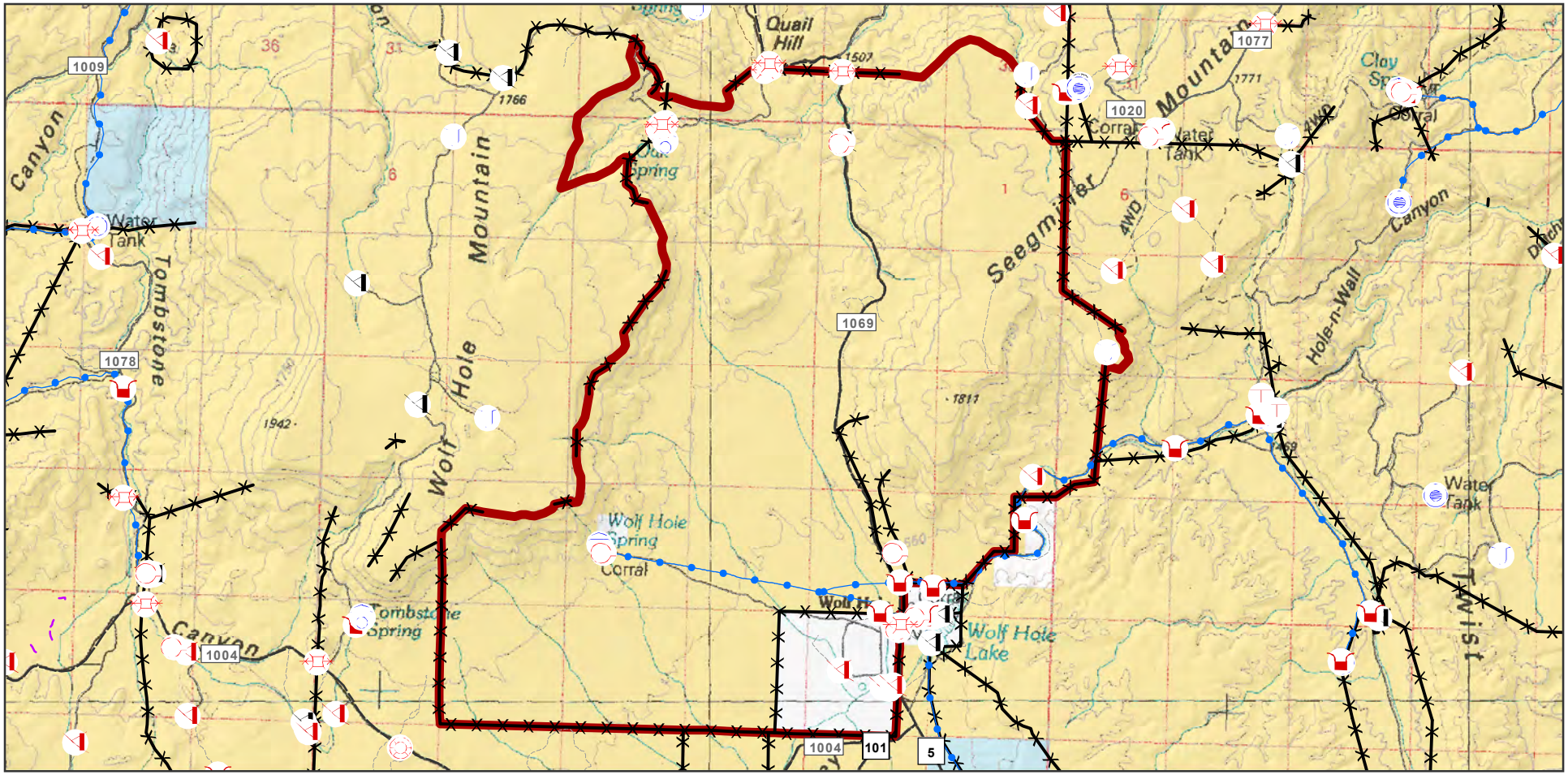
Figure 3. Wolfhole Lake Allotment Existing Range Improvements.

DOI-BLM-AZ-A010-2018-0032-EA

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



- Bucket Precip Gauge
- Cattleguard
- Corral
- Detention Dam
- Developed Spring
- Fenced Reservoir
- Livestock Catchment
- Livestock Trough
- Unfenced Reservoir
- Water Storage Tank
- Well
- Wildlife Drinker
- Fence
- Pipeline
- Dike

Arizona Strip Routes

- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track

- Arizona Strip District

Surface Management Agency

- Bureau of Land Management
- State
- Private
- Wolfhole_Lake_Allot

0 100 200 400 600 800 1,000 1,200 1,400 Miles

0 200 400 800 1,200 1,600 2,000 Kilometers

Map Produced by BLM Arizona Strip District
File: Wolfhole Lake existing RIPS 2018.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&B
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User: mcutler
Date: 6/27/2018

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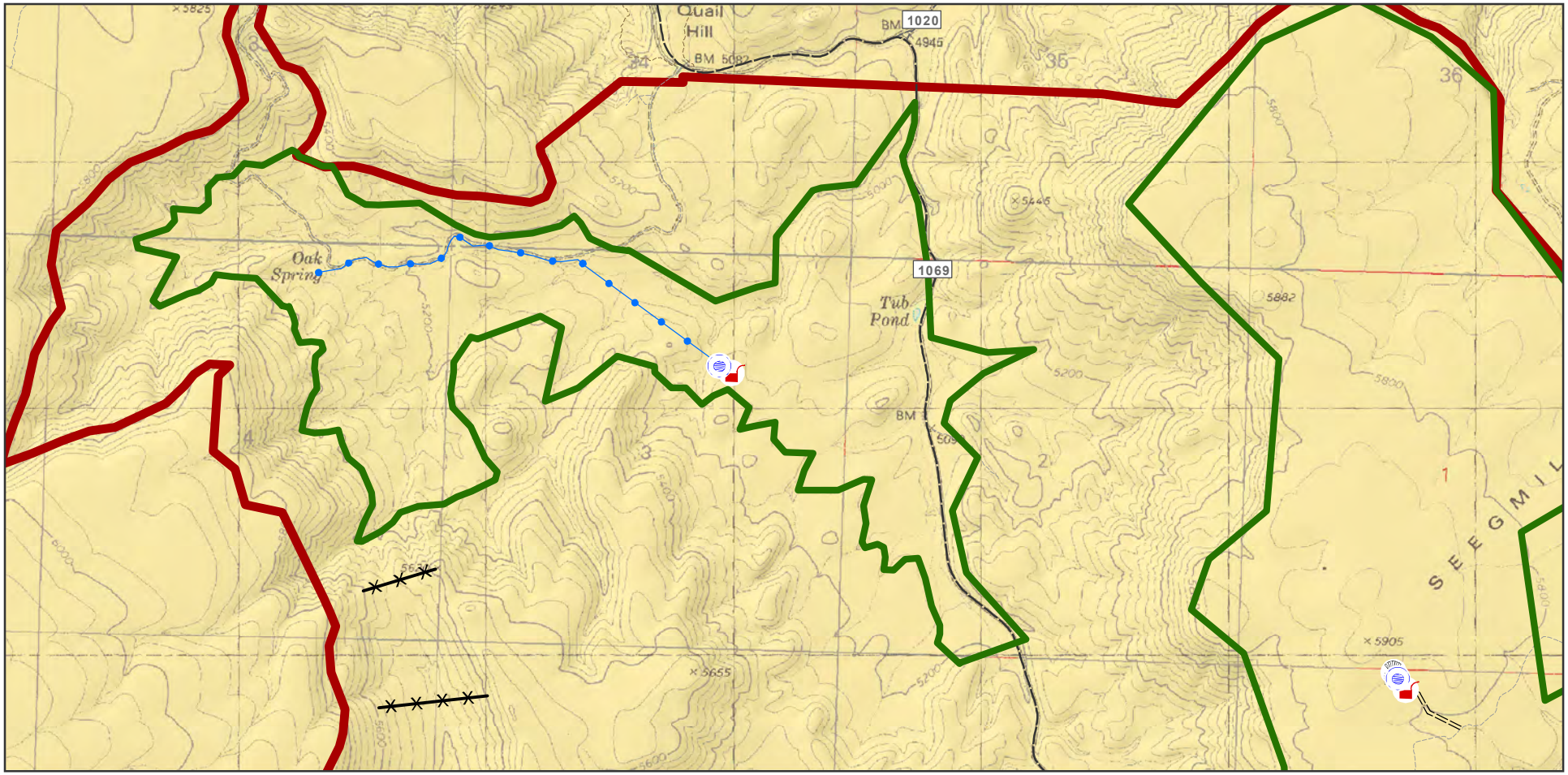
File Path: T:\AZ\Arizona_Strip_DOI\GIS_Users\mcutler\Projects\Lizard_WolfholeLk_Wildcat\Wolfhole etal new 2018\Wolfhole Lake existing RIPS 2018.mxd

Figure 4. Wolfhole Lake Allotment Proposed Range Improvements (Oak Springs and Portion of Seegmiller Proposed Treatment Areas).

DOI-BLM-AZ-A010-2018-0032-EA

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



proposed Wolfhole Lk Water Storage Tank

proposed_wolfhole_troughs

proposeed_catchment_Feature...

proposed__wolfhole_pipeline_ext

proposed _wolfholelk_fences

proposed Wolfhole Lk catchment access route

Arizona Strip Routes

Primary Road Unpaved

Secondary Road Unpaved

Tertiary Road Unpaved

Single Track

Arizona Strip District

Surface Management

Bureau of Land Management

Wolfhole Lake Veg tmts

Wolfhole_Lake_Allot

0 100 200 400 600 800 1,000 1,200 1,400 Miles

0 200 400 800 1,200 1,600 2,000 Kilometers

Map Produced by BLM Arizona Strip District
File: Oak Springs proposed RIPS 2018.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&B
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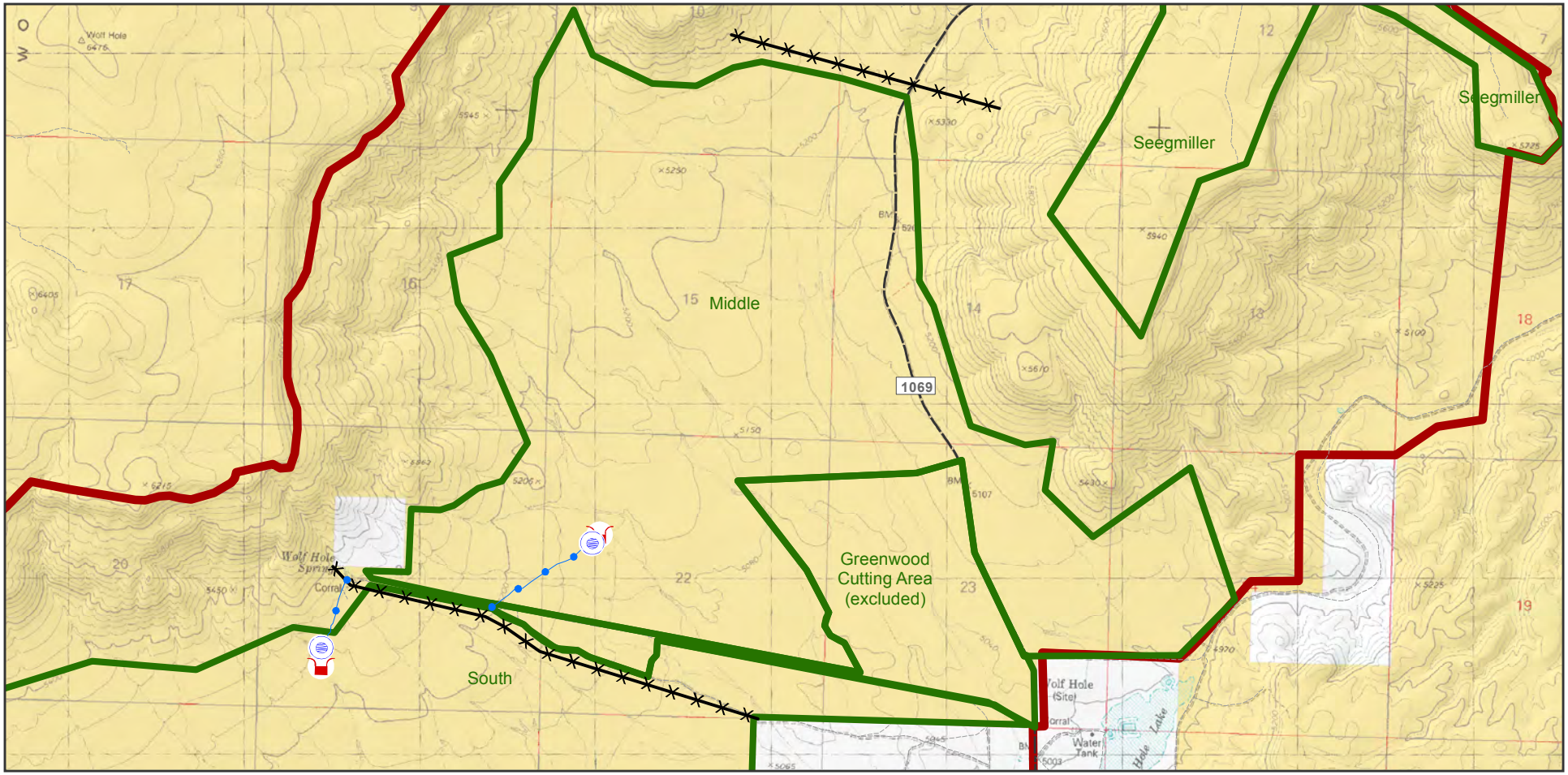
Figure 5. Wolfhole Lake Allotment Proposed Range Improvements (Middle and South Proposed Pastures and Treatment Areas).

DOI-BLM-AZ-A010-2018-0032-EA

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



proposed Wolfhole Lk Water Storage Tank

proposed_wolfhole_troughs

proposed__wolfhole_pipeline_ext

proposed _wolfholelk_fences

Arizona Strip Routes

Primary Road Unpaved

Tertiary Road Unpaved

Arizona Strip District

Surface Management Agency

Bureau of Land Management

Private

Wolfhole Lake Veg tmts

Wolfhole_Lake_Allot

0 100 200 400 600 800 1,000 1,200 Miles

0 200 400 800 1,200 1,600 2,000 Kilometers

Map Produced by BLM Arizona Strip District
File: Middle and south proposed RIPS 2018.mxd
Coordinate System: NAD 1983 UTM Zone 12N
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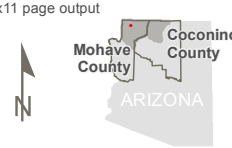

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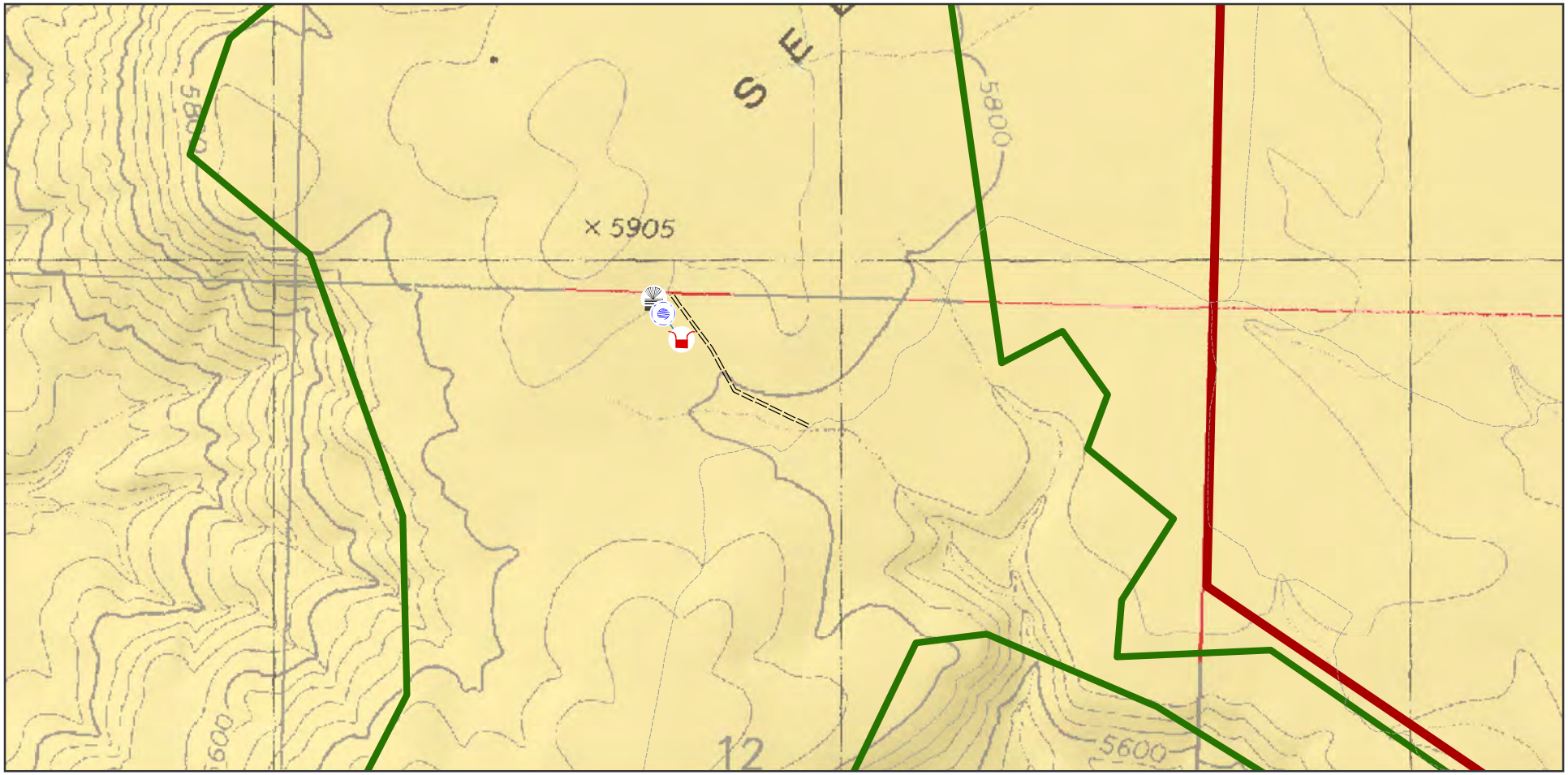
Figure 6. Wolfhole Lake Allotment Proposed Range Improvements (Seegmiller Pasture and Treatment Area). DOI-BLM-AZ-A010-2018-0032-EA

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



proposed Wolfhole Lk Water Storage Tank

proposed_wolfhole_troughs

proposeed_catchment

proposed__wolfhole_pipeline_ext

proposed Wolfhole Lk catchment access route

Arizona Strip Routes

Tertiary Road Unpaved

Arizona Strip District

Surface Management

Bureau of Land Management

Wolfhole Lk veg tmts

Wolfhole_Lake_Allot

0 100 200 400 600 800 1,000 1,200 1,400 Miles

0 200 400 800 1,200 1,600 2,000 Kilometers

Map Produced by BLM Arizona Strip District
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Date: 6/27/2018

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Figure 7. Lizard Allotment Current Major Vegetation Types
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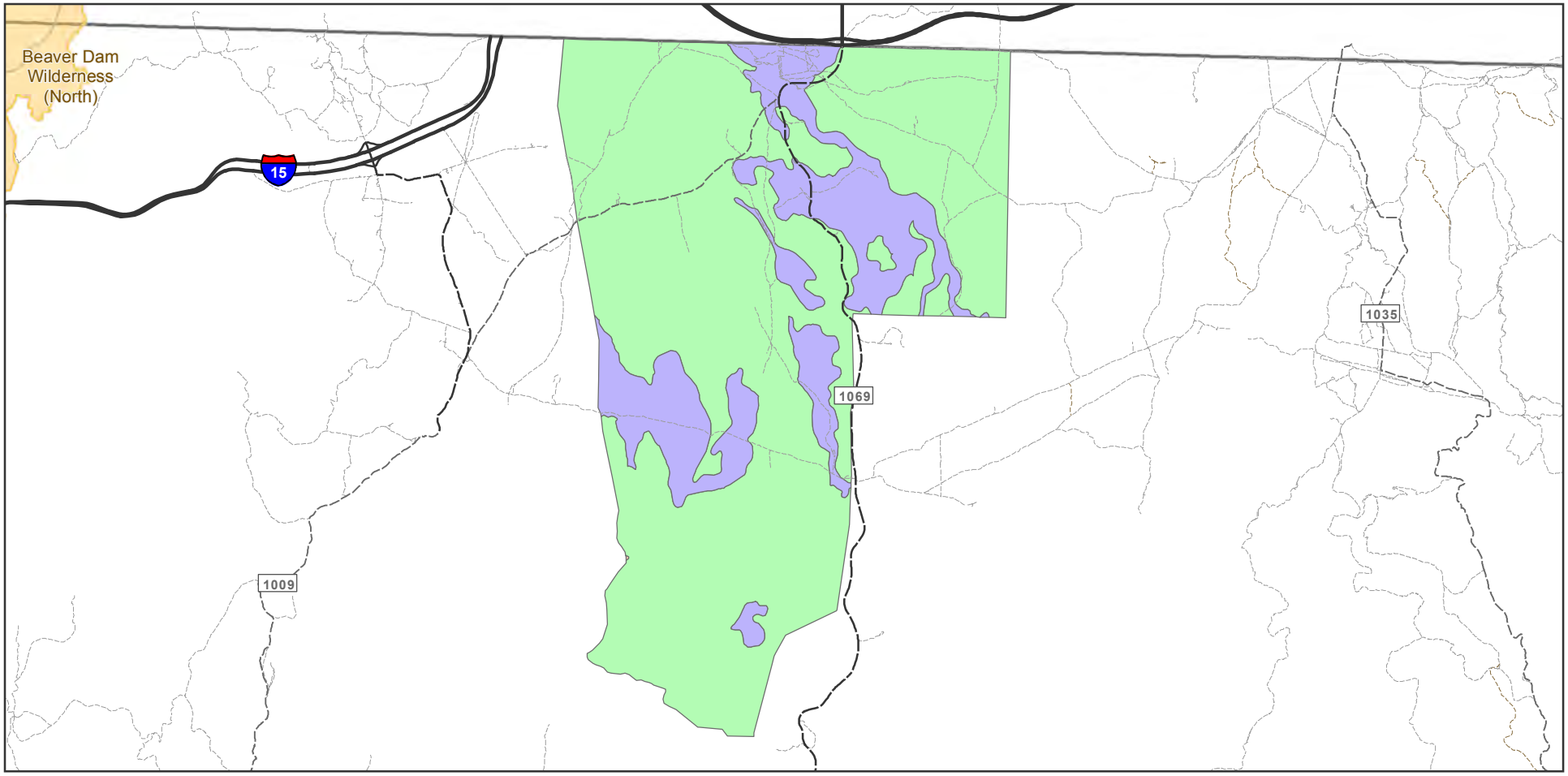
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Arizona Strip Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track

- Arizona Strip District
- Creosote/Bursage
- Great Basin Blackbrush
- Mohave Mixed Shrub
- BLM Designated Wilderness

0 100 200 400 600 800 1,000 1,200 Miles

0 200 400 800 1,200 1,600 2,000 Kilometers

Map Produced by BLM Arizona Strip District
File: Lizard 2018 current veg.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&B
Scale: 1:99,664 at 8.5x11 page output
User: mcutler
Date: 3/14/2018

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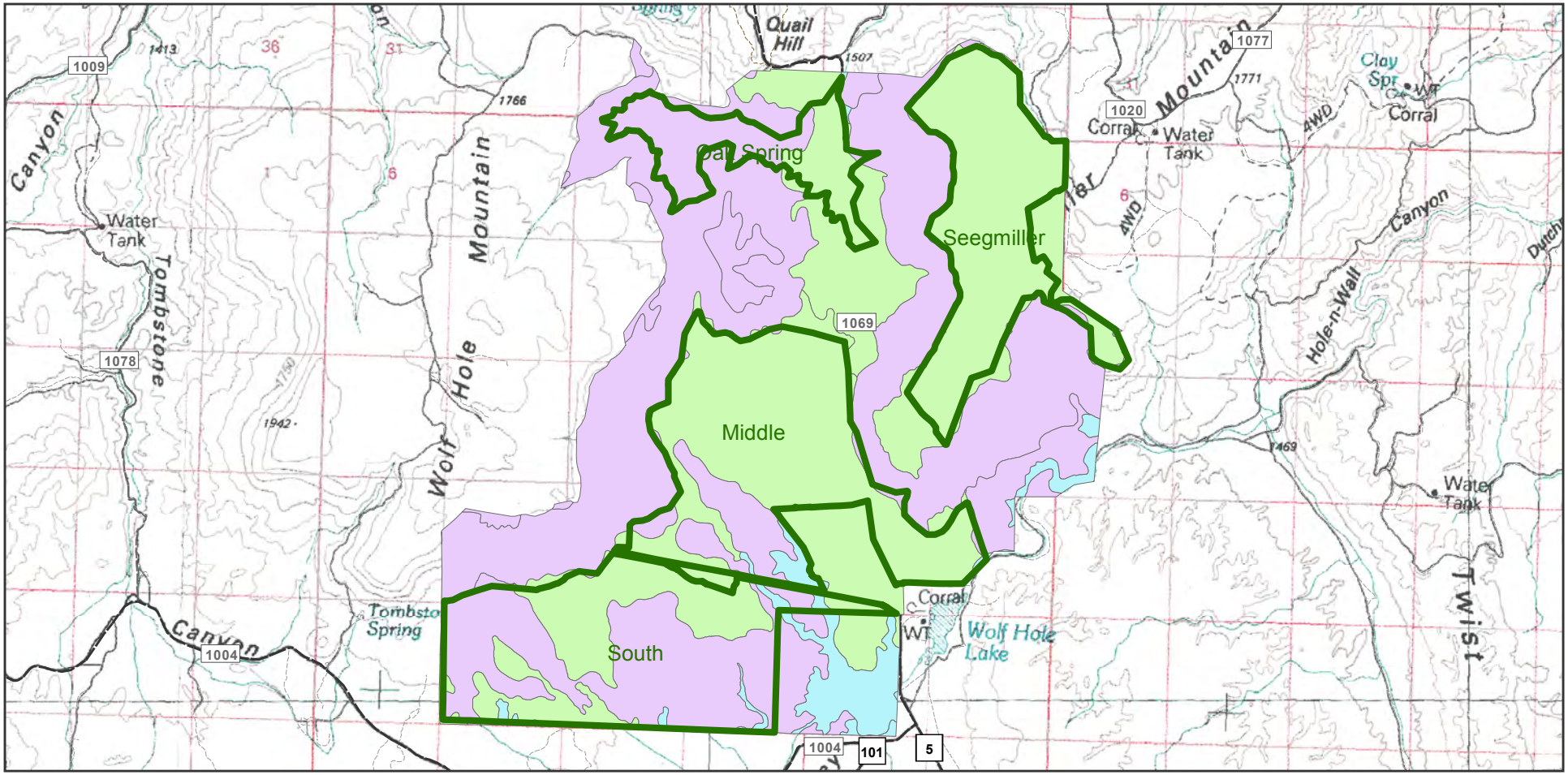
File Path: T:\AZA\Arizona_Strip_DOI\GIS_Users\mcutler\Projects\Lizard_Wolfhole\LX_WildcatWolfhole.etal.new 2018\Lizard 2018 current veg.mxd

Figure 8. Wolfhole Lake Allotment Current Major Vegetation Types.
DOI-BLM-AZ-A010-2018-0032-EA.

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Arizona Strip Routes
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track

Wolfhole_Veg_Treatment_Boundary

Wolfhole Lake Current Dominant Overstory
- PJ-sagebrush
- Pinyon-Juniper
- Sagebrush

0 100 200 400 600 800 1,000 1,200 Miles

0 200 400 800 1,200 1,600 2,000 Kilometers

Map Produced by BLM Arizona Strip District
File: Wolfhole Lk current veg 062019.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&B
Scale: 1:80,993 at 8.5x11 page output
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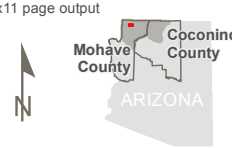
Date: 6/4/2019



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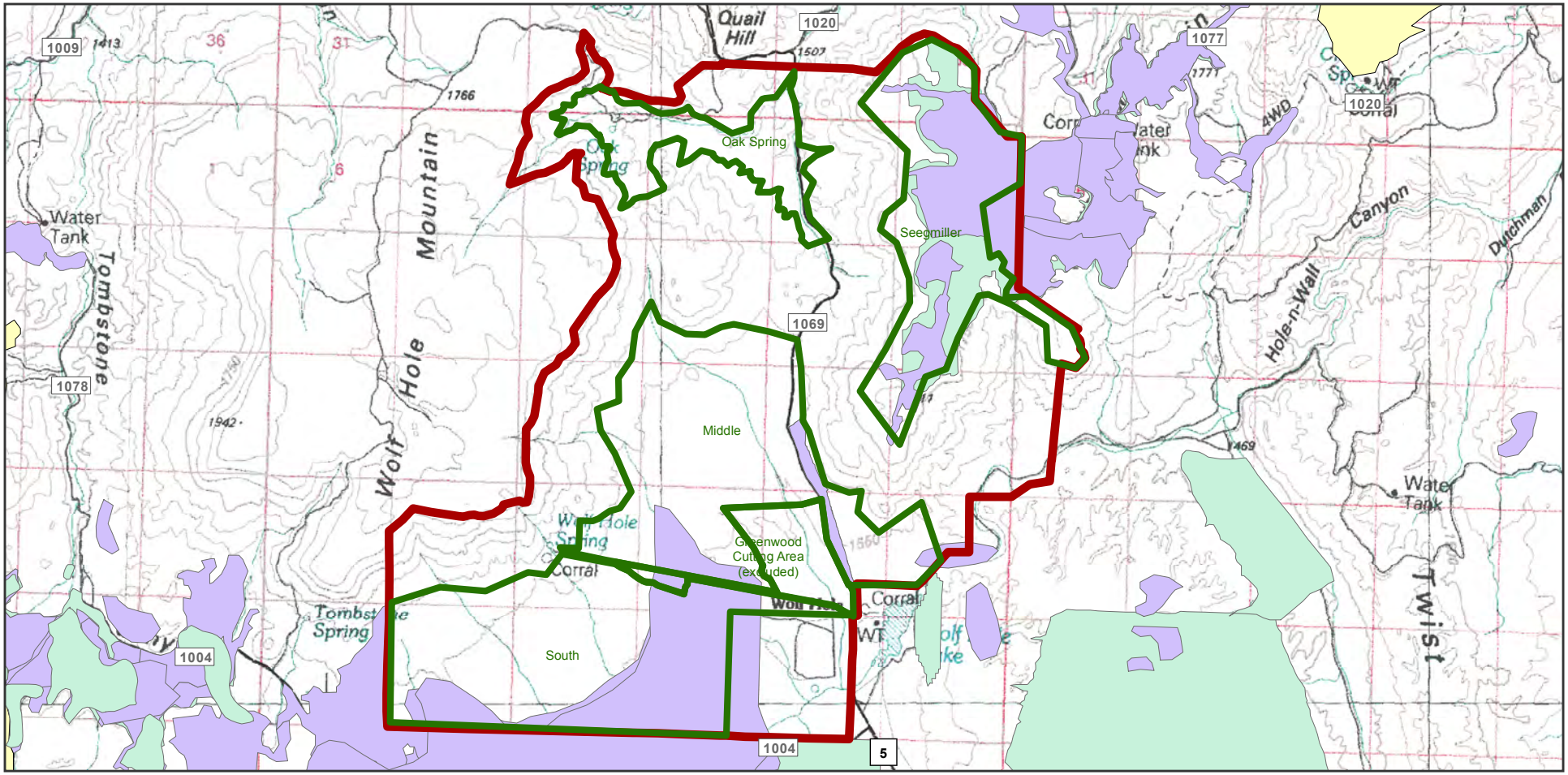
File Path: T:\AZ\Arizona_Strip_DO\GIS_Users\mcutler\Projects\Wolfhole 2019\Wolfhole Lk current veg 062019.mxd

Figure 9. Wolfhole Lake Allotment Historic VegetationTreatments.

DOI-BLM-AZ-A010-2018-0032-EA

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Vegetation Treatment Area Completed Polygons
TRTMNT_TYPE_CD
- CHEMICAL
- MECHANICAL/SEEDING
- PRESCRIBED FIRE

Arizona Strip Routes
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track

- Arizona Strip District
- Wolfhole_Lake_Allot
- Wolfhole Veg tmts

0 100 200 400 600 800 1,000 1,200 Miles
0 200 400 800 1,200 1,600 2,000 Kilometers

Map Produced by BLM Arizona Strip District
File: Wolfhole Lk 2018 historic veg tmts.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&B
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Date: 9/25/2018

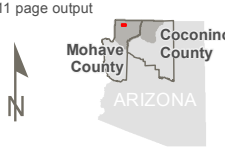

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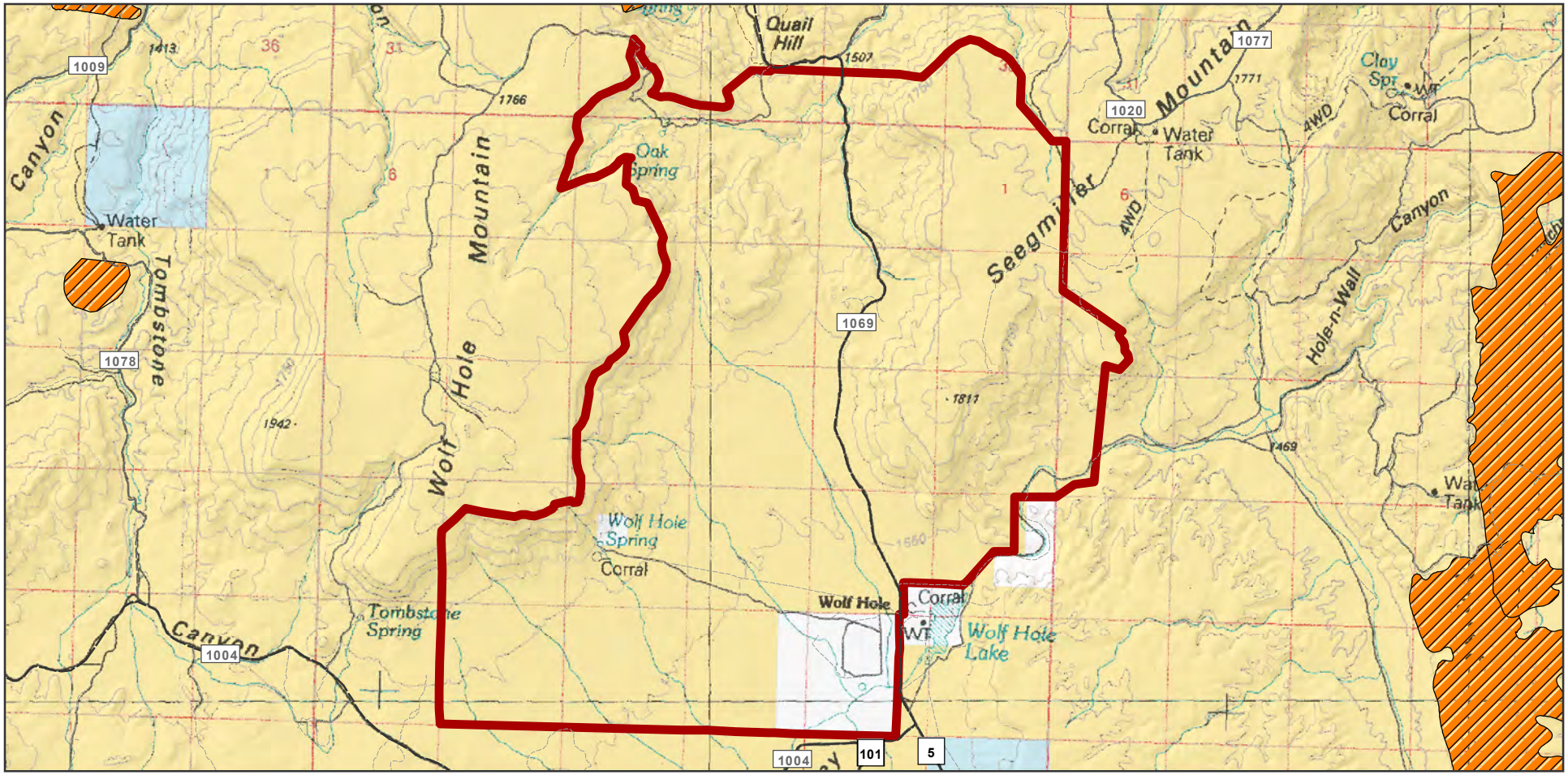
Figure 10. Wolfhole Lake Allotment Historic Wildfire.

DOI-BLM-AZ-A010-2018-0032-EA

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



fire history perimeter

Arizona Strip Routes

- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track

Arizona Strip District

Wolfhole_Lake_Allot

Surface Management Agency

- Bureau of Land Management
- State
- Private

0 100 200 400 600 800 1,000 1,200 Miles

0 200 400 800 1,200 1,600 2,000 Kilometers

Map Produced by BLM Arizona Strip District
File: fire history 2018.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&B
Scale: 1:80,900 at 8.5x11 page output
User: mcutler
Date: 6/27/2018

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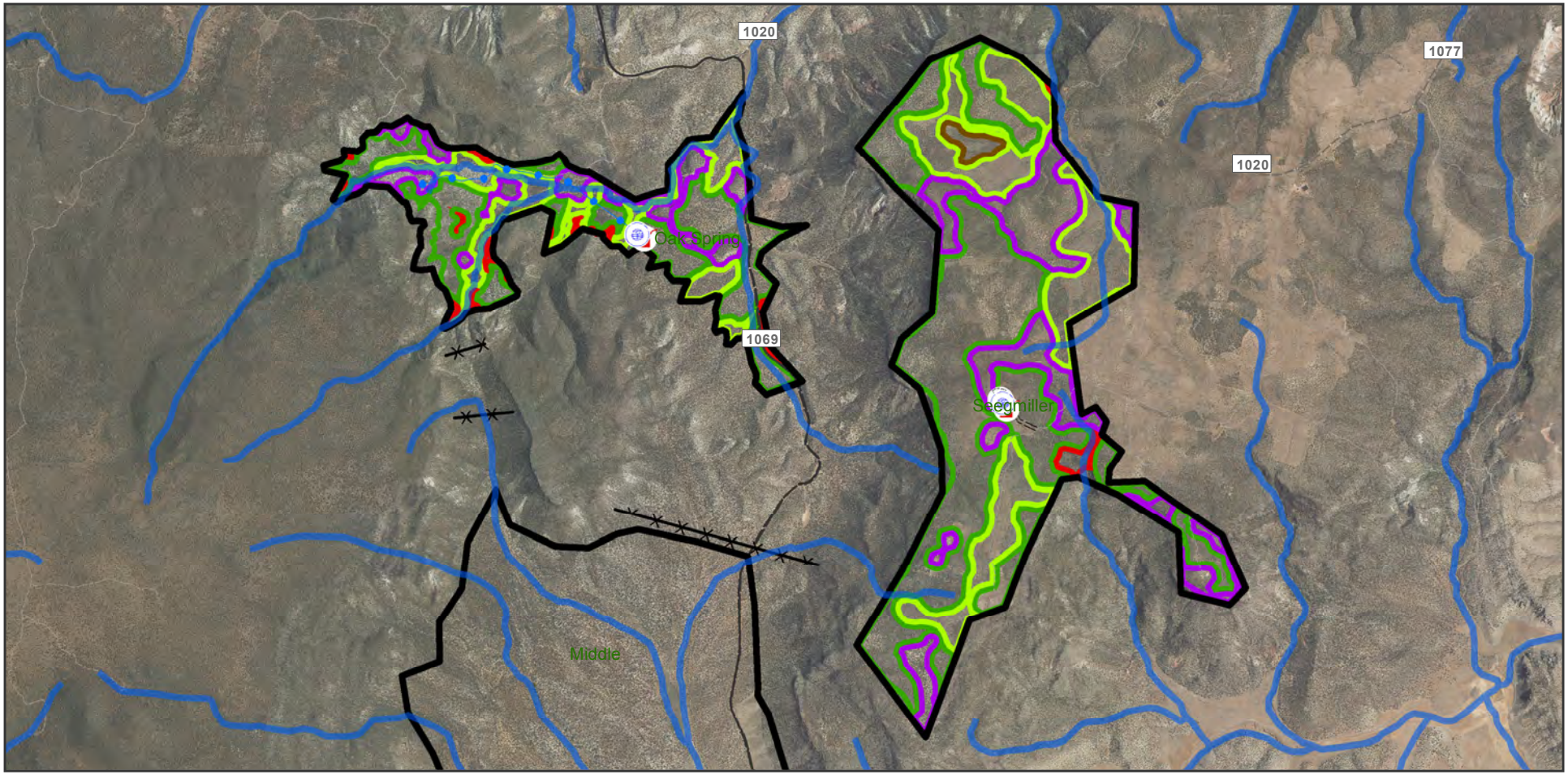
File Path: T:\AZ\Arizona_Strip_DOI\GIS_Users\mcutler\Projects\Lizard_Wolfhole\L_Wildcat\Wolfhole etal new 2018\fire history 2018.mxd

Figure 11. Schematic of Proposed Vegetation Treatments - Wolfhole Lake Allotment Oak Springs and Seegmiller Treatment Units.

DOI-BLM-AZ-A010-2018-0032-EA.

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Drainages

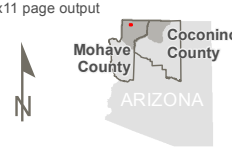
Wolfhole_Lk_Treatment_Polygons
Treatment_Type, Treatment_Subtype

- Mechanical, Early Seral (0-15% canopy cover remaining)
- Mechanical, Mid-Seral (15-30% canopy cover remaining)
- None, excluded due to steep slopes
- None, excluded due to steep slopes and/or presence of cultural resources
- None, excluded due to wildlife cover
- Wolfhole Lake Veg Treatment Boundary

0 100 200 400 600 800 1,000 1,200 Miles

0 200 400 800 1,200 1,600 2,000 Kilometers

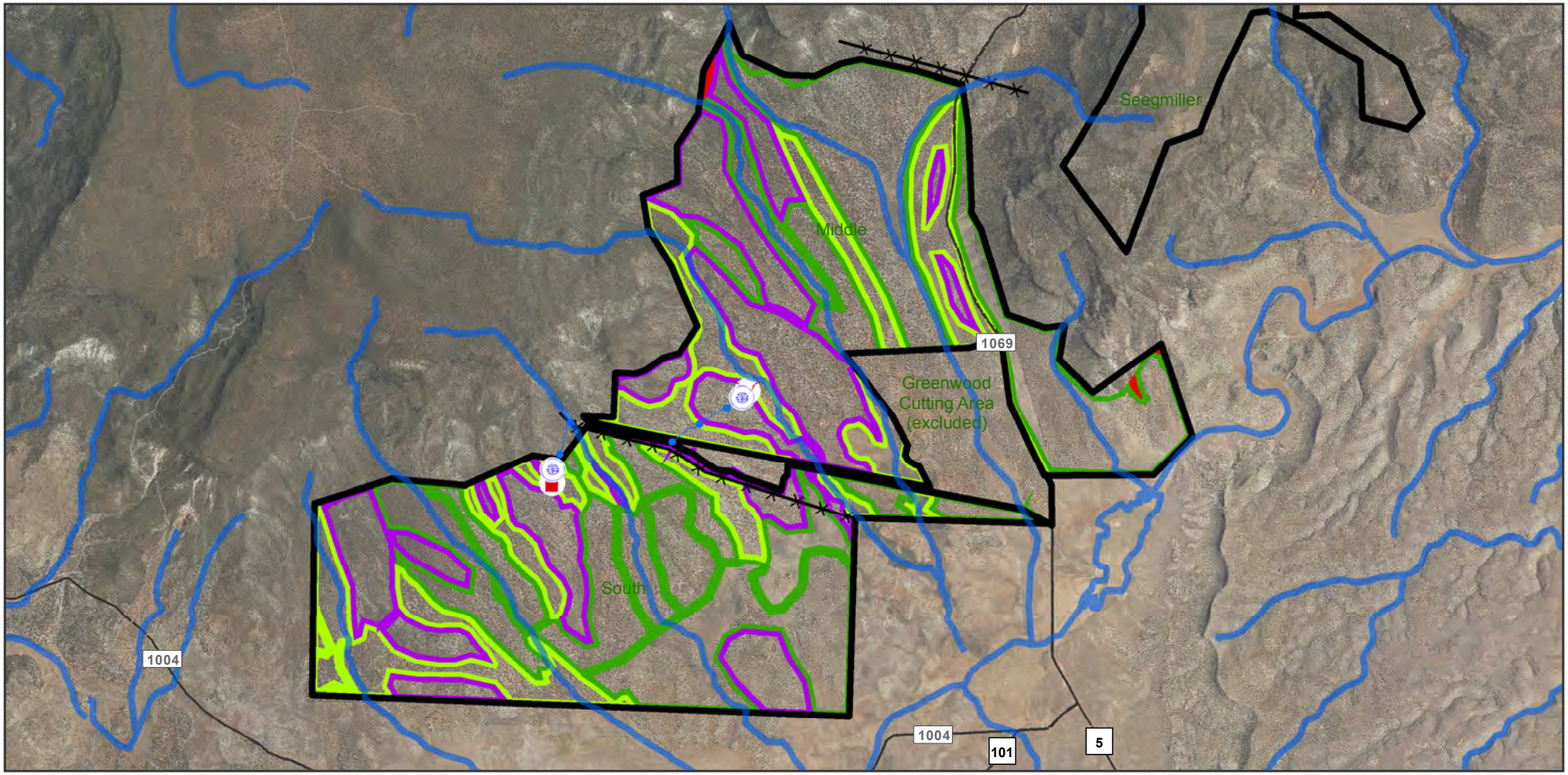
Map Produced by BLM Arizona Strip District
File: schematic oak spr and seegmiller veg tmts 2019.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&B
Scale: 1:46,265 at 8.5x11 page output
User: mcutler
Date: 6/5/2019



No warranty is made by the Bureau of Land Management (BLM) regarding the accuracy or completeness of this map. This map is representational and is to be used as intended by the BLM. Map data compiled from various sources. This map and the data from which it was derived are not binding on the BLM and may be revised at any time.

Figure 12. Schematic of Proposed Vegetation Treatments - Wolfhole Lake Allotment Middle and South Treatment Units. DOI-BLM-AZ-A010-2018-0032-EA.

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Drainages

Wolfhole_Lk_Treatment_Polygons

Treatment_Type, Treatment_Subtype

- Mechanical, Early Seral (0-15% canopy cover remaining)
- Mechanical, Mid-Seral (15-30% canopy cover remaining)
- None, excluded due to steep slopes
- None, excluded due to steep slopes and/or presence of cultural resources
- Wolfhole Lake Veg Treatment Boundary

0 100 200 400 600 800 1,000 1,200 Miles

0 200 400 800 1,200 1,600 2,000 Kilometers

Map Produced by BLM Arizona Strip District
File: schematic middle and south veg tmts 2019.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&B
Scale: 1:50,000 at 8.5x11 page output
User: mcutler
Date: 6/5/2019

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File Path: T:\AZ\Arizona_Strip_DO\GIS_Users\mcutler\Projects\Wolfhole 2019\schematic middle and south veg tmts 2019.mxd

Figure 13. Water Storage Tank.

Figure 14. Water Catchment.

Figure 15. Water Trough

Table A.1. Lizard and Wolfhole Lake Allotments Existing Range Improvements.

* Allotment, pasture/division, corrals, and water lot / reservoir fences.

Range Improvement Type	Lizard Allotment	Wolfhole Lake Allotment
Fence*	24.7 miles	28.3 miles
Natural barriers forming allotment/pasture boundaries (ridges/rim/topography)	2.3 miles	5.5 miles
Water pipelines	5.6 miles	5.0 miles
Developed Springs		2
Water Troughs	5	3
Reservoirs	2	7
Corral	2	5
Windmill	1	
Wildlife Drinkers		2

Appendix B. Applicable Resource Management Plan Decisions (for Plan Conformance Determination).

The following management decisions (includes Desired Future Conditions (DFC)), Management Actions (MA), and Land Use allocations (LA) are from Table 2.11 in the Arizona Strip Field Office RMP for Grazing Management (GM):

- **DFC-GM-01:** Healthy, sustainable rangeland ecosystems will be maintained or improved to meet Arizona's Standards for Rangeland Health (1997), and produce a wide range of public values such as wildlife habitat, livestock forage, recreation opportunities, clean water, and functional watersheds.
- **DFC-GM-02:** Livestock use and associated management practices will be conducted in a manner consistent with other resource needs and objectives to ensure that the health of rangeland resources is preserved or improved so that they are productive for all rangeland values. Where needed, public rangeland ecosystems will be improved to meet objectives.
- **LA-GM-01:** All allotments will continue to be classified as available for grazing by livestock under the principle of multiple use and sustained yield, except where specifically noted.[15]
- **MA-GM-02:** Implementing the Arizona Standards for Rangeland Health will continue on all grazing allotments in accordance with established schedules and congressional requirements. The Arizona Standards for Rangeland Health and Guidelines for Grazing Management will apply to all livestock grazing activities. These guidelines address management practices at the grazing AMP-level and are intended to maintain desirable conditions or improve undesirable rangeland conditions within reasonable time frames.
- **MA-GM-03:** The interdisciplinary allotment evaluation process will continue to be used to provide specific guidance and actions for managing livestock grazing. Existing AMPs and other activity plans will be consistent with achieving the DFCs and standards for rangeland health. They will contain the site-specific management objectives, as well as actions, methods, tools, and appropriate monitoring protocols.
- **MA-GM-04:** Existing management practices and levels of use on grazing allotments will be reviewed and evaluated on a priority basis to determine if they meet or are making progress toward meeting the Arizona Standards for Rangeland Health. Appropriate and timely actions will be implemented to deal with those areas not meeting the standards.
- **MA-GM-05:** The allotment management categorization process will continue to be used to define the level of management needed to properly administer livestock grazing according to management needs, resource conflicts, potential for improvement, and BLM funding/staffing constraints. The allotment categories are Custodial, managed custodially to protect resource conditions and values; Maintain, managed to maintain current satisfactory resource conditions and are actively managed to ensure that the condition of resource values do not decline; and Improve, actively managed to improve unsatisfactory resource conditions.[16]
- **MA-GM-07:** Allowable use on key forage species is 50% on allotments with rotational grazing systems, except in tortoise habitat. On allotments in desert tortoise habitat or being less intensively managed, then utilization is set at 45%[17].
- **MA-GM-08:** Any hay or other feed used in administering the livestock operation will be certified weed-free.

[15] No restrictions are associated with the Lizard and Wolfhole Lake allotments.
[16] The Wolfhole Lake Allotment is classified as an Improve allotment; the Lizard Allotment is classified as a Maintain allotment.
[17] The Lizard and Wolfhole Lake allotments are managed under a rotational grazing system, so maximum utilization is set at 50%.

The following management decisions are from Table 2.4 in the Arizona Strip Field Office RMP regarding Wildlife Management (WF).

- **DFC-WF-05:** Fences will be the minimum necessary for effective livestock control or other administrative purposes. Fences will be wildlife passable, consistent with the species found in the area.
- **DFC-WF-11:** The natural biological diversity of fish, wildlife, and plant species will be maintained or, where necessary and feasible, restored throughout the Arizona Strip FO. Habitats will be managed on an ecosystem basis, ensuring that all parts of the ecosystem and natural processes are functional.
- **DFC-WF-16:** Mule deer habitat in pinyon-juniper woodland sites will include a healthy diverse mosaic of trees, shrubs, grasses, and forbs.
- **DFC-WF-17:** Water sources within mule deer habitat will be safely accessible to deer and other wildlife.
- **DFC-WF-19:** All fences in mule deer habitat will be deer passable.
- **MA-WF-07:** Construction of wildlife habitat improvement projects, including water developments and vegetation treatments, may be authorized to meet DFCs, assuming compliance with NEPA, the Endangered Species Act (ESA), and other applicable laws, regulations, and policies. DPC objective for wildlife will be incorporated into all habitat improvement projects including restoration and vegetation treatment projects. Specific projects will be listed in HMPs

The following management decision is from Table 2.3 in the Arizona Strip Field Office RMP regarding Vegetation Management (VM).

- **DFC-VM-03 (Vegetation – All Ecological Zones):** Vegetative communities will provide sufficient plant cover and litter accumulation to protect soils from wind and water erosion and enhance nutrient cycling and productivity, even during drought years.
- **DFC-VM-11:** Sagebrush (primarily *Artemisia tridentata*) communities will consist of a healthy, diverse mosaic of different height and age structures with a thriving community of native grasses and forbs. Mosaics may include stands of young and old sagebrush, openings (ranging from bare ground to short or sparse vegetation to high-density grasslands), wet meadows, seeps, healthy streamside (riparian) vegetation, and other interspersed shrub and woodland habitats.
- **DFC-VM-21:** Healthy, diverse woodland communities will consist of a mosaic of trees, shrubs, grasses, and forbs. Mosaic patches can include stands of young and old pinyon-juniper, openings, wet meadows, seeps, and other interspersed shrub habitats. The communities will be composed of a variety of different height structures and age classes, with a thriving understory community of native grasses, forbs, and shrubs.
- **DFC-VM-23:** Treatment objectives in the pinyon-juniper vegetation communities will focus on restoring the natural disturbance regime; increasing vegetative ground cover of native grasses, forbs, and shrubs; and removing non-native invasive species.

The following management decisions are from Table 2.1 in the Arizona Strip Field Office RMP regarding Air, Water, and Soils (Watershed: WS).

- **DFC-WS-06:** The natural hydrologic functions of all watersheds will be intact.
- **DFC-WS-07:** Soils will exhibit infiltration, permeability, and erosion rates appropriate for the soil type, climate, and landform.

The following decisions are from Table 2.3 in the Arizona Strip Field Office RMP applicable to Great Basin Ecological Zone (PINYON-JUNIPER COMMUNITY)

- **DFC-VM-21:** Healthy, diverse woodland communities will consist of a mosaic of trees, shrubs, grasses, and forbs. Mosaic patches can include stands of young and old pinyon-juniper, openings, wet meadows,

seeps, and other interspersed shrub habitats. The communities will be composed of a variety of different height structures and age classes, with a thriving understory community of native grasses, forbs, and shrubs.

- **DFC-VM-22:** To reduce the threat of catastrophic fire, ladder fuels and downed woody debris will be limited or not present. Woody debris will be present to stabilize soil and enhance vegetation recovery in restoration areas.
- **DFC-VM-23:** Treatment objectives in the pinyon-juniper vegetation communities will focus on restoring the natural disturbance regime; increasing vegetative ground cover of native grasses, forbs, and shrubs; and removing non-native invasive species.
- **DFC-VM-24:** Stands of pinyon-juniper will include a balance between tree, shrub, and perennial grass cover to support pinyon jay and mule deer. This mosaic will include stands of old growth pinyon-juniper to support juniper titmouse; large openings of grasses, forbs and shrubs to support mule deer and provide foraging habitat for raptors such as sharp-shinned hawk, northern goshawk, Coopers hawk, American kestrel, and red-tailed hawk; and areas of sparse to dense tree canopy cover to support pinyon jay.
- **MA-VM-21:** Vegetation treatments can be used in the Great Basin Ecological Zone to enhance vegetative diversity, restore native plant communities, maintain or increase wildlife habitat, and reduce or eliminate hazardous fuels. Treatment priority areas will be where juniper canopy cover exceeds 40%, perennial grasses and forbs are less than 5%, and bare ground exceeds 50%.
- **MA-VM-22:** Treatment preferences will be to use a combination of wildland fire, fire use, prescribed fire, mechanical, and chemical methods.
- **MA-VM-23:** Up to 100,000 acres of pinyon-juniper habitat can be treated over the life of this RMP (approx. 50% of available habitat).

Appendix C. Desired Plant Community Objectives for Lizard and Wolfhole Lake Allotments.

Lizard Allotment

Key Area #1 Lizard
Ecological Site: Cobbly Gypsum Hills 6-9" precipitation zone (p.z.)

- Maintain total ground cover at 15 – 30%.
- Maintain native perennial grass (includes *Pleuraphis rigida* and other perennial grasses) at between 23 – 45% CBW.
- Increase total shrub composition to 47 – 78% CBW (includes *Ambrosia dumosa, Ephedra nevadensis, Krameria grayi, Lycium andersonii, Yucca baccata, Opuntia* and other shrubs).
- Increase forb composition to 1 – 6% CBW (excludes non-native invasive species).

DPC objectives are partially being met for this site. Ground cover and perennial grass both exceed the objectives. Shrub and forb composition do not meet the objectives. This site is a stable late seral shrub-dominated plant community. The ecological site guide lists few shrubs that may occur on this site, the most prominent being *Ambrosia dumosa*. However, in the 33 years of data that has been collected, *Ambrosia dumosa* has not been encountered. This leads us to believe the key area contains small inclusions within the site, which therefore change somewhat the overall plant composition found and expected at the site.

It should be noted that the vegetative composition listed in the site guides is an average across the entire ecological site; variations in an ecological site (due to inclusions or transition zones) may result in an actual plant composition that is different from that listed in the site guide. The 47-78% shrub composition may be too high for this particular site. As stated above, much of this percentage in the site guide is for *Ambrosia dumosa*, but that plant has yet to be monitored in this site. All other shrubs listed have been found there. The IAT would like to keep this composition as a DPC objective, although it may need to be reduced in the future.

Wolfhole Lake Allotment

Key Area #1 (Wolfhole Lake South)
Ecological Site: Loamy Upland 10-14" precipitation zone (p.z.)

- Maintain total ground cover above 15%.
- Increase native perennial grass (includes *Pascopyrum smithii, Poa fendleriana, Hesperostipa comata ssp. comata, Achnatherum hymenoides, Elymus elymoides ssp. elymoides, Bouteloua gracilis, Pleuraphis jamesii, Sporobolus cryptandrus, Aristida, Muhlenbergia torreyi* and other perennial grasses) to between 68 – 78% CBW.
- Decrease total shrub composition to 15 – 20% CBW (includes *Artemisia tridentata ssp. wyomingensis, Atriplex canescens, Ephedra, Mahonia trifoliolata, Gutierrezia sarothrae, Lycium, Mammillaria, Opuntia, Yucca* and other shrubs).
- Maintain forb composition at between 5 – 10% CBW (excludes non-native invasive species).
- Maintain tree composition at between 0 – 4% CBW (includes *Juniperus osteosperma* and *Pinus edulis).*

Key Area #2 (Wolfhole chaining)
Ecological Site: Loamy Upland 10-14" p.z.

- Maintain total ground cover above 15%.

- Increase native perennial grass (includes *Pascopyrum smithii, Poa fendleriana, Hesperostipa comata ssp. comata, Achnatherum hymenoides, Elymus elymoides ssp. elymoides, Bouteloua gracilis, Pleuraphis jamesii, Sporobolus cryptandrus, Aristida, Muhlenbergia torreyi* and other perennial grasses) to between 68 – 78% CBW.
- Decrease total shrub composition to 15 – 20% CBW (includes *Artemisia tridentata ssp. wyomingensis, Atriplex canescens, Ephedra, Mahonia trifoliolata, Gutierrezia sarothrae, Lycium, Mammillaria, Opuntia, Yucca* and other shrubs).
- Maintain forb composition at between 5 – 10% CBW (excludes non-native invasive species).
- Maintain tree composition at between 0 – 4% CBW (includes *Juniperus osteosperma* and *Pinus edulis).*

DPC objectives in Wolfhole Lake Key Area #1. The history of Key Area #1 involves a chaining/railing performed in 1948. A summary from the project file states, "Crested wheat and western wheatgrass broadcast seeded behind rail on densely covered sagebrush range at rate of 6 lbs. per acre. [It was] reseeded in January [and] showed promising results in April, no moisture through summer and apparently all seedlings died. Sagebrush railing was also disappointing as it now appears there was hardly more than a 40 percent kill. This is believed due to lateness in the year when project was carried out, rain and light snows in late Dec and early Jan put moisture in plants and the sage did not break off as well as it probably would have if railed earlier. No increase or decrease in erosion noticed as there was little or no rainfall during the summer to influence it either way. Native grasses have undoubtedly increased [in] vigor and perhaps slightly in density."

Although current trend is upward at this key area relative to the base year of 1982, the area is still not meeting two out of five DPC objectives which were established from the ecological site guide, nor is it progressing towards meeting. Perennial grass composition has remained relatively static over the 10 years. While shrub composition has increased 14%. This shift in species composition from a grass dominated PNC site to a shrub dominated one will continue unless a treatment (fire, herbicide or mechanical) occurs and reduces the sagebrush dominance and expansion. Although the data does not show the encroachment of the pinyon/juniper community at the key area, encroachment is occurring from the fan terraces into the bottoms. With the decrease in the grass component, increased erosion will likely occur. Excessive runoff from the surrounding tree dominated fan terraces is exacerbating the erosion problems along the drainages. It is therefore recommended that vegetation treatments and seeding (to reduce sagebrush and pinyon/juniper composition in these sites and also on the fan terraces) be implemented. These treatments, along with reassessing the level of permitted grazing use, should allow this site to turn around and start progressing towards PNC and meet DPC objectives.

DPC objectives in Wolfhole Lake Key Area #2 The history of Key Area #2 involves a chaining/railing and seeding completed in 1965. Although trend is static at this key area relative to the base year of 1982, the area is still not meeting two out of five DPC objectives which were established from the ecological site guide, nor is it progressing towards meeting. Perennial grass composition has shown an increase in the last 10 years while shrub composition has remained relatively constant. The areas adjacent to this key area show both sagebrush and PJ encroachment. Although not as extreme as Key Area #1, this shift in species composition from a grass dominated PNC site to a shrub dominated one will continue unless a treatment (fire, herbicide or mechanical) occurs and reduces the sagebrush dominance and expansion. With the decrease in the grass component, increased erosion will likely occur. Excessive runoff from the surrounding tree dominated fan terraces is exacerbating the erosion problems along the drainages. It is therefore

recommended that vegetation treatments and seeding (to reduce sagebrush and pinyon/juniper composition in these sites and also on the fan terraces) be implemented. These treatments, along with reassessing the level of permitted grazing use, should allow this site to turn around and start progressing towards PNC and meet DPC objectives.

Table C1. Wolfhole Lake Dominant Vegetation Overstory by Pasture/Treatment Area.
See narrative in Proposed Action for explanation of excluded acres.

Middle Tmt. Area	Acres	%	Oak Springs Tmt. Area	Acres	%	Seegmiller Tmt. Area	Acres	%	South Tmt. Area	Acres	%
Middle 0-15%	498.8		Oak Springs 0-15%	176.3		Seegmiller 0-15%	368		South 0-15%	504.4	
PJ	15.3	3.1		114.3	64.9		0	0.0		117.9	23.4
PJ-sage	426	85.4		59	33.5		368	100.0		358.6	71.1
Sage	57.4	11.5		2.9	1.6		0	0.0		27.9	5.5
	498.7	100.0		176.2	100.0		368	100.0		504.4	100.0
Middle Excluded	629.9		Oak Springs Excluded	183.7		Seegmiller Excluded	339		South Excluded	524.3	
PJ	329.4	52.3		141.8	77.2		14.5	4.5		295.1	56.3
PJ-sage	292.8	46.5		41.9	22.8		324	100.9		217.7	41.5
Sage	7.6	1.2		0	0.0		0	0.0		11.5	2.2
	629.8	100.0		183.7	0.0		338.5	105.4		524.3	100.0
Middle 15-30%	1030.8		Oak Springs 15-30%	294.1		Seegmiller 15-30%	735		South 15-30%	1154.8	
PJ	40	3.9		152.5	51.9		7.8	1.1		862.6	74.7
PJ-sage	986.4	95.7		141.6	48.1		727.2	98.9		267.4	23.2
Sage	4.3	0.4		0	0.0		0	0.0		24.8	2.1
	1030.7	100.0		294.1	100.0		735	100.0		1154.8	100.0
Middle Total PJ	384.7		Oak Springs Total PJ	408.6		Seegmiller Total PJ	22.3		South Total PJ	1275.6	
Middle Total PJ-sage	1705.2		Oak Springs Total PJ-sage	242.5		Seegmiller Total PJ-sage	1419.2		South Total PJ-sage	843.7	
Middle Total sage	69.3		Oak Springs Total sage	2.9		Seegmiller Total sage	0		South Total sage	64.2	
Total	2159.2			654			1441.5			2183.5	

Appendix D. Allotment Monitoring Data.

Lizard Allotment

***Actual Use*:**

Actual use is formulated from the grazing bills paid in December for the actual grazing.

Table D.1. Lizard Allotment Actual Use Data.

Year	AUMs Used	% of Permitted Use
1985	335	160%
1986	200	95%
1987	214	102%
1988	354	169%
1989	36	17%
1990	188	90%
1991	74	35%
1992	65	31%
1993	34	16%
1994	26	12%
1995	72	34%
1996	307	146%
1997	50	24%
1998	42	20%
1999	163	78%
2000	90	43%
2001	139	66%
2002	66	31%
2003	116	55%
2004	81	39%
2005	50	24%
2006	62	30%
2007	43	20%
2008	79	38%
2009	101	48%
2010	45	21%
2011	88	42%
2012	41	20%
2013	69	33%
2014	100	48%
2015	98	47%

Year	AUMs Used	% of Permitted Use
2016	76	36%
Average % of Permitted Use 2007-2016		35%

Utilization:

Utilization is defined as the proportion of the current year's forage production that is consumed or destroyed by grazing animals (both livestock and wildlife). Average utilization levels of key forage species for this allotment should not exceed 50%.

Management of the allotment is based on a selection of key species. Key species for the Lizard Allotment are listed in Section 3.4.2 of this EA. Table D.2 shows percent utilization of key forage species by year read at the key area. Blank cells indicate no plants of that species were encountered in the transect. Average percent utilization by year is calculated by averaging the utilization readings for all key species read in a given year.

Table D.2. Lizard Allotment – Utilization Data.

Utilization Summary – Key Area #1																				
Utilization expressed as a percent for each species.																				
Year	83	84	85	86	87	88	89	90	91	92	93	95	97	09	10	11	12	13	14	16
Cool Season																				
Achnatherum hymenoides *									10	4	8	4	1	28	NP	NP	NU	NU	NP	NP
Warm Season																				
*Pleuraphis jamesii**	26	33	42	34	38	32	25	29	14	9	5	16	22	8	19	14	NU	NU	15	17
*Sporobolus cryptandrus**										3				28			NU	NU		
Bouteloua eriopoda													1	28	NP	NP	NU	NU	NP	NP
Browse																				
Ephedra sp.*	22	24	35	21	21	35	37	23	4		1	2	3	8	37	27	NU	NU	18	13
*Krascheninnikovia lanata**					38		57	50	3	3	0	2	2	8	50	7	NU	NU	15	14
Psorothamnus arborescens						25	38	28												
Krameria erecta							41	24												

*Key Species. NP = Not Present, NU = No use/Rested

Utilization on key species for all years averaged 20% use for warm season grasses, 9% use for cool season grasses and 17% for browse. Once, in 1989, utilization on winterfat exceeded the 50% threshold. Overall average for all key species 2007-2016 is 14%.

Trend:

The trend of an area may be judged by noting changes in vegetation attributes such as species composition, density, cover, production, and frequency. Vegetation data is collected at different points in time on the same key area, and the results are then compared to detect change.

The trend index combines percent frequency of key forage species, percent litter, and percent live vegetation (basal cover) into one numerical value. Trend monitoring was collected using the Pace-Frequency method, which measures the occurrence frequency of forage and non-forage vegetative species. Cover data, which determines the percent of bare ground, litter, rock and live basal vegetation, is also collected. Ground cover is determined by dividing the total number of hits for all categories except bare ground by the total number of hits (including bare ground) – see page 73 of BLM Technical Reference 1734-4 (BLM 1999b). Change in ground cover is an important aspect of trend. It is also used to determine if favorable or unfavorable conditions exist for germination and establishment of new plants, and to estimate nutrient cycling. In addition, the occurrence frequency of all plant species is collected. The first readings established a baseline for comparison to all future readings. Trend is considered up when the species increases by 10+ points from the first reading to the last shown reading. The trend of a species is static or not apparent if it shows a change of 0 to 10 or 0 to -10 from the first to the last reading. Down trend is a reading of more than -10 from the first reading.

Monitoring trend plots were established in the allotment in 1982. Trend data has been collected at five year intervals from then until present. The most recent trend reading for this allotment was 2015 (see Table D.3). The key species frequency, which is the ratio between the number of sample units that contain key species and the total number of sample units, compares the most recent data to the base year. Overall trend at a key area is determined by assessing the sum percentages of the following attributes: key species, live vegetation cover/basal cover, and ground cover (surface litter). Both basal cover and surface litter are important attributes when evaluating Standard 1.

Table D.3. Lizard Allotment Trend Data.

Lizard Pasture - Site ID:1					
Quadrat Size: 40x40 cm					
Category	**Date of Data Collection**				
	5/4/82	**9/5/85**	**11/3/05**	**9/22/2010**	**10/20/2015**
	% Ground Cover				
Bare Ground	64	66	18	44	33
Cryptogam			1		2
Litter			47	30	43
Rock	9	8	24	17	19
Live Basal Veg.	2	6	12	10	3
Litter - Non-Persistent	26	18			
Litter - Persistent		3			
Woody Species	**% Plant Frequency**				
Dalea fremontii	2				
Ephedra nevadensis	14	21	18	16	20
Gutierrezia sarothrae	3	1	1		
Krameria parvifolia	5	6	3	2	3
Larrea tridentata	3				
Lycium andersonii	1		1		
Opuntia	1	2		.5	2
Opuntia whipplei			1		
Yucca baccata	8	16	14	14	20
Grasses - Perennial					
Aristida		1			2
Aristida longiseta			1		
Pleuraphis rigida	45	69	53	58	60
Muhlenbergia porteri	1	2	2		
Sitanion hystrix		1			

Lizard Pasture - Site ID:1					
Quadrat Size: 40x40 cm					
Category	**Date of Data Collection**				
	5/4/82	**9/5/85**	**11/3/05**	**9/22/2010**	**10/20/2015**
Sporobolus cryptandrus	1		1		
Tridens pulchellus	5	7	8		17
Bouteloua eriopoda				.5	
Forbs - Perennial/Biennial					
Eriogonum inflatum	3	6			
Annuals					
Eriogonum cernuum			**3**	**1**	
Euphorbia			**3**		

Table D.4. Lizard Allotment Overall Trend.

Key Area #1 – Trend Data			
Key Species or Cover Category	**1982**	**2010**	**2015**
Litter	26	30	43
Vegetation (basal cover)	2	10	3
Ephedra nevadensis	14	16	16
Pleuraphis rigida	45	58	60
Total	**87**	**114**	**122**
Overall Trend for Key Area #1: (↑) Up			

Based on an increase in all categories, as shown in Table D.4, trend for Key Area #1 is up.

Ecological Site Inventory Data – Ecological Condition (Seral Stage):

The "Dry Weight Rank" vegetative sampling method is used to determine species composition. The present composition and the potential for each key species are used to set composition objectives. The potential composition is determined by the applicable soil type and precipitation zone. These potentials are described in Ecological Site Guides provided by the NRCS. Table D.5 below compares the most recent plant composition data from the trend plots to the desired plant community composition from the site guide for the ecological site at the key area.

Table D.5. Lizard Allotment Ecological Condition.

Key Area #1 – Cobbly Gypsum Hills 6-9" p.z.			
Plant Species	**Current Composition (2015)**	**Site Guide Composition**	**Current Score**[18]
Ephedra nevadensis	16%	15%	15
Krameria parvifolia	3%	10%	3
Opuntia	2%	5%	2
Yucca baccata	20%	6%	6
Pleuraphis rigida	60%	35%	35
Tridens pulchellus	17%	10%	10
Score: 71 – Late Seral			

[18] "Current score" = lower of either Column 2 (current composition) or Column 3 (site guide composition)

It should be noted that the vegetative composition listed in the site guide is an average across the entire ecological site; variations in an ecological site (due to inclusions or transition zones) may result in an actual plant composition that is different from that listed in the site guide. This is seen with the continuously higher composition of *Pleuraphis rigida* and little to no *Ambrosia dumosa* over the last 28 years of monitoring.

Wolfhole Lake Allotment

***Actual Use*:**
Actual use on the Wolfhole Lake Allotment is displayed in Table D.6.

Table D.6. Wolfhole Lake Allotment Actual Use Data.

Year	AUMs Used	% of Permitted Use
1986	203	22
1987	101	11
1988	5	1
1989	167	18
1990	111	12
1991	0	0
1992	125	13
1993	113	12
1994	20	2
1995	193	21
1996	274	30
1997	194	21
1998	194	21
1999	182	20
2000	174	19
2001	295	32
2002	169	18
2003	221	24
2004	142	15
2005	186	20
2006	339	37
2007	142	15
2008	221	24
2009	122	13
2010	236	25
2011	189	20
2012	158	17
2013	340	37
2014	144	16
2015	33	4
2016	58	6
Average % Permitted Use 2007 - 2016	19%	

***Utilization*:**

As described above for Lizard Allotment, management of the allotment is based on a selection of key species. Key species for the Wolfhole Lake Allotment are listed in Section 3.4.2 of this EA.

Utilization data has been gathered on this allotment since 1985. Tables D.7 and D.8 show percent utilization of key forage species by year read at the key areas. Blank cells indicate no plants of that species were encountered in the transect. Average percent utilization by year is calculated by averaging the utilization readings for all key species read in a given year. Overall average utilization from 2007-2016 for both key areas and all key species is 18%. Average utilization levels of key forage species for the Wolfhole Lake Allotment should not exceed 50%. However, the utilization threshold of 50% was exceeded in 2010 and for one species in 2011.

Table D.7. Wolfhole Lake Allotment South Pasture Utilization Summary Data.

Wolfhole Lake Key Area #1													
Utilization expressed as a percent for each species. (Key Species = *)													
Year	85	87	92	95	1	9	10	11	12	13	14	15	16
Cool Season													
Achnatherum hymenoides *	28	42	3				77			50	9		
*Elymus elymoides ssp. elymoides**	17	18	5	6	49	36	25	60	6	44	8	1	2
Warm Season													
*Pleuraphis jamesii**	23	10	13	27	22	18	61	33	0	19	2	2	2
Browse													
*Ephedra nevadensis**			3										
Average Utilization	**23**	**23**	**6**	**17**	**36**	**27**	**54**	**47**	**3**	**38**	**6**	**2**	**2**
Overall Avg. 2007-2016													**22**

Table D.8. Wolfhole Lake Allotment Chaining Pasture Utilization Data.

Wolfhole Chaining Key Area #2												
Utilization expressed as a percent for each species. (Key Species = *)												
Year	85	86	89	2/21/1992	12/1/1992	01	11	12	13	14	15	16
Cool Season												
Achnatherum hymenoides *	43	57	36	6	15	48	24.8	23.6		NU	35	NU
*Elymus elymoides ssp. elymoides**	50	30					70	11.1		NU		NU
*Agropyron Spp.**	43	31	52	4			45	0		NU		NU
*Stipa comata**			36	6	15		0	0		NU		NU
Elymus spp.							90	0		NU		NU
Warm Season										NU		NU
*Pleuraphis jamesii**	35	25	25	3	5	28	20.2	9.9		NU	17	NU
*Sprorobolus cryptandrus**	40	47	45				58.3	40		NU	17	NU
Browse										NU		NU
*Ephedra nevadensis**				12	9					NU		NU
*Purshia mexicana**	70			12	9	34				NU		NU
Average Utilization	**46.8**	**38.0**	**38.8**	**7.2**	**10.6**	**36.7**	**44.0**	**12.1**	**0**	NU	**23**	NU

Overall Avg. 2007-2016												**13**

***Trend*:**

Trend monitoring was conducted at the two established key areas in the allotment. The South and Chaining Pastures have key area locations where trend data has been collected since 1982. Trend is determined using the method described above for Lizard Allotment.

Note that trend may be static, but not necessarily the desired future condition. Litter, as well as other parameters, are considered when calculating trend index. Higher litter amounts since trend establishment may indicate an upward trend, but not necessarily the desired future condition. This is the case with Wolfhole Lake Key Area #1. The site had a high density of sagebrush and sparse understory at the time the trend was established, and the data shows that the condition is similar, with more grass, but with a higher density of sagebrush in the most recent readings (see Table D.9). A comparison of current vegetation composition to historic or potential vegetation composition is also critical (see Appendix A for maps).

When the most recent trend readings of 2015 are compared to the baseline data collected in 1982 when trend study was established, we obtain the following:

Table D.9. Wolfhole Lake Allotment Key Area #1 South Pasture Trend Data.

Key Area #1				
Year	**Percent Frequency of key species**	**Percent Live basal vegetation**	**Percent Litter**	**Total**
1982	16	2	25	43
1987	33	1	48	82
2005	49	1	48	98
2010	35	12	28	75
2015	57	1	47	105
Overall Trend for Key Area #1: (↗) Up				

Table D.10. Wolfhole Lake Allotment Key Area #2 Chaining Pasture Trend Data.

Key Area #2				
Year	**Percent Frequency of key species**	**Percent Live basal vegetation**	**Percent Litter**	**Total**
1982	105	5	11	121
1987	112	1	43	158
2005	68*	4	38	110
2010	88	6	26	120
2015	98	3	35	136
Overall Trend for Key Area #2: (→) Static				

* No seeded grasses showed up in the 2005 reading

***Ecological Site Inventory Data – Ecological Condition (Seral Stage)*:**
As described above for Lizard Allotment, the present composition and the potential for each key species are used to set composition objectives. The potential composition is determined by the applicable soil type and precipitation zone. These potentials are described in the NRCS Ecological Site Guides. Tables D.10 and

D.11 below compares the most recent plant composition data from the trend plots to the desired plant community composition from the site guide for the ecological site at both key areas.

Table D.10. Wolfhole Lake Allotment Ecological Condition.

Key Area #1 – Wolfhole Lake South Loamy Upland 10-14" p.z.			
Plant Species	**Current Composition (2015)**	**Site Guide Composition**	**Current Score[19]**
Artemesia tridentata	81%	15%	15
Juniperus osteosperma	1%	5%	1
Pleuraphis jamesii	1%	15%	1
Achnatherum hymenoides	1%	20%	1
Elymus elymoides ssp. elymoides	11%	10%	10
Sphaeralcea	1%	5%	1
Perennial forbs		5%	4
Phlox longifolia	3%		
Penstemon	1%		
Score: 33 – Mid Seral			

Table D.11. Wolfhole Lake Allotment Ecological Condition.

Key Area #2 – Wolfhole Chaining Loamy Upland 10-14" p.z.			
Plant Species	**Current Composition (2015)**	**Site Guide Composition**	**Current Score[15]**
Artemesia tridentata	12%	15%	12
Gutierrezia sarothrae	13%	5%	5
Other shrubs		10%	3
Psilostrophe sparsiflora	1%		
Chrysothamnus	2%		
Juniperus osteosperma	1%	5%	1
Pleuraphis jamesii	41%	15%	15
Achnatherum hymenoides	4%	20%	4
Elymus elymoides ssp. elymoides	3%	10%	3
Sporobolus cryptandrus	1%	3%	1
Hesperostipa comate ssp. comata	1%	10%	1
Sphaeralcea	6%	5%	5
Perennial forbs		5%	5
Penstemon	1%		
Hymenopappus filifolius	1%		
Swertia albomarginata	1%		
Thelesperma subnudum	8%		
Annual forbs		5%	5
Cordylanthus parviflorus	6%		
Score: 60 – Late Seral			

[19] "Current score" = lower of either Column 2 (current composition) or Column 3 (site guide composition)

Appendix E. - Sensitive Species Excluded from Detailed Analysis.

Table E.1 Sensitive Species Excluded from Detailed Analysis

Species	Habitat Type
House Rock Valley Chisel-toothed Kangaroo Rat (*Dipodomys microps leucotis*)	This species is endemic to the House Rock Valley on the eastern side of the Arizona Strip and is not present within (or near) the two allotments.
Northern Leopard Frog (*Lithobates pipiens*)	This species has a limited range on the Arizona Strip and currently only occupies Soap Creek Tank on the Paria Plateau and possibly Kanab Creek. Habitat for this species is not present in or near the two allotments.
Arizona Toad (*Anaxyrus microscaphus*)	Found on the Arizona Strip only along the Virgin River and tributaries. Habitat for this species is not present in or near the two allotments.
Bald Eagle (*Haliaeetus leucocephalus*)	Bald eagles may be found in the project area during the winter months. Carrion and easily scavenged prey items provide important sources of winter food in terrestrial habitats that are away from open water, such as in the allotments. The proposed action and alternatives would have no impact on carrion food sources. No nests are located on the Arizona Strip and nesting habitat (large trees near bodies of water) is non-existent.
Native Fish (5 species)	These species are restricted to the Virgin River, Paria River, and Kanab Creek. Habitat for these species does not occur within or near the two allotments.
Spring Snails (4 species)	These species are restricted to very small ranges at spring sites along the Virgin River and are not present within or near the two allotments.

Appendix F – Ecological Site Descriptions

United States Department of Agriculture
NRCS Natural Resources Conservation Service

Ecological Site Description

Data Access

> Return to Reports Selection Screen

Report Selections

> General
> Physiographic Features
> Climate Features
> Water Features
> Soil Features
Plant Communities
> Site Interpretations
> Supporting Information
> Rangeland Health Reference Sheet
> Complete Report
> HTML Printable Format

Plant Communities

Ecological Dynamics of the Site

An ecological site is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. In all plant communities, variability is apparent in productivity and occurrence of individual species. Spatial boundaries of the communities; however, can be recognized by characteristic patterns of species composition, association, and community structure. The historic climax plant community for this ecological site has been described by sampling relict or relatively undisturbed sites and/or reviewing historic records. The historic climax plant community is the plant community that evolved over time with the soil forming process and long term changes in climatic conditions of the area. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site.

Natural disturbances, such as drought, fire, grazing of native fauna, and insects, are inherent in the development and maintenance of these plant communities. The effects of these disturbances are part of the range of characteristics of the ecological site. Fluctuations in plant community structure and function caused by the effects of natural disturbances help establish the boundaries and characteristics of an ecological site. They are accounted for as part of the range of characteristics of the ecological site. Recognizable plant community phases are identified in the reference state of the ecological site. Some sites may have a small range of variation, while others have a large range. Some plant community phases may exist for long periods of time, while others may only occur for a couple of years after a disturbance.

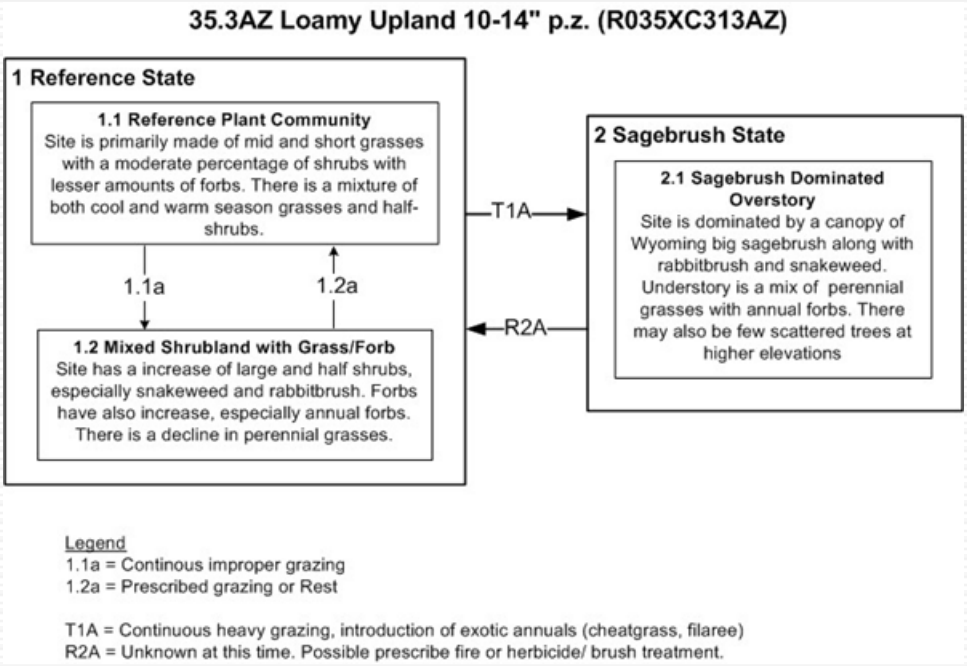
Deterioration of the plant community, hydrology, or soil site stability on an ecological site can result in crossing a threshold or potentially irreversible boundary to another state, or equilibrium. This can occur as a result of the loss of soil surface through erosion, the loss of the stability of the site due to disturbances that cause active erosion on the site, increases in the amounts and/or patterns or runoff from rainstorms, changes in availability of surface and subsurface water, significant changes in plant structural and functional types, or the introduction of non-native species. When these thresholds are crossed, the potential of the ecological site to return to the historic climax plant community can be lost, or restoration will require significant inputs . There may be multiple states possible for an ecological site, determined by the type and or severity of disturbance.

The known states and transition pathways for this ecological site are described in the state and transition model. Within each state, there may be one or more known plant community phases. These community phases describe the different plant community

that can be recognized and mapped across this ecological site. The state and transition model is intended to help land users recognize the current plant community on the ecological site, and the management options for improving the plant community to the desired plant community.

Plant production data provided in this site description is standardized to the air-dry weight of one year's growth. The plant communities described in this site description are based on near normal rainfall years.

State-and-Transition Diagram



State 1: Reference State

Community Phase 1.1: Historic Climax Plant Community

35.3 Loamy Upland Historic Climax Plant Community

This site has a plant community made up primarily of mid and short grasses with a moderate amount of shrubs. In the original plant community there is a mixture of both cool season and warm season plants.

Plants most likly to invade on this site are big sagebrush, snakeweed, rabbitbrush, juniper and annuals.

Community Phase Pathway 1.1a
Continous improper grazing

Historic Climax Plant Community Plant Species Composition

	Grass/Grasslike				Annual Production (pounds per acre)		Foliar cover (percent)	
Group	Group name	Common name	Symbol	Scientific name	Low	High	Low	High
1 -Dominant Perennial Grasses					300	550		
		Indian ricegrass	ACHY	*Achnatherum hymenoides*	100	180		
		blue grama	BOGR2	*Bouteloua gracilis*	150	250		
		western wheatgrass	PASM	*Pascopyrum smithii*	150	250		
		galleta	PLJA	*Pleuraphis jamesii*	60	125		
2 -Other Grasses					100	250		
		Grass, annual	2GA		0	10		
		Grass, perennial	2GP		0	30		
		Fendler threeawn	ARPUF	*Aristida purpurea var. fendleriana*	0	30		
		squirreltail	ELELE	*Elymus elymoides subsp. elymoides*	40	85		
		needle and thread	HECOC8	*Hesperostipa comata subsp. comata*	40	85		
		ring muhly	MUTO2	*Muhlenbergia*	0	30		

			torreyi				
	muttongrass	POFE	*Poa fendleriana*	40	85		
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0	30		

Forb

Group	Group name	Common name	Symbol	Scientific name	Annual Production (pounds per acre) Low	Annual Production (pounds per acre) High	Foliar cover (percent) Low	Foliar cover (percent) High
3 -Forbs					20	85		
		Forb, annual	2FA		0	42		
		Forb, perennial	2FP		0	42		
		Astralagus	ASTRA	*Astragalus*	0	42		
		Eriogonum	ERIOG	*Eriogonum*	0	42		
		Lupinus	LUPIN	*Lupinus*	0	42		
		Senecio	SENEC	*Senecio*	0	42		
		Sphaeralcea	SPHAE	*Sphaeralcea*	0	42		

Shrub/Vine

Group	Group name	Common name	Symbol	Scientific name	Annual Production (pounds per acre) Low	Annual Production (pounds per acre) High	Foliar cover (percent) Low	Foliar cover (percent) High
4 -Dominant Shrubs					50	200		
		Wyoming big sagebrush	ARTRW8	*Artemisia tridentata subsp. wyomingensis*	50	125		
		fourwing saltbush	ATCA2	*Atriplex canescens*	50	125		
5 -Other Shrubs					50	150		
		Ephedra	EPHED	*Ephedra*	10	85		
		broom snakeweed	GUSA2	*Gutierrezia sarothrae*	10	40		
		Lycium	LYCIU	*Lycium*	10	40		
		algerita barberry	MATR3	*Mahonia trifoliolata*	0	25		
		Opuntia	OPUNT	*Opuntia*	10	40		
		Yucca	YUCCA	*Yucca*	10	40		

Tree

Group	Group name	Common name	Symbol	Scientific name	Annual Production (pounds per acre) Low	Annual Production (pounds per acre) High	Foliar cover (percent) Low	Foliar cover (percent) High
6 -Trees					0	50		
		Juniperus	JUNIP	*Juniperus*	0	50		
		Colorado pinyon	PIED	*Pinus edulis*	0	50		

Annual Production by Plant Type

Annual Production (lbs/ac)

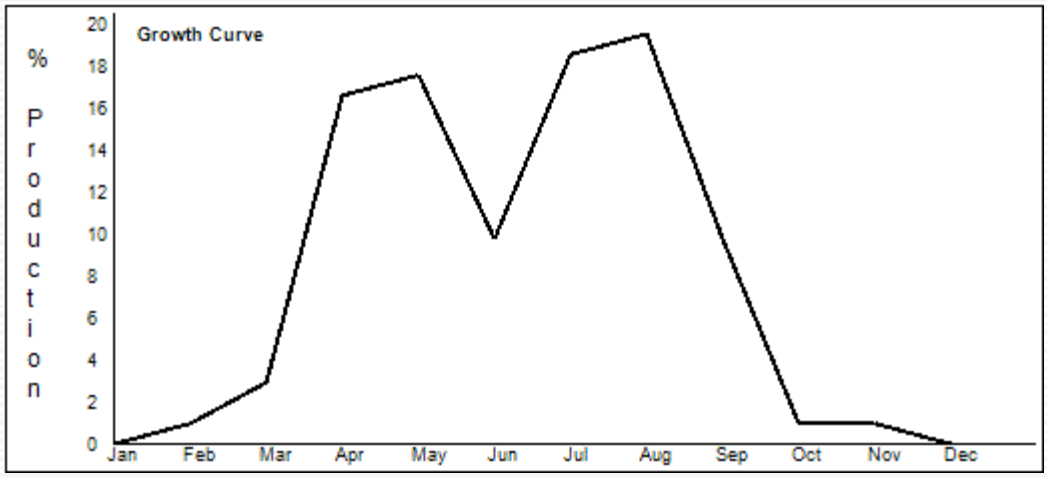
Plant type	Low	Representative value	High
Grass/Grasslike	400	525	650
Forb	20	50	85
Shrub/Vine	100	100	250
Tree	0	25	50
Total	520	700	1035

Plant Growth Curve

Growth curve number:	AZ3531
Growth curve name:	35.3 10-14" p.z. all sites
Growth curve description:	Growth begins in the spring and continues through the summer.

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	3	17	18	10	19	20	10	1	1	0



Community Phase 1.2: Mixed Shrubland with Grass/Forbs

35.3 LoamyUpland 1.2 Mixed Shrubland with Grass/Fo

The plant community is mix of large and half shrubs and perennial grasses. There is decline of cool season grasses and a increase of warm season grasses and annual forbs. Common shrubs are Wyoming big sagebrush, snakeweed, rabbitbrush. Blue grama, galleta, Indian ricegrass, squirreltail, and sand dropseed are the common grasses and western wheatgrass/muttongrass may be present but is greatly reduced.

Community Phase Pathway 1.2a
Prescribed grazing or Rest

State 2: Sagebrush State

This state is characterized by a canopy dominated by sagebrush with a rabbitbrush and snakeweed. The understory is a mix of warm and cool season grasses along with annuals forbs.

Community Phase 2.1: Sagebrush Domninated Overstory

35.3 Loamy Upland Community Phase 2.1

Sagebrush Dominated

This plant community is characterized by a dominance of Wyoming big sagebrush with scattered snakeweed/rabbitbrush. Understory is scattered with perennial snakeweed and annual forbs. This plant community has a small percentage of introduced exotics that are established in the understory. This plant community may also have scattered junipers.

Transition R2A

This transition is possible , but the treatments or practices necessary for this pathway may be a combination of prescribed grazing or Rest with brush/herbicide treatments.

United States Department of Agriculture
NRCS Natural Resources Conservation Service

Ecological Site Description

UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE

ECOLOGICAL SITE DESCRIPTION (Old Format Report)

ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

Site Name: Cobbly Gypsum Hills 6-9" p.z.

/ Ambrosia dumosa - Ephedra nevadensis / Pleuraphis rigida
(/ white bursage - Nevada Mormon tea / big galleta)

Site ID: R030XB223AZ

Major Land Resource Area: 030-Mojave Desert

Physiographic Features

This ecological site is generally found on low rounded hills, but occasionally is found on escarpments.

Landform: (1) Hill
(2) Escarpment

	Minimum	Maximum
Elevation (feet):	1600	3400
Slope (percent):	15	40
Water Table Depth (inches):		
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		

Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	High	Very high
Aspect:	No Influence on this site	

Climatic Features

The climate is arid and warm. Annual precipitation ranges from 6 to 9 inches. About 65 percent of the rainfall comes from October through May as gentle rain from Pacific storms which may last for a couple of days. The rest of the rainfall comes during the summer monsoon season from July through September as spotty, brief, intense thunderstorms. Snow rarely falls, and only remains on the ground a few hours at most. Annual air temperature ranges from 59 to 70 degrees F. The average frost-free period ranges from 156 to 259 days.

	Minimum	Maximum
Frost-free period (days):	156	259
Freeze-free period (days):	172	290
Mean annual precipitation (inches):	6.0	9.0

Monthly precipitation (inches) and temperature (°F):

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precip. Min.	0.9	1.04	0.43	0.25	0.15	0.49	0.65	0.66	0.71	0.58		
Precip. Max.	1.09	1.3	1.05	0.66	0.34	0.17	0.9	1.42	0.98	0.7	0.71	1.17
Temp. Min.	31.1	33.6	36.8	43.2	49.7	58.1	67.2	65.5	58.0	47.6	37.8	32.1
Temp. Max.	58.7	64.3	71.1	79.6	90.3	100.7	106.0	103.5	96.2	83.3	68.1	58.8

Climate Stations: (1) 020672, Beaver Dam, Arizona. Period of record 1956 - 2005
(2) 024639, Kingman, Arizona. Period of record 1901 - 2003
(3) 026538, Pierce Ferry, Arizona. Period of record 1963 - 1984

Influencing Water Features

Wetland
Description: System Subsystem Class

Representative Soil Features

The soil of this ecological site is very shallow to shallow. The surface texture is a very cobbly sandy loam. The subsurface texture is sandy loam. The soil is highly gypsiferous and

overlies layers of gypsum.

A typical soil profile is:
0 to 2 inches-pink very cobbly sandy loam
2 to 10 inches-light brown, gypsiferous sandy loam
10 to 18 inches-weathered, soft, gypsiferous shale
18 to 60 inches-hard gypsite interbedded with soft, gypsiferous shale

The soil taxanomic classification is Loamy, gypsic, thermic, shallow Typic Torriorthents.

Soils correlated to this ecological site include 623031, Gypill very cobbly sandy loam, 15 to 40 percent slopes; Shivwits Area, Arizona, Part of Mohave County, SSA.

Parent Materials:
Kind:
Origin:

Surface Texture: (1) Very cobbly Sandy loam

Subsurface Texture Group: Loamy

	Minimum	Maximum
Surface Fragments <=3" (% Cover):	0	15
Surface Fragments > 3" (% Cover):	50	75
Subsurface Fragments <=3" (% Volume):	0	25
Subsurface Fragments > 3" (% Volume):		

Drainage Class:

Permeability Class:

	Minimum	Maximum
Depth (inches):	4	15
Electrical Conductivity (mmhos/cm):	2	4
Sodium Absorption Ratio:		
Calcium Carbonate Equivalent (percent):	5	35
Soil Reaction (1:1 Water):	7.4	8.4
Soil Reaction (0.01M CaCl2):		
Available Water Capacity (inches):	0.0	0.0

Plant Communities

Ecological Dynamics of the Site

The historic climax plant community (HCPC) for a site in North America is the plant community that existed at the time of European immigration and settlement. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site at that time. The HCPC was in dynamic equilibrium with its environment and was able to avoid displacement by the suite of disturbances and disturbance

patterns (magnitude and frequency) that naturally occurred within the area occupied by the site. Natural disturbances, such as drought, fire, grazing of native fauna, and insects, were inherent in the development and maintenance of the plant community. The effects of these disturbances are part of the range of characteristics of the site that contribute to the dynamic equilibrium. Fluctuations in the plant community's structure and function caused by the effects of these natural disturbances establish the boundaries of dynamic equilibrium. They are accounted for as part of the range of characteristics for the ecological site. The HCPC is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. Variability is apparent in productivity and occurrence of individual species.

The HCPC for this ecological site has been estimated by sampling relict or relatively undisturbed sites and/or reviewing historic records.

A plant community that is subjected to abnormal disturbances and physical site deterioration or that is protected from natural influences, such as fire and grazing, for long periods seldom typifies the HCPC. Any physical site deterioration caused by the abnormal disturbance may result in the crossing of a threshold or irreversible boundary to another state, or equilibrium, for the ecological site. There may be multiple thresholds and states possible for an ecological site, determined by the type and or severity of abnormal disturbance. The known states and transition pathways for this ecological site are described in the accompanying state and transition model.

The "Plant Community Plant Species Composition" table provides a list of species and each species or group of species' annual production in pounds per acre (air-dry weight) expected in a normal rainfall year. Low and high production yields represent the modal range of variability for that species or group of species across the extent of the ecological site.

The "Annual Production by Plant Type" table provides the median air-dry production and the fluctuations to be expected during favorable, normal, and unfavorable years.
The present plant community on an ecological site can be compared to the various common vegetation states that can exist on the site. The degree of similarity is expressed through a similarity index. To determine the similarity index, compare the production of each species to that shown in the plant community description. For each species, count no more than the maximum amount shown for the species, and for each group, count no more than the maximum shown for the group. Divide the resulting total by the total representative value shown in the "Annual Production by Plant Type" table for the reference plant community. Variations in production due to above or below normal rainfall, incomplete growing season or utilization must be corrected before comparing it to the site description. The "Worksheet for Determining Similarity Index" is useful in making these corrections. The accompanying growth curve can be used as a guide for estimating percent of growth completed.

The State and Transition Model and Accompanying Narrative Descriptions are Still To Be Developed for this Ecological Site. For More Information Contact The Arizona NRCS State Rangeland Management Specialist.

Historic Climax Plant Community

The dominant aspect of this ecological site is a desert shrub-grassland. The dominant grass is big galleta. The dominant shrubs are white bursage, Nevada Mormon-tea and white ratany.

Plants that will increase with severe disturbance are white bursage. Plants that will invade are red brome.

Historic Climax Plant Community Plant Species Composition:

Grass/Grasslike

Group	Group Name	Common Name	Symbol	Scientific Name	Annual Production in Pounds Per Acre Low	High
1					70	122
		big galleta	PLRI3	*Pleuraphis rigida*	70	122
2					10	35
		other perennial grasses	2GP		10	35

Forb

Group	Group Name	Common Name	Symbol	Scientific Name	Annual Production in Pounds Per Acre Low	High
3					4	7
		desert trumpet buckwheat	ERIN4	*Eriogonum inflatum*	4	7

4				0	7
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0	7
5				0	3
	other annual forbs	2FA		0	3

Shrub/Vine

Group	Group Name	Common Name	Symbol	Scientific Name	Annual Production in Pounds Per Acre Low	High
6					52	70
		white bursage	AMDU2	*Ambrosia dumosa*	52	70
7					35	52
		Nevada Mormon tea	EPNE	*Ephedra nevadensis*	35	52
8					18	35
		white ratany	KRGR	*Krameria grayi*	18	35
9					18	24
		Anderson wolfberry	LYAN	*Lycium andersonii*	18	24
10					7	21
		banana yucca	YUBA	*Yucca baccata*	7	21
11					18	52
		other shrubs	2SHRUB		18	52
12					0	18
		Opuntia	OPUNT	*Opuntia*	0	18

Annual Production by Plant Type:

Plant Type	Annual Production (lbs/AC) Low	Representative Value	High
Forb	3	10	20
Grass/Grasslike	82	120	156
Shrub/Vine	165	220	274
Total:	250	350	450

Structure and Cover:

Ground Cover (%)

Vegetative Cover						Non-Vegetative Cover					
Grass/ Grasslike	Forb	Shrub/ Vine	Tree	Non-Vascular Plants	Biological Crust	Litter	Surface Fragments >.1/4 & <= 3"	Surface Fragments > 3"	Bedrock	Water	Bare Ground
0 to 2		1 to 3									

Structure of Canopy Cover (%)

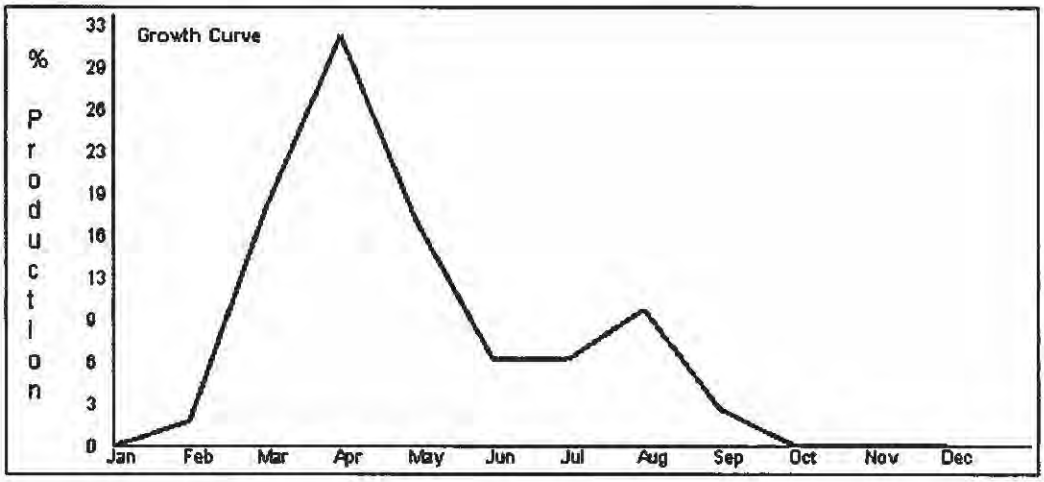
	Grasses/Grasslike	Forbs	Shrubs/Vines	Trees
<=0.5 feet		0 to 1		
> 0.5 - < 1 feet	1 to 3			
< 1 - >= 2 feet				
> 2 - < 4.5 feet			8 to 12	

Plant Growth Curve:

Growth Curve Number: AZ3022
Growth Curve Name: 30.2 6-9" p.z. upland sites
Growth Curve Description: Growth begins in the late winter, most growth occurs in the spring.

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	19	33	18	7	7	11	3	0	0	0

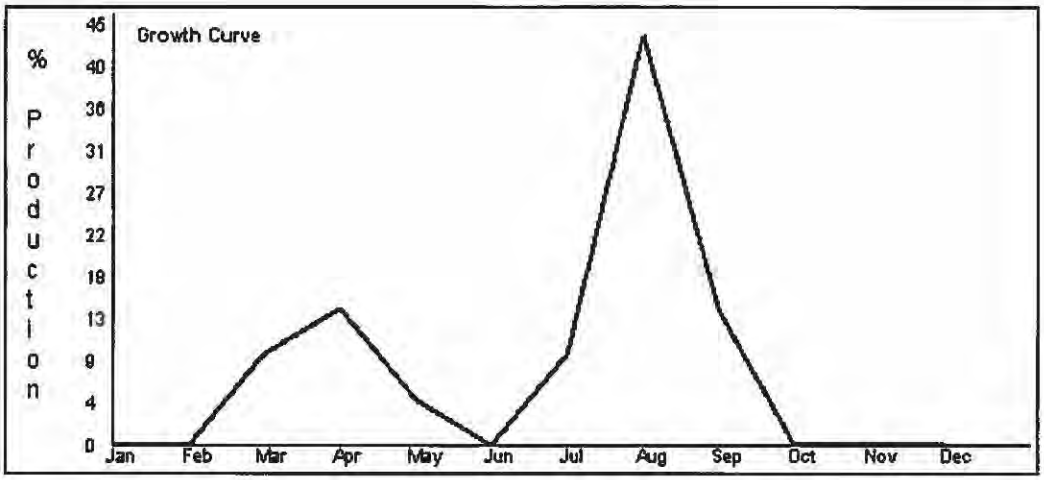


Plant Growth Curve:

Growth Curve Number: AZ3070
Growth Curve Name: 30.23 6-9" p.z. big galleta
Growth Curve Description: Growth begins in the spring, most growth occurs during the summer rainy season.

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	10	15	5	0	10	45	15	0	0	0

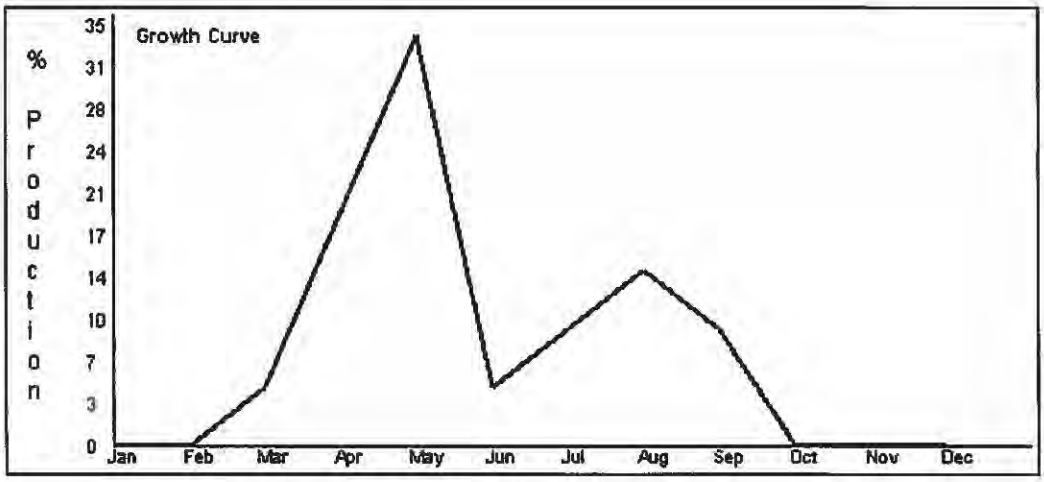


Plant Growth Curve:

Growth Curve Number:	AZ3075
Growth Curve Name:	30.23 6-9" p.z. white ratany
Growth Curve Description:	Most growth occurs in the spring, some growth occurs in the summer. Flowers in the spring.

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	20	35	5	10	15	10	0	0	0



Ecological Site Interpretations

Plant Preference by Animal Kind:

Hydrology Functions:

Recreational Uses:

Wood Products:

Other Products:

Other Information:

Supporting Information

Associated Sites:

Site Name	Site ID	Site Narrative
Limy Upland 6-9" p.z.	R030XB214AZ	
Sandy Loam Upland 6-9" p.z. Limy	R030XB215AZ	
Gypsum Hills 6-9" p.z. Alkaline	R030XB222AZ	
Gypsum Fan 6-9" p.z.	R030XB224AZ	

Similar Sites:

Site Name	Site ID	Site Narrative

State Correlation:
This site has been correlated with the following states:

Inventory Data References:

Type Locality:

State:	AZ
County:	Mohave
Township:	41 N.
Range:	12 W.
Section:	2
General Legal Description:	Lizzard Point Quad.; about 9 miles south of St. George, Utah; Sec. 2, T. 41 N., R. 12 W.; Mohave County, Arizona.
Universal Transverse Mercator (UTM) system:	

Relationship to Other Established Classifications:

Other References:

Site Description Approval:

Author	Date	Approval	Date
Stephen Cassady	2/18/1993	Steve Carmichael	2/18/1993

Site Description Revision Approval:

Author	Date	Approval	Date
Stephen Cassady	12/16/1993	Steve Carmichael	8/17/1994
Stephen Cassady	12/16/1993	Stephen Cassady	8/22/2006
Stephen Cassady	8/22/2003	Stephen Cassady	8/22/2003

Appendix G –EA Comments Responses

Comment No.	Commenter Name	Comment	Response
Scoping Comments			
Wolfhole Lake (WL) Allotment Scoping Comments			
WL001	Western Watersheds Project	Now that the RHE is "final" and signed by the field office manager, the BLM has no choice but to take action to remedy the downward trend and deleterious effects of the livestock grazing operation as soon as possible but not later than the start of the next grazing season. Where the BLM has found unsatisfactory rangeland health conditions, and where the trend is downward, the BLM must act to ensure against further harms. The BLM has identified a need for reductions in use and changes in season of use, and those changes should be implemented immediately.	The causal factor for not meeting land health Standard 3 in the Wolfhole Lake Allotment, as described in the land health evaluation report, is due to pinyon-juniper and sagebrush encroachment into ecological communities that historically were dominated by grasslands. See Section 3.2.3 and Appendix F of the EA for the Ecological Site Description that represents where the vast majority of treatments are planned in the Wolfhole Lake Allotment. As described in Section 1.2, action is necessary to promote significant progress toward, or the attainment and maintenance of, the standards for rangeland health on the Wolfhole Lake Allotment. Section 2.4 (Alternative B – Proposed Action) describes the proposed treatments that would address attainment of Standard 3 in this allotment. The action and time line described by commenter is necessary when livestock grazing is determined to be the causal factor for not meeting land health standards.
WL002	Western Watersheds Project	We commend the agency for encouraging an analysis of an alternative with reduced use and season. Moreover, we urge the agency to also complete a full and fair analysis of a "No Grazing" alternative, which would surely be the most expeditious way to achieve land health standards, address wildlife needs, and reduce ecosystem stress. The best way to improve this allotment is to remove livestock completely and allow recovery to occur.	See Section 2.6 – Alternative D (No Grazing). This alternative is fully analyzed (see Chapter 4).
WL003	Western Watersheds Project	No grazing would also be the most effective approach in combating climate change according to a recent peer-reviewed paper on the topic (see Beschta, et al 2012), and this should be addressed in forthcoming NEPA analyses per Secretarial Order 3289. The impacts of climate change in the region have been well established and the climate of the	A No Grazing alternative has been fully analyzed in the EA. The peer review articles cited by commenter show the distinct difference of opinions and models reflected by climate scientists. Beschata et al. 2012 poses the economic concern of removal of livestock from public lands and the devastating effects it may have on small, rural, western communities. The

		Wolfhole allotment and the Arizona Strip will become hotter and drier.	other two studies (Bahre et al. 1993 and Brown et al 2007) are studies conducted in the Chihuahuan Desert. The study areas are not representative of the sites analyzed in this EA, particularly of the Wolfhole Lake Allotment which is within the Colorado Plateau ecoregion. The Lizard Allotment is within the Mojave ecoregion. However, the conclusion from Bahre cites increases in woody species due to fire exclusion and overgrazing practices that likely predate the Taylor Grazing Act. Brown cites increases in woody vegetation as likely due to increases in winter precipitation, while summer precipitation has remained within the long-term average. Brown's conclusion contradicts the hypothesis that woody vegetation increases were due to livestock or desertification. The findings of these studies determined that climate change, including greater El Niño influence, had caused increased winter precipitation, giving woody plants an advantage for establishment and survival. The cited studies support our monitoring findings of increased extent and density of pinyon-juniper and sagebrush. Please note that Table 3.2 has been revised to add a discussion on climate change and greenhouse gas emissions.
WL004	Western Watersheds Project	It is clear that the poor conditions on the allotment persist even with low levels of grazing use. It is clear that the allotment cannot possibly sustain full permitted use without serious environmental degradation. It is clear that the utilization limits would have been exceeded if a higher stocking rate was approved.	See response to Comment No. WL001 for discussion on findings of the rangeland health determination, and the causal factor for not meeting Standard #1. The ecological site inventory and recent trend data (Appendix D) show that the vegetative communities are stable and ecological conditions are functional. However, the plant functional groups are shifting to a more shrub-dominated system with less understory. Based on monitoring, trend for the Lizard Allotment is upward; trend on the Wolfhole Lake Allotment is up at one key area, and static at the other key area (see Section 3.2.3). As discussed in the EA, the proposed vegetation treatments would help ecological processes in the currently sagebrush and pinyon/juniper dominated plant communities. These treatments would restore historic dominated grasslands while retaining a mosaic of

			sagebrush and trees. Openings and reduction in competition would allow for an increase in forb composition in the understories, and provide a more diverse plant community. Perennial understory vegetation would help stabilize soils and reduce erosion potentials. As described in Section 4.2.2 of the EA, implementation of the proposed vegetation treatments would also improve quantity and quality of forage for livestock over time, and would increase the production and vigor of herbaceous plant communities. The forage base would more adequately sustain the existing grazing preference of the Wolfhole Lake Allotment.
WL005	Western Watersheds Project	The LHE admits that forage availability limits the potential use of the allotment by wildlife. The BLM should explain how this is reasonably considered "multiple use" if one use (livestock grazing) is taking precedence over another (wildlife habitat).	As stated in Section 1.2, understory perennial grasses and forbs are outcompeted and ultimately reduced due to competition for limited resources from increasingly dense pinyon-juniper and sagebrush stands. Action is necessary to manage and enhance vegetation communities within the Wolfhole Lake Allotment to provide the necessary forage for livestock and forage and cover for healthy, self-sustaining wildlife populations. The purpose of the proposed vegetation treatments is to promote significant progress toward, or the attainment and maintenance of, the standards for rangeland health on the Wolfhole Lake Allotment. As described in Section 4.4.2.1, the proposed treatments would result in more structural diversity (i.e., a mosaic of trees and openings) by retaining a mix of tree canopy cover with a variety of different tree height structures and age classes. Open areas would be created that would see an increase in forage plants through seeding or natural establishment. The health, vigor, recruitment, age class, diversity and production of perennial grasses, forbs, and shrubs (including those preferred by mule deer) should improve since removal of pinyon and juniper would allow grasses, forbs, and shrubs to establish and compete for sunlight, nutrients and water, resulting in improved vegetative conditions across the project area. In addition, treatments are designed with irregularly shaped boundaries to

			increase edge effect, which is beneficial to mule deer.
WL006	Western Watersheds Project	The BLM should consider whether the absence of forage will be remedied by the proposed infrastructure. It seems that the BLM is simply seeking to redistribute the problem rather than implement a solution, and the pipeline extensions, water catchments and fence lines have their own ecological and economic cost that should be disclosed and analyzed.	As described in Section 4.3.2, the proposed structural range improvements would allow for an effective rotation grazing system that would provide for periodic rest and deferment. The deferred grazing system provides for the physiological needs of the key species – the scheduled graze and rest periods benefit key species and other vegetation by increasing plant vigor, aiding in seed dissemination, and providing periodic rest during critical growing periods. This would allow expansion and re-establishment of perennial grasses and forbs in the understory. This understory would add diversity to the ecological site, as well as provide wildlife and livestock with greater quantity and quality of forage, along with reliable water for both wildlife and livestock. Impacts to wildlife from the proposed structural range improvements are discussed in Section 4.4.2; impacts to soils from the proposed structural range improvements are discussed in Section 4.5.2.
WL007	Western Watersheds Project	The method for determining trend is misleading and insufficient. As WWP repeatedly points out, to require a 10-pt. change in frequency to determine whether a trend is up or down is not scientifically valid. It underestimates effects to any species with low frequencies to begin with, such as rare plants, that could disappear completely and have the key area be stable or even upwards. For plants struggling to re-establish after drought, the method does the same thing, and it really only gauges effects on common species. This isn't fine-tuned enough to provide overall trend for the allotment, or to ensure against harm to specific, naturally infrequent vegetation species.	Permanent Frequency Trend plots are an accepted Bureau methodology for monitoring key species that may be utilized by livestock or wildlife. Plant species that are classified as Special Status including Sensitive, Threatened, and Endangered are regularly monitored (usually annually), using other accepted monitoring methodologies. As described in Table 3.2, there are no special status plant species present in either of the allotments addressed in this EA.
WL008	Western Watersheds Project	The Wolfhole Lake LHE demonstrates the insufficiency of the trend methodology. For Key Area #1, BLM has determined the trend is upward, because of the change between 1982 and 2010. However, the frequency of key species, litter, and total cover is down substantially from the last	The establishment of the trend plot is considered the base data, and future readings are compared to this. However, the BLM does recognize that this methodology does not present a complete picture of what is occurring at the key areas, and therefore also developed

		time (2005) the attributes were measured. For Key Area #2, BLM considers the trend to be "stable," but key species are down (even after seeding) and percent live basal vegetation has barely improved. Bare ground has doubled since 2005. Litter has been steadily decreasing since the 1980s, and yet BLM determines that this represents stability. Something is wrong, either with BLM's interpretation of the data or its basic ecological knowledge, or with the working definition of "stable."	Desired Plant Community (DPC) objectives based on site potentials derived from Ecological Site Descriptions (ESD) as well as local knowledge. Understory, including both perennial grasses and forbs at Key Area #1 are restricted by the dense sagebrush overstory (81% composition in 2015; see Appendix D, Table D.10). Even with this overstory competition at Key Area #1, there has been an increase in key species from 16 percent in 1982 to 57 percent in 2015.
WL009	Western Watersheds Project	Key Area #1 is described as mid-seral even though the composition is heavily skewed away from the native perennial grasses that should be present on the site. The site is dominated by Squirreltail, which is less palatable later in the season when it has seeds/awn (which is when livestock are typically on the allotment). The LHE does not analyze this composition imbalance or admit that other species typical of the community are missing.	Please see response to Comment No. WL008.
WL010	Western Watersheds Project	The high amount of *Guterrezia* (usually indicative of disturbance and especially overgrazing) at Key Area #2 is not analyzed or discussed in the LHE. Here, *Pleuraphis rigida* composes the large majority of the perennial grass cover even though other species should be better represented in the community. This species' drought tolerance and mid-level palatability to livestock hints at why it is so dominant on the chained site, but the LHE doesn't explore whether the composition and high levels of two "increasers" should change the finding of "late seral" for this key area. It seems instead to be in poor condition, and BLM's conclusions to the contrary are unsupported.	*Guiterrizia*, while native, is often times "over represented" during early seral states, as it does favor disturbance (please note that this key area is in a site that was chained in the past). There has been a steady decline in this species in the last 10 years and a corresponding increase in native perennial grasses at this site (see Appendix D, Table D.11). *Pleuraphis jamesii* (*P. rigida* may have been mistakenly used in portions of the land health evaluation report), commonly referred to as galleta, is a native perennial grass that should be one of the dominant perennial grasses on this site according to the ESD. Other perennial grasses including *Oryzopsis hymenoides* (ricegrass) has been increasing at this site over the past ten years. Other perennial grasses are present on this site (see Appendix D, Table D.11 for composition data) and are captured in the trend data as well in varying amounts over the past 30 plus years.
WL011	Western Watersheds Project	The forthcoming NEPA analysis should discuss this allotment in context of its shared management with the Blake Pond allotment and the Lizard allotment. The "season of use" section admits that the Wolfhole Lake permit isn't used according to the permitted terms and conditions, begging the question how the 928 AUMs	The EA discusses the grazing system for Lizard, Wolfhole Lake, and Blake Pond allotments (see Sections 2.3.1 and 3.4.1), since they are combined under the Lizard AMP. (Please note that the permit for Blake Pond Allotment was renewed in 2017.) Total herd size is also disclosed in the EA (see Table 2.1).

		are distributed on this allotment. The total herd size should be disclosed. The monitoring results and the ecological conditions of the allotment are dependent on this variable, and the LHE should have accurately disclosed the use on the allotment.	The permitted season of use as stated in the current Wolfhole Lake grazing permit is yearlong (March 1 – February 28. The allotment is typically used in spring, summer, and early winter, depending on precipitation and snow conditions. As the permit allows yearlong use, this does not violate the terms and conditions of the permit. The proposed action is an effort to address tree and shrub encroachment on this allotment. This effort would allow better livestock distribution and forage opportunities. As described in Section 2.4 and the Actual Use tables in Appendix 5, the livestock grazing permittee has taken voluntary non-use for many years due to pinyon-juniper and sagebrush encroachment into what historically was primarily dominated by perennial grasslands. The proposed action would address restoring these grasslands which would provide greater diversity of habitats for wildlife as well.
WL012	Western Watersheds Project	It is unclear why the permit date is December 1 to November 30, rather than the standard March 1 to February 28.	Comment noted, and the requested change has been made to the EA. It is important to note that making this change did not change the results of the analysis.
WL013	Western Watersheds Project	Please explain why Key Area #2 is called the "Wolfhole chaining" key area. If this area has been chained or otherwise "[mis]treated," the type, extent, and date of manipulation should be revealed. It appears that Key Area #1 has also been chained and railed. The BLM should be clear about the extent to which these key areas are representative of the allotment as a whole.	Information on the Chaining Pasture is provided in Sections 2.4.2.2 and 3.4.1. In addition, the historic vegetation treatment in this pasture is described in Section 4.6. The key area in the Chaining Pasture provides valuable monitoring data on the success and progression of vegetation after treatment. A discussion of key area selection is described in Section 3.2.3 – key areas are representative study sites that are selected based on their ability to represent range conditions over much larger areas (University of Arizona 2010).
WL014	Western Watersheds Project	The issues identified in scoping indicate that there is some concern regarding the outcomes of pinyon-juniper woodcutting. A full description of the project, including past, present, and potential future impacts, should be included in the forthcoming NEPA analysis.	A detailed description of the proposed action is provided in Section 2.4. The green wood cutting area is discussed in Table 3.2 and in Section 4.6 (text has been added as a result of this comment).
WL015	Western Watersheds Project	It is unclear if the sensitive species habitats are potential because they are appropriate habitat where the species have never been recorded during surveys or whether surveys have ever been conducted. This information is important	Section 3.4.3.3 in the EA provides detailed information on sensitive species associated with the Lizard and Wolfhole Lake allotments.

		because it informs the publics' ability to interpret Table1 (of the LHE).	
WL016	Western Watersheds Project	The LHE identifies the Wolfhole Lake allotment as providing habitat for pronghorn. However, none of the vegetation health indices measure important pronghorn habitat variables, like hiding cover for fawns. Basal cover data are not enough to ensure that pronghorn fawns can escape predation, all the more significant since coyotes are described as being "common." The LHE claims that the allotment is meeting pronghorn habitat needs because of the presence of palatable shrubs at Key Area #1, but the BLM has not provided any analysis of the structural needs of the species, or any estimate of conditions *within* the pronghorn habitat. The forthcoming NEPA analysis should identify whether BLM knows the condition of pronghorn habitat and season of use on the allotment, and whether there is conflict between livestock-related infrastructure and pronghorn movement.	The majority of this allotment was classified as poor quality habitat for pronghorn in the LHE. This was cited as due to lack of sufficient forbs preferred by the species. As stated in the LHE, "Shrub dominated habitats, such as those found in the pronghorn habitat on this allotment, typically lack sufficient forbs preferred by pronghorn." The palatable shrub objective for pronghorn within the RMP (of at least 20% composition by weight) is exceeded at the key area adjacent to pronghorn habitat in the allotment. However, as acknowledged in the LHE), the grass/forb objective (of at least 20% composition) is not met – this is due to the domination by sagebrush, which crowds out understory species. Without treatments to remove/thin out sagebrush (which would allow grass and forb composition to increase), it is unlikely this forage objective for pronghorn will be met, and that habitat quality would remain poor. The proposed vegetation treatments are designed to increase perennial forbs and grasses. In addition, it should be noted that the composition of forbs is highly variable and is influenced by timing and amounts of precipitation (i.e., during normal or wet years, sufficient forbs would be present once the overstory is opened up).
WL017	Western Watersheds Project	The forthcoming NEPA analysis should also describe and disclose any and all predator management activities that the livestock operations entail. The LHE admits that the project area has a "long history of predator management." That history should be disclosed and an analysis of management activities should be incorporated in the Cumulative Effects section of the analysis.	In response to this comment, the following text was added to Section 4.6.3 concerning predator management: "AGFD issues hunting permits, including permits for predator species. The BLM has no specific information concerning permits or additional predator control in the areas addressed in this EA." See also response to Comment No. EA010 (below).
WL018	Western Watersheds Project	The LHE states that this allotment receives a lot of recreational traffic. The forthcoming NEPA analysis should analyze and disclose the extent to which recreation and livestock are in conflict on this allotment, and whether the visitor experience is harmed by the sight of heavily grazed landscapes, an abundance of cow pies and flies, and fences and other unsightly infrastructure. The BLM	Please see response below on Comment No. EA014.

		should disclose whether any surveys of visitor preference have ever been done and how the agency seeks to balance the multiple uses of recreation and livestock grazing in the project area. An economic comparison would also be helpful, so that the reader may evaluate the financial practicality.	
WL019	Western Watersheds Project	It appears that unauthorized vehicle use on the allotment is also a problem. BLM describes soil compaction that occurs as a result of overland travel. This should be thoroughly disclosed and analyzed in the forthcoming NEPA analysis, and any management actions necessary for ensuring rangeland health should be included.	Commenter incorrectly characterizes the issue of unauthorized vehicle use cited in the LHE. The reference was made in relation to the green wood cutting area, not the Wolfhole Lake Allotment as a whole. Unauthorized vehicle use in the green wood cutting area is not contributing to the allotment not meeting land health Standard #3. Unauthorized vehicle use is an enforcement issue, and the BLM uses a variety of options to educate the public about what routes and areas are open or closed – including signage and printing/distributing recreation map, and increased law enforcement patrols. Travel management is beyond the scope of this EA.
WL020	Western Watersheds Project	The LHE doesn't analyze any riparian/wetlands because no riparian/wetlands occur within the public lands portion of the allotment. The LHE doesn't evaluate whether seeps and springs would exist in the absence of livestock infrastructure, i.e., are the wells, stock tanks, and drinkers associated with the livestock operation dewatering or diverting water that would otherwise be creating riparian habitat?	There are no wetland/riparian areas within either allotment. Text has been added to Table 3.2 to discuss development of Oak Spring and Wolfhole Spring and to clarify that development and use of these springs are regulated and permitted by the State of Arizona.
WL021	Western Watersheds Project	The forthcoming NEPA analysis should analyze and disclose the amount of water potentially consumed by authorized livestock AUMs and the extent to which excretory wastes affect watershed health when the freshwater is transformed for commodity interests. The relative value of this water for ecological function should be analyzed and disclosed, and the number and extent of water developments (and the amount of water they use) should be assessed in the forthcoming NEPA analysis.	A summary of range improvements in these allotments, including water developments, is found in Appendix A, Table A.1. These developments are utilized by wildlife as well as livestock. It would not be practical to distinguish amounts that birds, reptiles, deer, rabbits, etc. use as opposed to livestock use. It is also not practical to assess a "relative value of this water for ecological function". The EA does analyze impacts of the new water developments on resources such as wildlife (see Section 4.4.2). As stated in Table 3.2, site visits to the allotments (during rangeland health evaluations and subsequent monitoring) has not indicated that current livestock use is altering water quality – no surface

			water within the allotments is used for domestic drinking water. Thus, no effect to water quality is expected from the alternatives.
WL022	Western Watersheds Project	It is unclear the relationship of the allotment to Wolfhole Lake. The LHE discusses the condition of the stream terraces being affected by erosion. Is this not a riparian area or a wetland? Why aren't these areas evaluated in the S&G assessment?	Wolfhole Lake is an ephemeral flat that only holds water for a few weeks each year. There is no vegetation present that is classified as facultative or obligate riparian vegetation. Vegetation in and around this flat is represented by upland type vegetation species.
WL023	Western Watersheds Project	The BLM appears convinced that restoration on the allotment depends on some kind of treatment (mechanical, chemical, fire, etc.). However, the forthcoming NEPA analysis should compare the potential of passive restoration, including the total removal of livestock and the stabilizing and restorative force of simply eliminating the disturbance caused by non-native herbivores. Because livestock are largely responsible for the current conditions of the allotment, "treating" the land without removing the disturbance responsible for the poor conditions simply kicks the can down the road. For example, BLM is urging the removal of sagebrush to restore perennial grasses for the benefit of pronghorn at Key Area #1 – the obvious question is whether the agency is going to allow the livestock to continue to remove 50 percent of the remaining or restored grasses.	A detailed description of the proposed action can be found in Section 2.4. This includes the suite of project design features that would be implemented to reduce or eliminate adverse impacts from specific project activities and to maximize the likelihood of project success. The EA fully analyzes impacts to resources (including vegetation) from continued livestock grazing, and from implementing the proposed vegetation treatments (see Chapter 4). Allotment monitoring would also continue (see Section 2.4.1.5 and Section 4.7). This monitoring would indicate, in part, attainment of the key area DPC objectives and to detect changes of individual species which determines a trend or change in vegetation composition. All monitoring data would be used to evaluate current management of the allotment and assist the BLM in making management decisions that help achieve vegetation objectives. This monitoring would be sufficient to identify changes in vegetation and other resources as a result of livestock grazing activities.
WL024	Western Watersheds Project	The Determination for Standard #3 attributes the movement from grassland to shrubland as being due to the absence of fire. However, it is well known that livestock also have this effect, or work in synergy with other perturbations to create these vegetation conversions. See Bahre and Shelton 1993, Brown et al 1997. The BLM's failure to attribute these rangeland changes – at least in part – to the influence of long-term livestock grazing is inexcusable.	The cumulative impacts section of the EA discusses past land uses that have contributed to the existing environment in these allotments. Section 4.6.1 states in part: "Livestock grazing in the region has evolved and changed considerably since it began in the 1860s, and is one factor that has created the current environment. At the turn of the century, large herds of livestock grazed on unreserved public domain in uncontrolled open range. Eventually, the range was stocked beyond its capacity, causing changes in plant, soil, and water relationships." In addition, Section 4.3 discusses the impacts that livestock grazing has on vegetation.

WL025	Western Watersheds Project	There is a discrepancy between the ecological site reported on the field sheet ("Loamy Bottom") and the ecological site reported in the DPC summary ("Loamy Upland," both key areas). It is not clear that BLM has compared the monitoring data with the correct Ecological Site Description to generate DPCs at Key Area #1. It is not clear that the BLM knew the appropriate reference area when it was evaluating field conditions. Additionally, there is only one field worksheet with the LHE. Where is the other data sheet from the other key area? It is not clear which key area the single data sheet refers to.	These two ecological sites share many common features, and neighbor one another in many places. The main distinguishing feature is a gradation based on slope from the Loamy Bottom to the Loamy Uplands. There is not a distinct line of demarcation where one site ends and the other begins as changes in vegetation are gradual, and slight changes in slope may lead to inclusions of each soil type. These sites are composed of almost identical species, except the trees are not in the Loamy Bottoms. For clarification, both the key areas are located within the Loamy Upland ESD (labeled as this in both LHE and EA); however, Key Area 1 is on the boundary of the two mapped sites. As stated in Section 2.2.2, it is important to note that the site guides are just that – they are "guides. Long-term monitoring of a site indicates what a particular area is capable of producing. The DPC objectives therefore reflect the potential of each key area.
WL026	Western Watersheds Project	It is unclear why BLM believes that erosion at Tub Pond is a natural, uncontrollable event "because the road crosses the wash at the pond." The road is not natural, and its location is not uncontrollable. If the BLM's road network is creating erosion, the BLM should be taking a "hard look" at the road.	This issue, identified during scoping for the LHE, concerns erosion of the reservoir (or pond) and the road that crosses the pond. The statement addressing this issue in the LHE does not state that the road is natural, but rather that the flash flooding down the narrow canyon bottom from intense rain storms is a natural event. Please note that travel management is beyond the scope of this EA.
WL027	Western Watersheds Project	The utilization on the allotment is quite high when individual species are considered. BLM averages utilization across species without analyzing the effects of 77 percent utilization on any individual species. Because the key species vary in their palatability and depending on the time of year, the dates of utilization monitoring should be disclosed and the limit on utilization should be set per species, not overall.	See Section 3.2.3 and Appendix D of this EA. Utilization is reported by pasture (see Tables D.7 and D.8 in Appendix D) and by species. The number of times utilization exceeded the 50 percent threshold is disclosed as twice in the past 10 years.
Lizard Allotment Scoping Comments (L)			
L001	Western Watersheds Project	BLM's methods for determining utilization are insufficient to ensure no long-term degradation of vegetation resources. For example, on the Lizard allotment, the BLM averaged utilization on Mormon tea in 2010 and determined 37 percent utilization. However, the BLM only measures the average percentage of current year's forage production that is	For an allotment with a rotation, which includes the Lizard Allotment, up to 50 percent utilization (livestock and wildlife) is acceptable. Up to this level of browse use is considered moderate. Plants are generally able to tolerate this amount of annual use with little deleterious effects. See Section 4.3 of the EA for a detailed discussion on the impacts of livestock

		consumed or destroyed. It does not account for the misshapen shrubs that occur from repeated livestock use or the stunted growth patterns that result. On the Lizard allotment, the BLM should be considering the effects of this kind of utilization on the quality of wildlife habitat, not just whether it is within the "allowable" utilization limits.	grazing on vegetation, and Section 4.4 for a detailed discussion on the impacts of livestock grazing on wildlife and wildlife habitat.
L002	Western Watersheds Project	There is a great disparity between the utilization data collected in 2009 and 2010 on the key species. No explanation is provided for this difference. Is it an artifact of when (seasonally or in the rotation schedule) the data were collected? The BLM should be attempting to explain the significance of these numbers to the public. BLM should also explain the 12-year gap in the data between 1997 and 2009.	Both years (2009 and 2010), utilization was acceptable (i.e., within the 50 percent threshold). The majority of the AUMs used in 2009 in the Lizard BLM Pasture were used during the winter months when the vegetation is dormant; the livestock primarily utilized dormant shrubs. The use in 2010 occurred in the spring time. The concept of deferred grazing and rest-rotation grazing allows the season of use to alternate every other year (see Table 3.4), so as to allow rest during the active growing season at least every other year. See Section 4.3 of the EA for a detailed discussion on the impacts of livestock grazing on vegetation. It is unknown why utilization data was not collected from 1997-2008. Please note that it has been collected most years since 2009 (see Table D.2 in Appendix D).
L003	Western Watersheds Project	The BLM's trend determination fails to incorporate the evidence that Mojave indigobush, littleleaf ratany, sand dropseed, black grama, and Indian ricegrass disappeared from the utilization transects in 2010. BLM apparently only is concerned with the trend of Mormon tea and Big Galleta, but no explanation is given for the disappearance of other important indicator species.	Many of the species listed in the comment were captured in previous or subsequent trend readings. Utilization data is typically concerned with key species, except for sand dropseed and ricegrass; the species listed are not key species. Management of the allotment is based on a selection of key species; these species are selected for their similarity to other grasses and browse species that occur in the allotment. As stated in Section 3.4.2, the definition of key species is: (1) forage species of sufficient abundance and palatability to justify its use as an indicator to the *degree of use* of associated species; and (2) those species which must, because of their importance, be considered in the management program. The primary reason for collecting utilization data is to determine what the livestock are eating and whether they within the parameters of use levels (50% of current year's growth for this allotment). Non-key species are typically not eaten at all, or are eaten to a lesser

			extent since more palatable plants are available at the site – in this instance Mormon tea, winterfat, and galleta.
L004	Western Watersheds Project	The field data indicate that *Dalea fremontii, Gutierrezia sarothrae, Larrea tridentata, Lycium andersonii, Opuntia spp., Aristida spp., Muhlenbergia porteri, Sitanion hystrix, Sporabolus cryptandrus, Tridens pulchellus,* and *Eriogonum inflatum* have all disappeared from Key Area #1 since 2005. Species such as *Ephedra nevadensis, Krameria parvifolia, Yucca baccata,* and *Pleuraphis rigida* are all declining from previously higher frequencies. BLM determination that trend is up neglects the overwhelming evidence that the diversity and abundance of native vegetation has substantially decreased on this allotment.	Additional data has been collected since 2005, which is the data commenter is referencing (see Table D.3 in Appendix D). This table also displays the fluctuation of the species over the past 30 years. It is important to note that several of the referenced species (such as *Ephedra nevadensi, Opuntia spp., Yucca baccata,* and *Tridens pulchellus)* have substantially increased recently. Some species (such as *Krameria parvifolia* and *Aristida spp.)* have remained stable, while others (including *Dalea fremontii, Gutierrezia sarothrae, Larrea tridentata, Lycium andersonii, Muhlenbergia porteri, Sitanion hystrix,* and *Sporabolus cryptandrus*) never were very frequent at the key area – the years these species were detected at the key area were wet years, but they do not normally occur at this site. If livestock grazing were the reason for the decline in these species, then the more palatable species (such as *Ephedra nevadensi)* would also be declining, rather than increasing as is currently occurring. The data in Tables D.3 and D.4 of Appendix D show that this site is stable with an upward to static trend in all indicators over the course of 30 years.
L005	Western Watersheds Project	BLM's trend determination compares just two species at two points in time, 1982 and 2010. Notably, BLM does not include actual use for 1982, but other use levels during that same decade show much higher (including excessive) levels of use. In 2010, actual use was just 21 percent of the permitted use. The S&G, therefore, does not demonstrate that the Lizard allotment can support the permitted numbers without harming the ecosystem function. The technical recommendation to "Maintain usage at current licensed [?] levels and use periods and renew the ten year permit," is unsupported by the data. The forthcoming NEPA analysis should take a hard look at whether this allotment can truly sustain the permitted levels of livestock grazing, when actual use is so much lower.	Utilization patterns are more complex than just actual use reported. Utilization is influenced by precipitation, season of use, and distribution. When comparisons are made between Appendix D Table D.1 (Actual Use) and Table D.2 (Utilization), actual use levels in the 1980s approached or exceeded 100 percent of permitted AUMs (not the current permittee), but utilization was well below the 50 percent maximum allowed. A detailed discussion of impacts to vegetation from livestock grazing can be found in Section 4.3 of the EA.
L006	Western Watersheds Project	Where BLM repeatedly emphasizes the high frequency of *Pleuraphis rigida* on the allotment, it neglects to explain the	See Appendix F for the ESD specific to this key area. This is a desert shrub community *(Ephedra nevadensis, Krameria*

		absence of sand dropseed and Indian ricegrass (also key species) in 2010. BLM fails to explain the disappearance of these key species, or why the absence of indicator perennial grasses doesn't alter the BLM's determination about the health of this allotment. It conflicts with the conclusions about rangeland health.	*grayi, etc.)*; however the sub-dominant portion of this community is and should be *Pleuraphis rigida.* Other perennial grasses could be present, but they would only comprise trace amounts. *Sporobolus* and *Boutelua* have been captured in miner amounts during various trend readings (2005 and 2010). Please also see response to Comment No. L004.
L007	Western Watersheds Project	The S&G briefly discusses the infestation of halogeton, but fails to discuss that the understory of the allotment is heavily infested with red brome. The S&G does not indicate that BLM is monitoring the extent of this infestation, and *B. rubens* does not appear in any of the data sets that are included in the S&G. The degree to which this species has infested the allotment is an integral part of the allotment's ecological health, and the discussion in the S&G is insufficient to demonstrate that the allotment is in proper condition without a thorough analysis of this species. Because this species carries fire, BLM should be especially concerned with livestock-induced disturbance facilitating the spread of this species on public lands. The forthcoming EA should contain a thorough analysis.	Red brome is present within this allotment. However, contrary to the comment, outside of heavily disturbed areas such as a few isolated roadsides, this species is not known to be heavily infested in this allotment. See Appendix D for vegetation monitoring data, and Table 3.2 for a discussion of invasive, non-native species within the allotment.
L008	Western Watersheds Project	The S&G discusses use of the allotment by bighorn sheep, but no specific evaluation of their habitat is included. Bighorn habitat is found along the northeastern edge of Lizard Point and the species has been known to use Lizard Spring. Ibid. The key area is apparently over a mile from these locations. No other observations are included to support BLM's conclusions about bighorn habitat. The forthcoming NEPA should discuss the social intolerance of bighorn sheep for livestock, and discuss whether the seasons of use currently permitted on the allotment conflict with lambing seasons.	Table 3.2 in the EA has been revised to add a discussion on bighorn sheep (*Ovis Canadensis nelsoni*) and their use (or lack of use) of the allotment. Historic sightings (Lizard Point) are in the adjacent allotments (Quail Canyon and Black Rock) where the topography becomes greater with steeper slopes and canyons. While the southern end of the allotment (the northeastern edge of Lizard Point) is considered suitable habitat for desert bighorn sheep, it is used on such an infrequent basis that AGFD did not recommend its inclusion in the Virgin Mountains Wildlife Habitat Area.
L009	Western Watersheds Project	The S&G reveals the allotment was recently affected by fire but only the map discloses that they key area remained unburned. The S&G says field observations were conducted on October 13, 2011, but the monitoring data are from 2010. There is no discussion of post-fire conditions in the key area. The technical recommendations to, "Provide the rest needed in this pasture for	This pasture was rested for the two years following the Plateau Fire (2012-2013). The majority of the burned area due to the Plateau Fire in this allotment is ridgetop with no available water for livestock. Livestock do not frequent this area due to these factors. During annual visits to the neighboring key area to conduct utilization, observations have been made in this burned area. According to these

		vegetative recovery from the 2011 Plateau Fire," is vague. Rather than base management on permittee preference, the BLM should be developing actual post-fire recovery parameters that must be met before livestock are allowed back on the allotment. The S&G also does not identify any specific monitoring that has been implemented upon which to base the determinations. Because the key area is outside of the burned area, it is unclear what data the BLM will be basing "recovery" on.	observations, as well as personal recent visits to the area (2018) by BLM resource specialists, the area has adequate ground cover consisting of native perennial grasses and forbs, and various young desert shrubs.
L010	Western Watersheds Project	The statements in the S&G about the fire-related livestock deferral are also confusing because it states that the permittee won't be using the BLM pasture in 2011/2012 except for "a couple of days" and that the BLM will meet with the permittee to discuss the plans for 2012/2013. It is unclear how this relates to the rotation schedule. Figure 1 should be amended to identify which years in the recent past have had longer rest periods in the rotation, and where the allotment is in 2012, as well as how this relates to the use and monitoring data the BLM provided.	See response to Comment No. L009.
L011	Western Watersheds Project	The S&G fails to identify the conditions of the xeroriparian areas/washes on the allotment. It appears there are a number of large washes on the allotment, and these areas provide important wildlife habitat and corridors. The S&G does not discuss the impacts livestock might be having on these areas. There are three water sources on or immediately adjacent to the BLM lands of the allotment, according to the map. The BLM should disclose the condition of these range developments (including a review of wildlife escape opportunities) and whether the source well for the range developments is affecting the groundwater or surface water levels of the wash.	Xeroriparian habitat is defined as areas that are "supported by intermittent or ephemeral stream flows that increase the amount of water available to plants beyond that available by direct rainfall. Xeroriparian habitats commonly contain the same plant communities as the adjacent upland vegetation, but have larger plants and denser growth due to the availability of water" (City of Tucson 2019). The Lizard Allotment, while it does contain some large washes, does not contain xeroriparian habitat. However, impacts to vegetation in washes from livestock grazing can be extrapolated from the evaluation of impacts to upland vegetation. The EA includes a detailed discussion on the impacts of livestock grazing on vegetation (see Section 4.3) and the impacts of livestock grazing on wildlife and wildlife habitat (see Section 4.4). This includes information on storage tank lids, wildlife escape ramps, and floating bird ladders to minimize mortality to wildlife from water developments.

			Please see also the responses to Comment Nos. WL020 and WL021 (above).
L012	Western Watersheds Project	The BLM fails to really explore whether the allotment is meeting the objectives of the AMP. For example, the AMP set 15-year goals for the allotment to maintain squirreltail and galleta grass and 78 and 75 per quadrat. Ibid. It is unclear how these measurements compare to the data reported in Appendix D, but squirreltail (Sitanion sp.) disappeared from the key area, and galleta grass decreased from its highest frequency in 1985. In neither case can frequency be considered "maintained." The AMP also set a goal of increasing live basal vegetation cover from 5 to 15 percent. The data reveal that the BLM has not met this goal and only reached 10 percent cover in 2010. There has not been a "steady improvement" as BLM claims. Additionally, the AMP goals identify a "sagebrush canopy." It is not clear what species this refers to, but the shrub canopy has also been diminishing. Thus, none of the AMP's objectives seems to have been met.	Live basal vegetation represents all vegetation including annuals. This can vary from readings depending on precipitation, as response by annuals to seasonal moisture is more immediate than perennials. A more reliable, long term parameter is exhibited in the trend of perennial desirable vegetation. Many of the native perennial grasses and shrubs at Key Area #1 have shown a consistent (10-25%) increase since the trend was established in 1982. See Appendix 3 for the Desired Plant Community (DPC) objectives for Lizard Allotment. The DPCs represent the capabilities of the ecological site (based on the ESD). Monitoring data shows that *Pleuraphis rigida* has been in excess of 45% composition since this trend was established in 1982. The DPC objective for this species is 23-45%. Other perennial grasses would comprise a trace of the composition, which is expected. This site is within an arid desert, specifically within the Mojave ecoregion. Establishment and retention of desired plants occurs slowly. There is an increase in both Ephedra and yucca; both are native plants and Ephedra is a key species, a desired forage of cattle. *Kramaria* fluctuates overtime, although it has remained relatively steady. An ESD may not reflect soil inclusions that occur within a site. These inclusions lead to natural variability within an ESD (see Appendix F for Ecological Site Description System R030XB223AZ). The Lizard Allotment is within the Mojave Desert ecological zone, so sagebrush (a Great Basin species) is not present, and is not expected to be present. See response below to Comment No. L013 for more information. Please see also response to Comment No. L004.
L013	Western Watersheds Project	The BLM appears to simply jettison the goals it did not reach in the AMP and to develop new ones (DPCs) based on what already occurs. (The S&G simply writes off goals pertaining to the existence and abundance of *Ambrosia* and *Sitanion* as inaccuracies.) In this way, the BLM is not	The Lizard, Wolfhole Lake, and Blake Pond AMP was signed in 1982. This document addressed a wide and diverse set of (three) allotments. It was the information that the Bureau had at the time. However, when covering allotments that range from Mojave Desert to Colorado

		setting "objectives" but "subjectives" based on pre-existing conditions. Therefore, "meeting" the objectives doesn't really indicate attainment of rangeland health, just attainment of the *status quo*, which may or may not reflect what a healthy landscape would look like. Where BLM does not meet its low expectations, as in the case of the shrub/tree and forb composition, it simply decides those objectives don't really matter enough to change grazing management (despite the fact that livestock influence and suppress shrubs/trees and forbs).	Plateau in a single document, the detail is lacking, i.e. "Sagebrush canopy" probably refers to the Wolfhole Lake Allotment or one of the Blake Pond Pastures, not the Lizard Allotment (see response to Comment No. L012 above). The Soil Survey of Shivwits Area, Arizona, Part of Mohave County was completed in 1993. This gives much more detailed soil and ESD information. Since the BLM uses the best data available for decision making, the AMP objectives were replaced with the DPC objectives. As is indicative of Key Area #1 in this allotment, a key species shrub, *Ephedra nevadensis*, which is highly palatable to cattle, has been increasing since the trend was established.
Comments on Preliminary EA			
EA001	Western Watersheds Project	The LHE and RHE from 2011 (Lizard) and 2013 (Wolfhole Lake), while outdated, indicate that Wolfhole Lake Allotment is not meeting nor making progress towards meeting standards for desired resource conditions because perennial grass composition is decreasing and shrub/tree composition is increasing. EA at 1. According to the Arizona Strip RMP, "[r]angelands should be achieving or making significant progress towards achieving the standards and to provide for proper nutrient cycling, hydrologic cycling, and energy flow. Guidelines direct the selection of grazing management practices and, where appropriate, livestock facilities to promote significant progress toward, or the attainment and maintenance of, the standards." EA at 2. The Wolfhole Lake Allotment is not meeting nor making progress towards Standard 3, and the result is a violation of the RMP. EA at 3, 13.	As commenter notes, land health evaluation reports were completed in 2011 (Lizard Allotment) and 2013 (Wolfhole Lake Allotment). Although new land health evaluation reports have not been prepared, the BLM has conducted long-term trend monitoring, composition data collection, inspections, and utilization monitoring on the allotments since the evaluation reports were completed, to update land health conditions and to evaluate whether the original determinations on whether the allotments were meeting land health standards were still valid. The subsequent monitoring confirmed the results of the land health evaluations (see Section 3.2.3 and Appendix D of this EA). Conifer and sagebrush encroachment into historic grasslands was determined to be the causal factor for Wolfhole Lake Allotment not meeting Standard 3. Text has been added to the EA to clarify this (see Sections 1.2 and 2.4). The vegetation treatments were proposed to address this encroachment in order to promote significant progress toward, or the attainment and maintenance of, the standards for rangeland health on the Wolfhole Lake Allotment. This action is in conformance with the Arizona Strip Field Office RMP.
EA002	Western Watersheds Project	Proposed vegetation treatments in the Wolfhole Lake Allotment include manual (lop and scatter), mechanical, and	"Adequate" in this context is used to describe areas where seeding in treatment units is not necessary as the understory

		chemical over approximately 6,836 acres. EA at 14. We are confused that the BLM states the understory for these acres to be treated are adequate, but that these same acres must be treated. EA at 14. Please explain whether and how the treatments proposed would decrease the now adequate understory and how long it will take for the understory to recover to its present, adequate, state after treatment. Especially concerning is how the vehicles/tractors used for mechanical treatment will impact the soil, the vegetation, and any wildlife present in the area or in underground burrows.	although sparse, is adequate to provide native seed and/or rhizome spread. Section 2.4.1 of the EA has been revised to clarify this.
EA003	Western Watersheds Project	Especially concerning is how the vehicles/tractors used for mechanical treatment will impact the soil, the vegetation, and any wildlife present in the area or in underground burrows.	Design features have been incorporated into the proposed action to reduce adverse impacts to soils (such as soil compaction), and minimize impacts to vegetation and wildlife (see Section 2.4.1). A detailed analysis of impacts to soils, vegetation, and wildlife from the vegetation treatments can be found in Chapter 4 of the EA.
EA004	Western Watersheds Project	Of the eight pastures in the Wolfhole Lake Allotment, only one will be treated at a time to "allow adequate rest for the treated pasture." EA at 14. Please describe how much time will pass between the end of treatment of one allotment and the beginning of treatment on another. If rest-rotation is practiced on the eight allotments and each treated allotment is to rest for two years following treatment, how many allotments will be out of the rotation schedule because they have been treated at one time? How will this impact the allotments that are available for the rotation schedule – will they be used more than they have been used in the past? If so, how will this impact the vegetation on those allotments?	The Wolfhole Lake Allotment currently has "four general use areas" (not eight pastures) – this was corrected to state that the proposed action would create three new pastures, which would result in a total of five pastures in the allotment – see Section 2.4.1.2. (The fifth "pasture" is in reality a small holding pasture used when gathering cattle.) Section 2.4.1.3 (Project Design Features) describes livestock grazing rest following treatment. Please note that treatments are proposed in only one allotment (Wolfhole Lake), and the rest-rotation connected with the proposed treatments is by pasture not allotment. Implementation of this project could take up to ten years to allow adequate rest after treatment and increase the understory of perennial grasses and forbs which have been reduced due to overstory competition from sagebrush and pinyon-juniper trees. Section 3.4.1 of the EA describes the livestock operator's current grazing rotation and potential flexibilities offered by neighboring allotments which the permittee uses.
EA005	Western Watersheds Project	If the goal of the vegetation treatments is to reduce pinyon and juniper, how does mechanical treatment facilitate this goal? Does the soil disturbance and physical	As described in Section 2.4.1.2 of the EA, "Mechanical treatments are designed to kill or reduce the cover of undesirable vegetation, and thus, encourage growth of

		disruption to the targeted plants actually reduce the amount of "undesired" vegetation? Or, does this mechanical action further the spread of these plants via seed dispersal? What actions are planned to ensure the goal of the treatment is not thwarted by the treatment itself?	desirable vegetation. Mechanical treatments involve the use of vehicles such as wheeled tractors, crawler-type tractors and specially designed vehicles with attached mulching/chipping implements that cut, uproot, or chop existing vegetation (i.e., trees and shrubs) over large areas of thick vegetation and scatter the debris (mulch) on site. The selection of a particular mechanical method would be based on the characteristics of the vegetation, seedbed preparation and revegetation needs, topography and terrain, soil characteristics, and weather conditions." Project design features were developed to reduce or eliminate adverse impacts from specific project activities such as use of mechanical equipment. Design features have been developed to reduce invasive vegetation and soil compaction/erosion (see Section 2.4.1.3). The BLM would monitor the vegetation treatments to ensure they are implemented as designed and to determine their effectiveness in achieving desired outcomes, and the effectiveness of project design features. In addition, monitoring of treatment implementation would occur to ensure that contractors/project workers adhere to project specifications. All monitoring would be in accordance with BLM monitoring protocols and would be subject to funding and staff availability. A section on monitoring (Section 2.4.1.4) was added to the EA.
EA006	Western Watersheds Project	There is no explanation as to how the chemical treatments will be used. The only explanation refers to the BLM's programmatic EIS from 2017 that covers 17 Western states, is not specific to this allotment or project area in any way, provides no explanation about any aspect of the treatments to be implement on this allotment for this project. EA at 15. The only thing that is clear from the explanation of chemical treatments is all chemical application methods are provided for and the impacts to non-target animals and plants have not been disclosed nor analyzed as to this project area or the species within it.	Additional information concerning the use of herbicides in the Wolfhole Lake Allotment was added to Section 2.4.1 of the EA. Please note that use of Tebuthiuron was approved for use on the Arizona Strip under the *Arizona Strip District Herbicidal Application Plan for the Control and Eradication of Noxious and Invasive Species* in 2017. No additional mitigation has been deemed necessary for the current proposed project.

EA007	Western Watersheds Project	For seeding, the BLM again acknowledges that for much of the project area the understory is adequate, begging the question – why is vegetation treatment being proposed, especially for areas where adequate understory is present? EA at 15. The statement that the understory could be encroached upon by the woody vegetation is presented without support in the record. Please provide a reference for this statement.	Section 3.4.2 of the EA provides a detailed discussion on vegetation in the Lizard and Wolfhole Lake Allotments. Ecological Site Descriptions (ESD) base potential community vegetation primarily on site soils, which incorporates slope, aspect, parent material, and other abiotic and biotic factors. The dominant ecological site proposed for treatments is the Loamy Upland 10-14". This site, based on soils, would be a grass dominated community with shrubs and trees as a minor to moderate component. This ESD has been included in Appendix F for reference. See also response to Comment No. EA002.
EA008	Western Watersheds Project	The structural improvements proposed under Alternative B are significant. As stated in the EA, there are no division fences in the 13,338 acre allotment other than fencing related to a 150 acre pasture. EA at 16. The 3 miles of proposed fencing will fragment a currently unfragmented landscape. It also seems that the proposed fencing creates a need for water development that does not currently exist. EA at 16.	The range improvements proposed in this EA would improve livestock distribution, as well as allow for a rotation with periodic rest throughout the allotment to manage and enhance vegetation communities within the Wolfhole Lake Allotment. This would provide the necessary forage for livestock and forage and cover for healthy, self-sustaining wildlife populations, and would promote significant progress toward, or the attainment and maintenance of, the standards for rangeland health on the Wolfhole Lake Allotment (see EA Section 1.2). A discussion on impacts of the less than three miles of new fencing on mule deer has been added to the EA (see Section 4.4.2.1). In summary, the proposed fences would be designed to meet wildlife specifications. This includes spacing between the top two strands being at least 12 inches, the bottom strand being smooth (no barbed) wire, and the bottom strand being at least 16 inches above the ground. This would reduce deer mortality and reduce impacts to deer movement. Commenter is correct that the pasture creation would require new waters – see Section 2.4.2.2.
EA009	Western Watersheds Project	The analysis of impacts from the proposed water developments is limited to a description of the pipeline, trenching, and additional fencing needed to keep deer and pronghorn out of the water developments. EA at 16. However, there are other impacts associated with water	Comment noted and further addressed in Section 4.4.2. Effects to wildlife from other activities are addressed in the Section 4.6.3 (Cumulative Impacts). Most of the photos submitted by commenter, including the photos of range

		developments that should have been, and now must be, analyzed before this project can move forward. For example, wildlife are directly negatively impacted by water developments from crushing and displacement during construction, and drowning after the tanks are filled. Wildlife are indirectly impacted when people leave trash at the water developments or use tanks a target shooting backdrops. Please see Appendix C, WWP photos of trash and other impacts at water developments. Notably, our photos of range "improvements" for the allotment look very different from those found in Appendix 1 of the EA.	improvements, are not of either of the allotments addressed in this EA. It is possible that one or two of the photos depicting trash are of the Arizona State managed portions of the Lizard Allotment. No range improvements are proposed for that allotment. Trash dumping is a law enforcement issue, which is beyond the scope of this EA. The current permittee has a good history of maintaining range improvements on the allotments.
EA010	Western Watersheds Project	It is improper for the BLM to claim that wildlife will benefit from the water developments while the BLM's plan for some of those same water developments is to fence wildlife out. EA at 16-17. Further, the BLM has failed to analyze the impacts to prey species that can be negatively impacted when predator species are benefited by artificial waters.	Wildlife exclosure fencing would be around storage tanks/pond to reduce wildlife drowning. This has been clarified in the EA, along with stating that wildlife would have access to troughs for drinking. A full discussion of potential impacts to wildlife can be found in Section 4.4.2, including impacts of water developments on wildlife resulting from predation (which was added based upon this comment). The analysis determined that wildlife species would benefit from an increase in available water within the allotment.
EA011	Western Watersheds Project	For all alternatives, the permittee could substitute up to three domestic horses for an AUM on the Lizard Allotment. EA at 7. This is a bit confusing. Does this mean 3 horses per AUM, or 1 horse per AUM for up to three AUMs? The EA indicates horse and cattle AUMs are equivalent so the language should be clarified to indicate the permittee may substitute 1 horse for 1 AUM, instead of the misleading language. Further, is the public to believe that the permittee will be allowed to keep the total number of AUMs for cattle and then, when horses are needed on the allotment to manage those cattle, some of those cattle will be removed before the horses are brought on to the allotment to manage the cattle? Please explain how this will work.	Comment noted – this was clarified in Section 2.2. Cattle and horse AUMs are equivalent – one cow for one month is one AUM; one horse for one month is one AUM. In addition, an analysis on the differences between how cattle and horses graze plants, due to differences in the anatomy of their mouths has been added to Section 4.3.1. This addition did not change the overall analysis of impacts to vegetation from what was presented in the preliminary EA.
EA012	Western Watersheds Project	Also common to all alternatives is the transfer of the permits for the Lizard and Wolfhole Lake allotments to a new entity, from the Bridlebit Three Cattle Company, which controls the base water, to the Esplin Family Trust. EA at 7. We note that	The transfer of these two allotments was included in the EA that was submitted for public comment. However, since a permit transfer can be categorically excluded, the review of this administrative action was completed through DOI-BLM-AZ-A010-

		the requirements for grazing permits are as follows: Any U.S. citizen or validly licensed business can apply for a BLM grazing permit or lease. To do so, one must either: □Buy or control private property known as base property (property that has been legally recognized by the BLM as having preference for the use of public land grazing privileges), or □Acquire property that has the capability to serve as base property and then apply to the BLM to transfer the preference for grazing privileges from an existing base property to the acquired property (this would become the new base property). It is unclear whether the Esplin Family Trust has base property, or will acquire base property, so that they may validly apply for a grazing permit. Please clarify. WWP is concerned that the transfer of the permit from Bridlebit Three Cattle Company to the Esplin Family Trust, common to all three action alternatives, is addressed in a single paragraph on page 7 of the EA and no information about the proposed new permittee is provided. Why is the permit transfer being sought? Is the Esplin Family Trust connected financially to the Bridlebit Three Cattle Company?	2019-0011-CX, and is no longer part of the EA analysis. Please note that the Esplin Family Trust was determined to be a qualified transferee.
EA013	Western Watersheds Project	Please identify which non-native seed species will be used following mechanical treatments as part of Alternative B and describe in detail which management objectives are met by seeding with non-native species. EA at 57. We strongly recommend that only native seed species be utilized.	The exact seed mix (including any non-native seed) would be based on the specific location of the seeding action. As described in Section 2.4.1.2, seed mixes would primarily be composed of native species, although non-native species may be used to meet restoration objectives. Seed selection would be based on site potential and objectives. Removing the option to use non-native seed in certain treatment areas would conflict with direction contained in the Arizona Strip Field Office RMP. The RMP states: "The use and perpetuation of native species will be emphasized. However, when restoring or rehabilitating disturbed or degraded rangelands, non-intrusive, non-native plant species may be used where native species: (1) are not available; (2) are not economically feasible; (3) cannot achieve desired conditions or other ecological objectives as well as non-native species; and/or (4) cannot compete with already established non-native species." Seed

			selection would be based on ecological site descriptions and current understory composition. For some sites, a combination of both native and non-native seed ensures the best success in out-competing aggressive non-native species, including cheatgrass.
EA014	Western Watersheds Project	The EA lacks analysis of important issues and these issues should be re-evaluated: o Air Quality (EA at 26) – this issue was determined to be NI, with the rationale that the air quality in the area is generally good and that livestock cause fugitive dust only where they congregate at waters, making the dust impacts localized and temporary. This analysis fails to acknowledge that livestock grazing removes vegetation from large swaths of the landscape, hoof action disturbs desert soil crusts, and the potential for fugitive dust related to livestock grazing covers the entire allotment acreage.2 Therefore, air quality impacts should have been analyzed in the EA. Notably, the BLM does recognize the impacts livestock grazing has on soils and vegetation. EA at 3-21. o Water Quality (EA at 28) – this issue was determined to be NI, with the rationale that the analysis in the EA indicates that livestock are not altering water quality at this time. However, there does not appear to be an adequate analysis of the impacts to water quantity from the proposed new water developments. o Woodland/Forestry (EA at 29) – this issue was determined to be NI, with the rationale that livestock grazing will have no impact on fuelwood resources in the EA. However, this project includes significant vegetation management on pinyon and juniper which are fuelwoods. Therefore, the impacts of the action alternatives should have included how this project will affect fuelwood resources. o Recreation (EA at 29) – this issue was determined to be NI, but this is likely because the EA fails to discuss how livestock grazing displaces those public lands visitors who are put off by livestock, cow dung, and landscapes degraded by livestock. Additionally, fencing can make the public feel they are not allowed	The direct, indirect, and cumulative impacts of the alternatives were analyzed in the EA (see Chapter 4). This includes past and proposed vegetation treatments. The cited resources were evaluated by a specialist for that resource, and determinations on impacts were made based on experience with similar projects and specific locations of proposals. Water Quality/Quantity: Water sampling is conducted by District specialists and the water is analyzed for various toxins. Water quantity is managed by the Arizona Department of Water Resources (ADWR). ADWR monitors and permits development of surface waters. Table 3.2 has been revised to clarify this. Table 3.2 does address woodland/forestry resources, acknowledging that pinyon-juniper woodlands would be treated. Table 3.2 includes the following text: "Continued livestock use would not affect the availability of, or access to, these resources. An economic assessment of the value of woodland/forestry products (fuel wood, timber, posts, etc.) within the treatment units has not been conducted. However, it is likely that the economic value of these resources is limited based on the remoteness of the area (i.e., distance from populated areas). For detailed discussion/analysis on impacts to pinyon-juniper woodlands, see the Vegetation sections of this EA." See also response to Comment No. WL014. Table 3.2 has been revised to address impacts to recreation users from grazing of livestock, as well as project implementation and potential displacement after construction of the water developments. The BLM resource specialist considered impacts on visual resources from implementation of the action alternatives

		access to certain areas. These issues related to recreation should be analyzed. o Visual Resources (EA at 29) – this issue was determined to be NI, but the EA fails to acknowledge that removal of vegetation on thousands of acres of land by livestock, as well as the concomitant fencing and roads/two tracks, do have an impact on visual resources.	and determined that these actions would continue to meet the designated VRM class objectives. Table 3.2 has been revised to address visual impacts from the proposed range improvements.
EA015	Western Watersheds Project	The Wolfhole Lake Allotment is categorized as an "improve" status, which means the present range condition is unsatisfactory, the allotment is not producing to its potential, there are serious resource-use conflicts or controversy, and present management appears unsatisfactory. EA at 31. This allotment is within the Great Basin Ecological Zone. EA at 32. While this allotment is approved for yearlong grazing, the EA indicates it is used only as a stopover when the herd is trailing to the Blake Pond Allotment. EA at 32. This allotment is reportedly used for only three months out of the year. The EA indicates that the Wolfhole Lake Allotment has a vegetation community that is not consistent with historical trends. EA at 34. However, there is no discussion as to the potential causes of this shift and climate change is not adequately discussed (actually, it is not discussed at all). The BLM must answer the question: in light of climate change, are historic trends applicable to this area?	An allotment is categorized as "improve" for any of the reasons cited by commenter, as well as that there are "opportunities exist for positive economic return from public investments" (BLM 2008a), which is not cited by the commenter. The proposed treatments should provide a substantial return for soil health, improved wildlife habitat, reliable water resources, and increased forage for both livestock and wildlife by reducing erosion and increasing desirable ground cover and diversity of understory plant species. As evidence to the potential benefit to both game and non-game wildlife, one of the main proponents and cooperators for the proposed vegetation treatments and range improvements is AGFD. Based on existing monitoring on neighboring allotments with vegetation treatments, it appears likely that understory species will be restored by reducing overstory competition. Table 3.2 has been revised to add a discussion on climate change and greenhouse gas emissions. See also the response to Comment No. WL003.
EA016	Western Watersheds Project	Mule deer are described as present throughout both allotments and have a preference for the type of habitat found in the Wolfhole Lake Allotment (sagebrush and pinyon-juniper). This is the same area that the BLM seeks to alter through vegetation management. EA at 36. The deer are present throughout the allotments even with "few perennial water sources." EA at 37. It would appear, from the information in the EA, the Wolfhole Lake Allotment is suitable for wildlife at this time and any proposed changes are likely to be detrimental. However, the analysis of the impacts to wildlife are secondary to the analysis and plans to make the allotment more suitable to livestock.	Section 4.4.2.1 discusses impacts to mule deer from the proposed vegetation treatments. This analysis acknowledges there would be impacts (both beneficial and adverse) to deer. The proposed treatments are based on vegetation treatment studies that are specifically designed for wildlife habitat improvement in pinyon juniper communities. Additional text has been added to Section 4.4.2.1 to discuss anticipated beneficial effects to mule deer from the proposed treatments. Please note that the purpose of the proposed vegetation treatments is to promote significant progress toward, or the attainment and maintenance of, the standards for rangeland health on the

		Interestingly, the impacts of Alternative B on the Wolfhole Lake Allotment are described as beneficial to livestock production – increased cow weight, increased calf crops, increased weaning weights, and the ability to use this allotment to its full preference. EA at 47. Given that this allotment seems to be functioning well as wildlife habitat, the BLM should have weighed the benefits to the livestock permittee against the harms to the wildlife community more carefully and given larger consideration to protecting a functioning ecosystem.	Wolfhole Lake Allotment (see Section 1.2), which benefits wildlife as well as other resources. The allotment was determined to not meet Land Health Standard 3-Upland Vegetation Communities due to PJ and sagebrush encroachment in the absence of natural occurring fire return intervals. This is discussed in Section 3.2.3.
EA017	Western Watersheds Project	The impacts of Alternative C, reflecting and codifying current actual use, are described as having a "substantial economic impact on the grazing operator." EA at 48. Please explain how continuing to operate as the permittee has been operating will have any economic impact on the permittee, it would simply continue the status quo and there is no indication the grazing operator is suffering economically.	Comment noted and text in the EA has been clarified – see Section 4.2.3.
EA018	Western Watersheds Project	For the impacts analysis regarding vegetation, there are multiple statements that are made without reference to any scientific report or support. The EA indicates that livestock grazing can directly affect vegetation by reducing plant vigor, eliminating desirable forage species, increasing soil instability and erosion, reducing water quality and quantity, and damaging plants through trampling. EA at 49. But, this EA also states that "[r]ange plants evolved to withstand grazing and can withstand a heavy grazing event if done in the right season." EA at 50. Similarly, the EA indicates that dormant plants are "affected little" by grazing. Id. Please provide a reference for these statements. We are confused by the statement that "[l]ate winter/spring grazing defers use during the growing season for warm season plants, while summer grazing defers use during the growing season for cool season plants." EA at 50. Please explain how the livestock will know which plants to graze on – the warm or cool season plants – if the plants occur in the same pasture. Please also provide a reference for this statement.	Citations have been added to Section 4.3 text. Deferment and rest allow all plants periods to recover from grazing. See 4.3 Vegetation EA. See reference in same section. The season of deferment may favor rest for either warm or cool season grasses, depending on when it occurs, as explained in Section 4.3. This is based on grass plant physiology, not grass identification by livestock. Seasonal deferment allows use at different times of the year in a given pasture, thus alternating rest or deferment for cool and warm season grasses. Livestock choose the most palatable grass that is available to them, i.e., new foliage is more palatable than more mature foliage (Trlica 2013).

EA019	Western Watersheds Project	Generally, the analysis indicates that because livestock grazing has been occurring on the allotments for many years, continued grazing will be acceptable and that "properly managed livestock grazing is designed to cause minimal impacts [,]" therefore, the BLM seems to believe there really aren't any impacts from any of the alternatives. EA at 25, 50, 54, 55, 56, 57. While this EA appears to indicate that livestock grazing has no impact on bats, birds, and other wildlife, this is known to be untrue. The BLM has failed to analyze the impacts to the prey species or food sources for these animals, rendering the EA inadequate, and possibly explaining the statements that livestock grazing has minimal impacts.	The EA analysis does not state that there would be no impacts to wildlife, but instead that by continuing present management there would be minimal impacts (as quoted in the comment). Section 4.4.1.1 describes why the wildlife biologist reached this conclusion – in summary, rotating the season of use among pastures provides periodic rest for vegetation to help maintain plant vigor. Section 4.3.1 discusses in detail anticipated impacts to vegetation (i.e., wildlife habitat) from livestock grazing. See also response to Comment No. EA018.
EA020	Western Watersheds Project	There is insufficient evaluation of the need for vegetation treatment in the Wolfhole Lake Allotment given that "[p]inyon-juniper forests provide important habitat components for many Birds of Conservation Concern including the gray vireo, juniper titmouse, and pinyon jay. Paulin et al. (1997) concluded that mature pinyon-juniper sites (200-400 years old) with few understory plants ranked second in total individual birds and third in diversity of seven upland forest types. Pinyon-juniper also had the highest percentage of obligate and semi-obligate species in the same study. O'meara et al. (1981) also found that breeding bird densities were more than double in unchained vs. chained areas in northwest Colorado pinyon-juniper woodlands." EA at 59.	The proposed action includes project design features for retention of large trees and snags in treatment areas, as well as other project design features specifically developed to minimize impacts to wildlife (see Sections 2.4 and 2.4.1.3). Please note that no chaining is proposed as a vegetation treatment tool in this EA. The proposed action would leave over half of the allotment untreated, providing a mosaic of openings and untreated pinyon-juniper woodlands. Approximately 25% of proposed treatment units would be left untreated in response to resource concerns, including wildlife. Pre-treatment surveys would establish non-treatment areas. Treatments would result in more structural diversity (i.e., a mosaic of trees and openings), by retaining a mix of tree canopy cover with a variety of different tree height structures and age classes. Open areas would be created that would see an increase in forage plants through seeding or natural establishment. This would also create more diversity of habitats across the Wolfhole Lake Allotment. See also response to Comment No. 016.
EA021	Western Watersheds Project	The excuse for vegetation management on the Wolfhole Lake Allotment is that the allotment is not meeting Arizona Rangeland Health Standard 3, which states:	Prevey et al. 2010 is a study specific to southern Idaho. However, cheatgrass is an invasive species known to the Arizona Strip. The study cites that communities with intact native perennial understories are much more resistant to invasion by

		Standard 3: Desired Resource Conditions - Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained. Criteria for meeting Standard 3: Upland and riparian-wetland plant communities meet desired plant community objectives. Plant community objectives are determined with consideration for all multiple uses. Objectives also address native species, and the requirements of the Taylor Grazing Act, Federal Land Policy and Management Act, Endangered Species Act, Clean Water Act, and appropriate laws, regulations, and policies. The Wolfhole Lake Allotment is not meeting this standard "primarily due to sagebrush encroachment, as well as pinyon and juniper tree encroachment." EA at 3. Further, "[a]ction is necessary to manage and enhance vegetation communities within the Wolfhole Lake Allotment to provide the necessary forage for livestock and forage and cover for healthy, self-sustaining wildlife populations." EA at 3. We also see, from information in the EA, that deer populations on this allotment are doing well and Birds of Conservation Concern do very well, perhaps best, in mature pinyon-juniper sites with few understory plants. Pinyon, juniper, and sagebrush are species native to this allotment. In terms of sagebrush communities, Prevey et. al 2010, found that exotic plants increased and native plants decreased when sagebrush was removed. This same paper provides extensive evidence that the removal of sagebrush to increase forage for cattle has deleterious abundance and health effects on native vegetation communities. It reports increases in cheatgrass in areas where shrubs are removed. Id. Therefore, it seems the only actual need for vegetation treatment is to increase the potential for livestock grazing forage on the allotment, in spite of the impacts to deer, birds, or native vegetation.	cheatgrass. As discussed in the proposed action, the majority of the proposed treatment units would not require seeding because they have an understory that would likely respond favorably to overstory removal and thinning. There is a threshold at which increases in density of pinyon-juniper in the overstory causes a decrease or even eliminates understory plants including native perennial grasses and forbs. In portions of the allotment, this threshold has been crossed in portions of the Wolfhole Lake Allotment. Selective reduction of sagebrush and pinyon-juniper can help increase desirable perennial forbs and grasses and enhance site resilience to disturbance and resistance to wildfire and invasive non-native annual grasses and forbs (Chambers 2014) – see Section 2.4.1. The areas with sparse understory have been proposed for seeding; seed mixes would primarily be composed of native species, although non-native species may be used to meet restoration objectives (as provided for in the Arizona Strip Field Office RMP) – see Section 2.4.1.2. We acknowledge that studies have shown that short-term increases in site soil moisture from overstory plant removal favored the establishment of invasive annual grass species such as cheatgrass (Roundy et al. 2014; Coultrap et al. 2008). However, annual weeds often decrease over a period of years as native perennials are established on the site (USGS 2007); seeding treated areas, where necessary, also mitigates the invasion of these areas by annual weeds (Bybee 2013). Section 3.4.3.1 describes the mule deer population across the entire Unit 13B area, not specifically in the Wolfhole Lake Allotment, as "exist[ing] at low densities: in some areas less than 1 per square mile. The population, while not at levels attained in the 1970s, has shown signs of growth in recent years." The highest concentrations of mule deer in this unit are the Black Rock Mountain area and southern portions of Grand Canyon-Parashant National Monument (AGFD & BLM 2015), both of which are outside this allotment, although Black Rock Mountain

			is adjacent to the west side of the allotment. Section 4.4.2.2 states that "Treatments would increase vegetative and structural diversity within the units and allow opportunities for a variety of nesting and foraging habitat." Due to large amounts of the allotment remaining untreated, and project design features developed to minimize impacts to wildlife, adequate untreated habitat on the allotment would remain to allow for successful breeding and foraging for species dependent on persistent pinyon-juniper woodlands. This would include the Birds of Conservation Concern. See also response to Comment Nos. EA016 and EA020.
EA022	Western Watersheds Project	Desired Plant Community (DPC) objectives are used as an indicator of ecosystem function and rangeland health except when a change in existing vegetation is physically, biologically, or economically impractical on ecological sites. For the Wolfhole Lake Allotment it is likely that climate change has caused the change in historic trend for the vegetation type and, therefore, it is likely that a change in existing vegetation is biologically impossible. Long-term, repeated treatments are likely to be economically impractical. Unfortunately, climate change is not mentioned in the EA for this project. Please note that we asked the BLM to address issues of climate change as related to livestock grazing in our April 2013 comments, on page 2, and we noted that Secretarial Order 3289 requires such analysis.	Please see response to Comment Nos. WL003 and EA015.
EA023	Western Watersheds Project	Requirements found in the RMP are repeated in Appendix 2 of the EA: "MA-VM-21: Vegetation treatments can be used in the Great Basin Ecological Zone to enhance vegetative diversity, restore native plant communities, maintain or increase wildlife habitat, and reduce or eliminate hazardous fuels. Treatment priority areas will be where juniper canopy cover exceeds 40%, perennial grasses and forbs are less than 5%, and bare ground exceeds 50%. MA-VM-22: Treatment preferences will be to use a combination of wildland fire, fire use,	In response to this comment, the EA was revised to address consideration of using fire as a treatment method. Section 2.7.1 states (in part) that "This option was considered but eliminated due the risk for introduction and proliferation of cheatgrass associated with prescribed fire, particular at lower elevations (which include portions of the treatment area). Based on experience with wildfire in pinyon-juniper communities, and literature regarding annual grass expansion associated with wildfire or prescribed fire, it was determined this

		prescribed fire, mechanical, and chemical methods." We are curious why passive restoration and/or fire were not included as vegetation treatment options for the Wolfhole Lake Allotment, especially because the absence of fire is listed as one of (actually, the only) reason the allotment is not meeting DPC objectives. EA at 4, 25, 63, 65. The most efficient and economically viable course of action would be to cease fire exclusion efforts and let nature take its course. Please explain why this was not considered as an option. The EA indicates that more than 30,000 acres of the Wolfhole Lake Allotment have been treated, either with mechanical or chemical treatments. EA at 68. Yet there remains a need to continue treatment and fire has not been considered an option despite the fact that the lack of fire is the known cause of the "problem." Please note that we raised this issue in our April 2013 comments as well and our concerns have not been addressed. We are also curious as to which pastures have juniper cover that exceeds 40 percent, perennial grasses and forbs are less than 5 percent, and bare ground exceeds 50 percent. Notably, the entire allotment consists of less than 40 percent pinyon-juniper. The maps found in Appendix 1 do not provide this information. Please provide us with information about which pastures include pinyon-juniper that exceeds 40 percent and where perennial grasses and forbs account for less than 5 percent.	treatment method would not meet the purpose and need of enhancing vegetation communities within the Wolfhole Lake Allotment."
EA024	Western Watersheds Project	We are concerned about the proposal to use chemical applications and the effects on non-target plant and animal species. Non-selective herbicides can kill many species of native vegetation: sagebrush, piñon pine, juniper, four-wing saltbush, cliffrose, ephedra, and perennial grasses. Some of these species provide important food, shelter, and nesting sites for wildlife. The herbicides also have effects on wildlife communities, including arthropods and other insects whose place on the web of life is poorly understand but deserves respect. The EA fails to disclose the chemicals to be used and the potential consequences to native	Please see response to Comment No. EA006.

		ecosystems that such chemicals may have. The EA should have disclosed the types and abundance of non-target vegetative species present in each of the proposed treatment areas and the degree to which they will be reduced by the proposed herbicide applications. The oversight of these important issues renders the EA invalid and precludes a Finding of No Significant Impact.	
EA025	Western Watersheds Project	In our April 2013 comments we noted that the BLM found the Wolfhole Lake Allotment "at risk" in the LHE and at that time BLM identified a need for reductions in use and changes in season of use. These recommendations do not appear in the current EA and range of alternatives except for the "no grazing" alternative. Notably, the recommended changes and the need for those changes also do not appear in the current EA, but there is no explanation as to why or how the conditions on the allotment have changed. It remains our position that the "no grazing" alternative is the most expeditious way to achieve the land health standards.	Contrary to the comment, the EA considers two alternatives that would reduce livestock numbers on the Wolfhole Lake Allotment: Alternative C (an 82% reduction) and Alternative D (no grazing). Chapter 4 of the EA includes a detailed discussion of the impacts to vegetation from all of the alternatives, including a discussion on whether the alternatives would result in the Wolfhole Lake Allotment making progress toward meeting Arizona Rangeland Health Standard 3.
EA026	Western Watersheds Project	Predator management is not discussed in the EA. Please note that we specifically asked that this issue be analyzed in our April 2013 comments. No rationale is provided as to why this important issue was not addressed.	In response to this comment, the following text was added to Section 4.6.3 concerning predator management: "AGFD issues hunting permits, including permits for predator species. The BLM has no specific information concerning permits or additional predator control in the areas addressed in this EA. See also response to Comment No. 010.
EA027	Western Watersheds Project	Finally, where FLPMA requires that goals and objectives for public lands be established by law as guidelines for public land use planning, and that management is on the basis of multiple use and sustained yield, it adds, "unless otherwise specified by law." §102(a)(7). And "multiple use" is specifically defined in the statute as, in part, "making the most judicious use of the land for some or all of these resources...the use of some land for less than all of the resources... with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output." §103(c). Simply because the overarching	Comment noted. The EA has been revised, as appropriate, to address all comments submitted.

		land management plan describes these allotments as “available” for grazing doesn’t preclude the agency from taking a hard look at the balance of uses at the site-specific level. Therefore, Western Watersheds Project encourages the BLM to revise the existing environmental analysis to correct the deficiencies we have identified above. We look forward to reviewing the next step in this NEPA process for this project.	
EA028	Barry Bundy	I am in favor of Alternative B which is to issue a 10 year grazing permit along with vegetation treatments and range improvements. I have seen the type of improvements that could be done on this allotment and they would be a huge benefit for livestock but also wildlife as well.	Comment noted.

Appendix H – Rangeland Health Descriptions

RANGELAND HEALTH STANDARDS DETERMINATION

Site/Area: Wolfhole Lake Allotment **BLM Acres:** 12,590

Compliance with Rangeland Health Standards:

Standard	Standard Met?	Progress Towards Meeting?	**Rationale:** *(Summarize the evidence and indicators used to reach conclusions regarding meeting, not meeting and the progress towards meeting each Standard.)*
# 1 – Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site)	Yes	Not applicable	A summary of field observations indicate that the majority of soil/site stability indicators showed a "none to slight" departure from expected ecological conditions.
# 2 – Riparian and wetland areas are in properly functioning condition	Not applicable	Not applicable	None on BLM lands. There are no riparian/wetland areas within this allotment since Oak Spring and Wolfhole Spring meet the exemption criteria for Standard 2 (Riparian/Wetland Sites).
# 3 – Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.	No	No	It has been determined the allotment is not meeting Standard #3 for desired resource conditions – objectives for ground cover, forbs and trees are being met on both key area sites. However, perennial grass and shrub functional groups do not meet the current Desired Plant Community objectives, nor are they progressing towards meeting them. The ecological succession in the absence of disturbance (fire, etc.) has moved the majority of the allotment from a grass dominated ecological site to a shrub dominated site. Livestock are not identified as the causal factor for the allotment not meeting this standard.

Determination Summary

Based on my review of the Assessment Team's recommendation, Evaluation of Rangeland Health Standards and other relevant information, and as indicated in this document I have determined that the Wolfhole Lake Allotment does not meets Arizona's Standards for Rangeland Health, particularly Standard 3. There is no indication that current grazing practices are the causal factor for non-attainment.

Signature: Lorraine M. Christian **Date:** July 12, 2019

Title: **Arizona Strip Field Manager**

RANGELAND HEALTH STANDARDS DETERMINATION

Site/Area: Lizard Allotment **BLM Acres:** 4,198

Compliance with Rangeland Health Standards:

Standard	Standard Met?	Progress Towards Meeting?	Rationale: *(Summarize the evidence and indicators used to reach conclusions regarding meeting, not meeting and the progress towards meeting each Standard.)*
# 1 – Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site)	Yes	Not applicable	A summary of field observations indicate that the majority of soil/site stability indicators showed a "none to slight" departure from expected ecological conditions.
# 2 – Riparian and wetland areas are in properly functioning condition	Not applicable	Not applicable	None on BLM Lands within the allotment.
# 3 – Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.	Yes	Not applicable	A summary of field observations indicate that the majority of biotic integrity indicators showed a "none to slight" to "moderate" departure from expected ecological conditions.

Determination Summary

Based on my review of the Assessment Team's recommendation, Evaluation of Rangeland Health Standards and other relevant information, and as indicated in this document, I have determined that the Lizard Allotment meets Arizona's Standards for Rangeland Health and that current grazing practices are in conformance with Arizona's Guidelines for Grazing Management. While DPC objectives are partially being met in the Lizard Allotment, DPCs are a management objective, which may include managing for various seral stages to meet management objectives. This differs from rangeland health, which is an indicator of ecological status or functionality. The Lizard Allotment is meeting Rangeland Health Standards as it is ecologically stable and functional based on the vegetation communities and soil conditions throughout the allotment.

Signature: Lorraine M. Christian

Title: Arizona Strip Field Manager

Date: July 12, 2019